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CONTENTS

	PAGE
Council Officers and Directors.....	3
Annual Meeting of Members.....	7
General Session	47
Annual Banquet	75
Safety in the Small Plant.....	97
Industrial Safety Supervisors in Small Communities.....	121
Group Plant Safety Supervisors Session.....	143
General Round Table.....	169
Fire Prevention Session	197
Health Service Division.....	233
A. B. C. Sessions.....	289
Public Speaking Class.....	333
A. S. S. E.—Engineering Section.....	361
Automotive Section	421
Power Press and Automotive Joint Session.....	477
Cement Section	501
Cement and Quarry Joint Session.....	529
Cement, Quarry and Mining Joint Luncheon.....	557
Chemical Section	565
Construction Section	645
Electric Railway Section.....	693
Public Utilities and Electric Railway Luncheon.....	773
Employees' Benefit Associations Section.....	781
Employees' Publication Section.....	837
Employees' Publication and Benefit Association Luncheon.....	907
Food Section	913
Index	963

NOTE

Volume III of these Transactions, containing the Public Safety and Home Safety Sessions, is being mailed automatically to certain members of the National Safety Council who are believed to be interested in the subject. Any other member of the Council may also receive a copy of this Volume III without charge by requesting it.

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*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Annual Meeting of Members

Monday, September 26, 1927

WALTER G. KING, Chairman
President, National Safety Council

The Annual Meeting of the Members of the National Safety Council at the Sixteenth Annual Safety Congress, was called to order at 10 o'clock by the President, Walter G. King, American Optical Company.

PRESIDENT KING: The Sixteenth Annual Meeting of the National Safety Council will please come to order.

Our deliberations will be opened with prayer by the Reverend Rufus A. White, of Chicago.

REVEREND RUFUS A. WHITE: Almighty God, assembled in this great and important convention, we are moved to thank Thee for our great nation and express before Thee at the beginning of our deliberations our great love for it.

Today we are renewedly proud of its achievements, we are full of hope for its future. And here today by the grace of our heroic dead under American skies, by our youthful heroes who sleep today amidst the poppies of Flanders and where the white crosses are caressed by the French sunshine and moistened with the French rains that fall like tears from French skies, may we pledge ourselves anew to this great land of ours and bow with renewed adoration and determination before the beauty and significance of our great national banner.

We are impressed today, O God, deeply impressed by this great convention. We are appalled by the necessity of this gathering. We live in a most marvelous world; the beauty of it has been ever a challenge to human emotions, and the concealed mysteries and forces of it are a daily challenge to the human mind, and man has met this challenge. One after another he has unlocked the doors of light to concealed forces; and from the hidden resources of the world he has forged new weapons whereby other great achievements and victories might prevail in the struggle of man for predominance over the forces of the world, and for the establishment of greater and nobler civilization. But we are impressed today with the great and sometimes ghastly fact that achievements of this kind bring with them their disadvantage and that death sometimes follows in the footsteps of industrial and commercial success.

We are impressed with the fact that man with his genius and his determination has unleashed forces over which we now have no complete control. So it happens today that men from all over this great land of ours have gathered here that they may consult together as to how these great unleashed forces which bring with them tremendous advantages, and yet which scatter here and there death and wounds and despair, may be controlled and harnessed and made to serve without danger and disadvantage the interests of mankind.

Therefore, we ask of Thee, O God, that upon this gathering Thy great blessing may rest and that wisdom may be given unto those who are here assembled that they

may wisely and well work out the problem that has become one of the greatest problems of the United States, how to handle these unleashed forces without danger and destructiveness. So we pray that out of these deliberations may come not only a deepened purpose, but a larger and a wider vision as to how we shall lay our controlling hand upon the great forces that have been unlocked and sent abroad from the treasuries in this marvelous universe of ours, that the ways of men may pass in safety and in peace while they serve us and hasten us on to the larger civilization and to the peace of God. Amen.

PRESIDENT KING: The secretary having advised the chairman that a quorum of members is present in person or by proxy, the chair will be glad to entertain a motion to dispense with the calling of the roll.

(A motion was regularly made, seconded and carried, that the roll call be dispensed with.)

PRESIDENT KING: The address of welcome to this gathering will be made by Mr. William D. Saltiel, City Attorney of Chicago.

Address of Welcome to the Congress

William D. Saltiel, City Attorney of Chicago

The Corporation Counsel of the City of Chicago was asked to be here this morning and of course considered it a very great honor, but destiny and fate have otherwise decreed that Mr. Ettelson, the Corporation Counsel, at this hour is grief stricken at the bier of his brother. He has asked me to extend to you on behalf of the city of Chicago a very cordial, hearty welcome.

We are quite cognizant in Chicago of the work done by your Council. We know of its inspirational force. We know of its scientific contribution. Chicago, a city of 3,000,000 people, with a metropolitan area of 4,000,000 people, has great need of an organization like your own.

With our 5,000 miles of streets and alleys, with our hundreds of thousands of visitors who gather here each week, with the automobiles of our city and with huge industries, countless machines and the ramifications and complications of the new commercial era, we in Chicago are very much in need of organizations of your nature.

We believe we have done all that we can humanly and practically do toward the adoption of the plans which your men of genius have laid before our governmental agencies.

The mayor of Chicago, Mr. Thompson, long felt the need of emphasizing the safety of our people and has therefore given instructions to all departments of government, which have anything at all to do with the public in regard to safety, to consider that first of all government has an obligation to protect and to safeguard her people. If government does not do that it has failed. Our police department, too small and inadequate in view of the size of our city and our people, is doing all it can. We have only 1,000 men at one time walking the beats of our city, because we have not as yet been able to secure enough legislation to give us men for the protection of our homes. Our Department of Public Works, our Engineering Department, all of these have done all they can; and in our schools we have tried to emphasize through the Board of Education how very essential it is that these 550,000 children in our schools are given an education so that their little bodies will be protected, so that the nation tomorrow will have strong, able-bodied men and women. We have done all we can, ladies and gentlemen, but we must come to you who have given your lives, your talents, your energies in this highly specialized field.

I marvel at the tenacity of your endeavors. I compliment you upon the earnestness and the sincerity of your work. We know that it means sacrifice to be in work of your kind. We know that there is an ideal in the work that you men and

women are doing. We compliment you for the fact that you, perhaps more than in most other avenues of human endeavor, are working with a genuine desire to serve. So we are proud that you have come to Chicago.

Chicago is a city which is growing rapidly, and it is a city which deserves a very serious and a very concentrated consideration and study. While you are here we want you to see all of the city which you possibly can with the limited time that you have at hand—our growing avenues, our widening streets, our bridges, our new sky line, our new schools, all that we are doing to live up to what we consider the inspiring tradition of the greatest pioneers that ever came to any section of the country. We love Chicago and we love her more because you have come here; you have enriched us by this session, you have added tremendously to our happiness by coming here, rubbing elbows with our citizens, holding your deliberations here in our center.

We wish you Godspeed in your endeavors, and we hope that you will carry on, throughout the nation and to any part of the world from which you come, the happy gospel that Chicago is an American city, thoroughly American, alive to her responsibilities, the responsibilities she owes her citizens in safeguarding their lives and their happiness. We want you to go out and proclaim to all the world that here is a city of 3,000,000 harmonious people working together with unusual teamwork to make it a finer and a more splendid city so that America will become what fate has decreed she should become, the greatest nation at any period in the history of time.

PRESIDENT KING: Mr. Saltiel, I want to thank you on behalf of the National Safety Council. We are mighty glad you know so much about our work. The people of Chicago have done a great deal for our comfort and our pleasure, and I know you will all be glad to give a rising vote of thanks to Mr. Saltiel for his splendid welcome to us.

(A rising vote of thanks was extended to Mr. Saltiel.)

PRESIDENT KING: Our next speaker is a distinguished sociologist of New York City. There has been no important social or religious movement in the United States during the past twenty-five years in which Mr. Stelzle has not had a leading part. He was born on the Bowery of New York City. He had little early education. He suffered all of the privation in early life that are associated with life on the Bowery. He has been a worker in the printing industry and holds a certificate for high-class workmanship in the machinist's trade. He has been a Presbyterian minister, a newspaper editor, an author of many books, an organizer and lecturer of international reputation.

There is no man in the United States better qualified through thirty years of experience to talk to us this morning on practical, social and industrial problems. Mr. Stelzle is deeply interested in the problems shared by the National Safety Council with others, and he has been kind enough to give up his regular work to come to Chicago to address us on this occasion.

It gives me great pleasure to introduce to you our friend, Mr. Charles Stelzle, of New York City.

Life's Greatest Adventure

Charles Stelzle, New York City

You impress me as a crowd of hard-hitters. I don't believe there is a sissy in the audience. That's the kind of crowd I like to talk to, because I am sure there will be a comeback that will make things interesting, whether it will be here or whether you get back at me later in some other relationship.

My interest in the work of the National Safety Council goes back to many very real experiences. My father died of an occupational disease when I was

ten years old. That meant that I had to go to work when I was eleven, and I never went back to school, that is not to the day school. I went to night school for fifteen years. For twenty years I lived in the tenements on the East Side of New York City, where I faced all the problems of poverty that face any man there today. Then for eight years I was a machinist in the biggest shop in New York City, serving five years as an apprentice and three years as a journeyman, and there I learned something about the everyday problems of the average working man. I still have a very vivid recollection of the accidents of those days.

Then I became a preacher, pastor of working men's churches, where for eight more years I found in the homes of working men many of the difficulties and problems which face working men today.

Then for eight years I was at the head of the national industrial work of a great denomination, establishing its church and labor department.

For the last ten years, as a free lance in this country and in Europe, I have studied industrial problems in practically every industrial center in the United States and in many European cities. That orients me, sets me straight with you, I hope.

Placing Safety Upon a High Level

"Safety First" is the slogan of a coward, it means merely taking care of yourself, but I am glad to learn that the National Safety Council repudiates the narrow meaning which has often been given this phrase. In an important sense there is need for safety first campaigns, and you are going to talk about these campaigns this week. I shall not spend any time telling you what to do on your kind of a job; I don't know your job. But in your opening session I want to lift your thought to a higher level, or to a different level. I want to deal more particularly with the motives which are back of your plans and your campaigns. I should like to point out to you the high purpose which will make safety first mean not only your safety, but the other man's safety.

Accidents of any kind are costly; you know that. They increase the expense of production, and that means that they decrease profits. It also means they lower wages. Therefore, any working man who will not do his share in keeping down accidents is a distinct detriment to his fellow-workers as well as to his employer. An incompetent workman is also costly; whether his incompetency is due to carelessness or ignorance or drinking booze, doesn't matter. He increases the expense of production, he decreases profits, and he lowers wages, because the rates of wages for all men are largely determined by the standards set by the last man who came into the shop door. When low-grade workers predominate in a plant, the high-grade workman suffers, because he is compelled to overcome the handicap of the mass of inferior workmen whose incompetency create low standards in the factory.

What are you going to do with a man who won't play fair, who cares nothing for the rest of us, whose low ideals and indifference makes it hard for all of us? This is the problem that faces every executive. What is the answer? Just this: You have got to carry him along; and you will carry him by lifting the level of living and the standards of practice of all of us. You can't leave him behind because there are too many of him.

Do you remember that there were nearly 2,000,000 men tested psychologically in the war draft, and that of all these 70 per cent were rated as having the mentality of fourteen-year-old children, or less, and about one-third were rated as morons, which means that they were incapable of complete self-guidance? And remember this, gentlemen, not all the morons are in the wage-earning class. I have discovered them even among preachers.

The job which this National Safety Council has cut out for itself is going to

require the finest devotion that this world has ever known; and I say that advisedly, because the saving of human life is humanity's greatest adventure.

The other day the cables carried the story of the death of Professor Adrian Stokes in West Africa, just as he had discovered the causes of the transmission of yellow fever; but the fever got him first. I think of the supreme sacrifice of David Livingstone in the heart of the Dark Continent. I am reminded of Dr. Grenfell who today is at work among the fishermen of Labrador; of Sheldon Jackson, the missionary, who saved the Eskimos in Alaska from starvation through the introduction of a herd of reindeer; of Father Damien, who gave his life to the lepers. And then there is Lillian Wald, who 30 years ago went down to the tenements on New York's East Side as a visiting nurse and lived among those people, and who now directs 250 trained nurses in the greatest public nursing service in the world.

Then there is Jane Addams of Hull House, Chicago, recently voted the greatest woman in America because of her service to humanity. And John Elliott, the Cornell graduate who went directly into the heart of Hell's Kitchen in New York 30 years ago and is still there, running one of the finest social settlements in this country. And Graham Taylor, in Chicago Commons, where he has given his life to the solution of the human problems of his neighbors. And thousands of others who were not so well known, but who gave themselves freely as these I have mentioned.

The other day, in a New York hospital, a little girl, because of anemia, required the transfusion of blood—somebody else's blood. Her young brother 16 years old volunteered for the service. After the thing was all over, the boy stepped outside the room and sat in a chair and waited for the doctor. When the doctor came out he said to him, "Say, Doc, when do I croke?" We can find many such unconscious heroes in the tenements of our great cities.

An Old Record From an Ancient Writer

Just to show you that heroism is not a thing of recent days, but an old story, I want to read just a paragraph or two of an old record from an ancient writer. He has been talking about men and women who have made the supreme sacrifice, and then he goes on to say:

"And what more shall I say? For the time would fail me to tell of Gideon, and of Barak, and of Samson, and of Jephthe; of David also, and Samuel, and of the prophets:

"Who through faith subdued kingdoms, wrought righteousness, obtained promises, stopped the mouths of lions,

"Quenched the violence of fire, escaped the edge of the sword, out of weakness were made strong, waxed valiant in fight, turned to flight the armies of the aliens.

"They were stoned, they were sawn asunder, were tempted, were slain with the sword: they wandered about in sheepskins and goatskins; being destitute, afflicted, tormented;

"Of whom the world was not worthy: they wandered in deserts, and in mountains, and in dens and caves of the earth.

"And these all, having obtained a good report through faith, received not the promise:

"God having provided some better thing for us, that they without us should not be made perfect."

In other words, the jobs of these martyrs way back in history, the tasks of Father Damien and David Livingstone and all these men and women who come to your minds, will be incomplete unless you finish your job; without you their tasks will not be perfect.

Humanity has been blessed through the great adventures of these heroes of the past and the present.

Organized industry and industrial management have their chance to serve humanity. In the divine economy, its function is to work for the abundant life of mankind, as do medicine, education and religion. American industry leads the world today. This is the verdict of every other nation, through commissions which have been studying us—England, Germany, Australia, and other lands—and our supremacy in the industrial field is due mainly to our system of mass production.

I recall, when I was pastor of a little church on the East Side of New York among working men, frequently passing a little shoemaker's shop. This little hunchback German shoemaker would pick up the shoe upon which he had been working, and holding it up to me would say with great pride in his face and in his voice, "I made that shoe, every bit of it. I made that shoe! That's my shoe!"

Today every shoe passes through a hundred different hands because of the specialization of that industry. The other day I was in one of these shoe shops. I saw one room crowded with women, with young girls, mainly, each of them was running an electric machine, and each of them performing the minutest detail in the making of shoes. You know that story far better than I do.

Industry Has Narrowed the Worker's Life

Through scientific methods the length of life of the worker has been prolonged, but the scientific methods in industry have narrowed the lives of the workers. It is true that they are enjoying more of the benefits of invention and labor-saving machinery, but their daily tasks have become extremely monotonous. Mass production, I want to remind you, is not self-expression: it is self-repression, it is restriction, it is restraint. The minute specialization of the efficiency expert has made most mechanics mere machine tenders. Many of the workers have found relief in jazz. Now to many excellent people who believe that the long-meter Doxology is the tune that the angels sing, jazz is the gateway to hell. I don't believe that. I believe that jazz is merely a protest against monotony, it is an attempt at self-expression.

We cannot go backward in the course of industrial progress. We will never go back to the time when that shoemaker will finish an entire shoe; maybe in ten years from now 200 hands will be needed to make one shoe; but it is imperative that the lives of the workers who become part of the system of mass production must be enlarged, enriched, and each industry must work out its own program for itself.

Mark you this. Unless we do something in this direction we shall soon have what would be equal to a nation of serfs, without the craftsmanship which has so long been our honor and our pride.

But the worker pays a heavier price for our industrial supremacy than the mere giving up of variety in his work and pride in his craft. In spite of the increased length of life of the people as a whole, working men's death rates are still abnormally high, plainly on account of their occupations. The death rates of working men in America of middle age today are nearly 40 per cent above the death rates of men as a whole in the United States. Ten years ago the death rate was almost 60 per cent above the death rate of men as a whole. So progress has been made.

Dr. Louis I. Dublin, the statistician of the Metropolitan Life Insurance Company, has given us some interesting and important data on this matter. It will be recalled that four-fifths of the 5,000,000 men insured by the Metropolitan Life Insurance Company are industrial workers, so that Dr. Dublin has a good

basis for his facts. Dr. Dublin says that the most determining factor in the lives of men is their occupations. He tells us that the length of life of industrial workers is eight years shorter than that of non-industrial workers. To this must be added the loss through sickness.

You are familiar with the figures showing the loss of life through accidents. I need not repeat them, only to say that in New York state alone there are annually over 2,000 deaths among working men due to accidents. Roughly, death from accidents among workers is two and a half times as great as among non-industrial workers.

But Dr. Dublin points out that death from tuberculosis among industrial workers is even greater than it is from accidents. It shortens the average life of all workers by two years.

A chart prepared by Dr. Dublin's office shows the death rate from tuberculosis during one year. Up to about the age of 20 the death rate from tuberculosis among all classes of men is about the same. Then there comes a sharp break—an upward shoot, showing that the death rate among industrial workers between 45 and 54 is 210 per 100,000—twice as many deaths among working men on account of tuberculosis as there is among men as a whole.

Dr. Dublin shows that industrial employment is probably the most important single factor in the tuberculosis death rate, and that the problem of confronting tuberculosis is today largely concentrated in the industrial classes.

Quoting very briefly from a recent address given by Dr. Dublin, let me just give you this paragraph:

"The term 'industry' is here used in its broadest connotation to include the effects of the dusts inevitable in certain trades, excessive fatigue, bad posture, crowded workrooms, and other conditions of employment which made the worker more susceptible to deleterious home influences. These circumstances surround all workers, and not only those who are especially exposed to this disease.

"Pneumonia," he says, "is twice as high among industrial as among non-industrial workers, and may, therefore, be considered an added occupational hazard. Possibly the loss in life expectation resulting from this cause is as great as that from industrial accidents.

The Individual Worker a Valuable Asset

"In like manner," says Dr. Dublin, "the degenerative diseases, such as cerebral hemorrhage, Bright's disease, and organic heart disease show strikingly the effects of industrial exposure. The death rates are two and three times as high as in the non-industrial groups during the active working years of life. These high rates probably reflect the results of long-continued strenuous labor, of heat, of marked changes in temperature, and, in some instances, of specific occupational poisoning." And so I might go on:

Every working man may be said to be worth the equivalent of a \$10,000 mill. There are probably 10 million workers in manufacturing industries alone in this country. This means a total value of 100 billions of dollars, or about the equivalent of our national wealth in 1902; one-fourth of our total wealth today.

The value of a man, namely, \$10,000, was determined by the courts many years ago, but as the price of sheep has gone up since, I rather think we will have to boost the price of men a bit in order to equalize things. Actually the value in cash of the working men of America today probably is at least half the total national wealth of these United States. At any rate, these workers would about equal the value of all the products in manufactures today. Surely such valuable equipment is worthy of more attention than we seem to be

giving it. They come to us full-fledged, \$10,000 mills, for which we are paying not one sou marqué—and there are 10 million of them.

In spite of the reduction in death rates from almost every kind of disease, the percentage of women dying as the result of child-bearing remains almost stationary in the United States. To what extent is this due to their industrial experiences before marriage and during marriage itself? That question should give industrial leaders very great concern. The real curse of child labor is not in the fact that children are compelled to work. Even a child of eight may perform a certain routine of duties on the farm or in the home without serious injury. It is the continuous toil for long hours under unsanitary conditions without proper and sufficient food that stunts the body and the mind, so that when the child arrives at the years when it should be giving expression to its best self it is impossible for it to appreciate the best values of life, and the tragedy of it is that there comes no realization of that which is missing. I have heard many a brute of a man declare that going to work in a factory at a very early age never did him any harm—and everybody knew he was a brute but himself.

Safety Work a Great Adventure

This emphasizes the influence of welfare work, but it means the enlistment of men of the very highest type. Unfortunately (and I think I know what I am talking about), most of those who are engaged in welfare work today in our industrial plants are inferior mentally and socially. The situation demands that such work should take on the nature of a definite campaign, a crusade, a great adventure. It should reach out to the utmost ramification of the worker's life.

In the last analysis, this whole problem has to do chiefly with human elements. These stand out as a challenge to American industry today.

Some time ago I had an hour's talk with John D. Rockefeller, Jr., about industrial problems in America. He was far more generous in his estimate of things than I, as a former machinist, would have been. In the course of that conversation, Mr. Rockefeller said to me: "The most important man in industry today is not the production manager or the sales manager. The most important man in American industry today," he said in substance, "is the man who is in charge of creating right human relationships." Industrial relationships and safety campaigns are so largely dependent upon the state of the human mind, I was about to say that nothing else matters, for unless the state of mind is receptive and open and friendly, you may as well stop.

Human engineering is much more important than mechanical engineering in the progress of American industry. We are just awaking to the importance of this fact. If you fail to establish a brotherhood in industry, no efficiency plans or safety rules will accomplish very much.

You know how suspicious every working man is concerning anything that emerges from the office. When I was a young machinist in New York City and a notice came from behind the glass door that divided the shop from the office—how I hated everything back of that damned glass door, as I used to call it in those days. I hated everybody and everything that emanated from that great cavern, or whatever it was, that I never saw, which no working man ever saw during the years that he worked there. And how we hated the clerk that brought the notice, the fellow who wore a white collar when I wore a blue shirt! I would go up to the bulletin board where the notice had been posted and jab my fists into my overall pockets and say to myself, or to the chap looking at it with me, "I wonder what those blankety-blanks are trying to put over on us now?" The better the plan looked to us the more suspicious

we were of it. Thoroughly human. I was a typical machinist. Human relationships, the human mind, the attitude of the man in the shop—these are the things that count.

Take the question of unemployment. During that winter of 1914 in New York City when there were something like 400,000 men out of work, I served as Director of Relief and Emergency Measures for Mayor Mitchell's Committee on Unemployment. It was part of my job to relate the public and private agencies in New York City, and I worked at that job all winter down in the Municipal Building. I learned a lot about unemployment; I knew something about it before. But surely you must know that unemployment is a fearful tragedy in the working man's life.

The average working man fears being out of a job more than he fears going to hell. I learned that as a preacher, if I didn't know it as a machinist. And yet most managers regard it very lightly, merely firing or laying off so much equipment. The man who meets with an accident may have a pension, but the unemployed working man is doomed, doomed, I say, literally, to deterioration and often to destitution. We seem to be able to prepare for almost every other kind of catastrophe, but the cycles of unemployment leave us just as unprepared as though we had never experienced such a thing in industrial history.

No More Epidemics of Unemployment

I hope the day will come when an epidemic of unemployment will be just as unpardonable as an epidemic of the small-pox. But it is going to require a great adventure on somebody's part, an adventure that will save many lives and many industries.

Another challenge to America and American industry that will mean much to us will be a better understanding of our deeper social and economic problems. Most of us are afraid of them, we are afraid not only to talk about them, but we are afraid to think about them, and we become restless when anybody suggests that we look the facts in the face. I am not going to lead you through that path this morning, there isn't time for it. Only I want to say this, we cannot evade the fact that labor is not interested in our safety plans, because they have not been sufficiently democratized. "That is the boss's job," we are told by them, and frankly we have made it a boss's job.

I recently spent four months in Europe studying industrial problems. In England I attended a meeting of the British Trade Union Congress for a week. I know the American labor movement very well. I have attended possibly a dozen conventions of the American Federation of Labor. I know every labor leader of prominence in the United States, some of them intimately. I wrote for the labor press, 250 papers, for eight years, and never missed a week.

I am convinced, out of that knowledge and experience, that the growth of democracy is the outstanding fact in every country in the world, with one or two possible exceptions. All through the centuries the great masses of people have been winning in their struggle for democracy, first religious democracy, then political democracy, then educational democracy, then social democracy, then the democracy of the sexes, then racial democracy, and now we are frankly facing the problem of industrial democracy. I don't know what it is going to mean, and I have no cure for it. If I had, I would be a world beater.

Many of us are afraid of the restlessness in our country today because we don't get at the root of it. What causes restlessness among working men? Why can't you get your safety plans across with many working men? Restlessness is not caused by the labor agitator. He has not created it; it has created him. It existed long before he got on the job. Restlessness is caused

by public libraries, by art galleries, by universities, by big business through its big advertising campaigns, by the church, by every great movement in our country today which points out to the people higher ideals and greater possibilities, showing them the conditions, wretched, physical, mental and moral, under which they are living, and then showing them the possibilities of a life to be attained through study, through art, through religion, whatever it may be. Social unrest, let me say to you, is the legitimate outcome of the finest idealism the world has ever known, and when once that gets hold of you, you will approach your safety problem, your industrial problem, whatever it may be, from an entirely different angle. You will forget all about labor unions and sovietism and all the rest of it, and you will face the things right in your own town that have to do with the individual man. When you do that, you will make a tremendous stride forward in any plan or program that you may have in the industrial field.

If I had the time I should like to show the importance of character in this whole enterprise of welfare. I recall a little while ago in New York in one of the subways they placed some placards which read something like this: "We spent \$1,000,000 (or whatever it was) to make the subway safe. Now it is up to you." And they were perfectly right.

Here is a doctor who comes to his patient, diagnoses the case, prescribes for him, and at that point he may as well take his hat and coat and go home, because it is then up to the patient as to whether he will stop doing the thing which he knows he ought not to do or, whether he will do the things which he knows he ought to do. No doctor in creation can help that patient unless he has the character to see the thing through for himself.

Only a small percentage of accidents can be prevented by mechanical safeguards. The balance must come through the development of character.

So far as employers and managers are concerned, what is needed is a great leadership, a leadership that is big enough to frankly face the outstanding American problems.

Give Social Experiments a Fair Chance

I have spoken of social unrest. May I barely mention two other questions which everybody interested in safety must honestly answer. The first is prohibition. Whatever may be one's opinion regarding prohibition, there can be no doubt that this greatest social experiment—let me repeat that, this greatest social experiment in the history of the nations of the world—should be given a fair chance by industrial leaders in our American life, if only upon the economic basis. That we have made distinct economic gains under prohibition, no reasonable man will question. It has simply become a matter of the fair and just application of the principles of prohibition to all the people.

The second is our relationship to world peace. America must find a moral equivalent for war. I recently spent a month at Geneva, and every day I went to the International Labor Office to interview the heads of departments—men from all over the world, except America. I came back impressed with this fact, that this Labor Department of the League of Nations, whatever may be true of any other function of the League of Nations, is doing more to bring about world peace than any other single factor in all the world.

For after all, if you trace back history you will find that practically every war had an economic and industrial basis, and if you can solve the labor problems for this country and other countries, you will have solved practically every problem that tears men apart, in so far as economics are concerned.

America must find a moral equivalent for war. The destruction of human life through national conflicts has become unthinkable. Next to peace, I love a

good night. If we as a nation decline to become participants in leagues of nations, or whatever you choose to call them, we must—mark you this, gentlemen—lay at the feet of the nations of the world accomplished tasks in social, economic and political reforms as an equivalent for what they are trying to do by League of Nations, by World Court, or whatever else that body may be. We, as Americans, cannot avoid our responsibility as a nation in humanizing the affairs of the world. This week as you go to your conferences and your meetings, God speed you in the task of helping to bring about that condition where right relationships shall exist between man and man and between nation and nation.

PRESIDENT KING: We find it necessary to make a slight change in our program. Brigadier General Dalton is on our program for this afternoon. He is obliged to leave on a one o'clock train. I want to introduce you to him at this time.

Brigadier General Dalton has for many years rendered distinguished service to his country and has had a long and brilliant career in government service. He graduated from the Infantry and Cavalry School of Fort Leavenworth, Kansas, in 1895. He served the United States in France and was cited for gallantry in action. He has been a great soldier and is now continuing to serve our national government as the President of the United States Shipping Board, Merchant Fleet Corporation. He has come from Washington especially for this convention. General Dalton is an authority on the problem of "Safety on the High Seas," and it gives me great pleasure to introduce him to you.

Safety on the High Seas

**Brigadier General Albert C. Dalton, President, Merchant Fleet Corporation,
Washington, D. C.**

I am sincerely pleased to have the pleasure and privilege of addressing you during the meeting of the National Safety Council. With your indulgence, I will attempt to outline the accomplishments with respect to safety at sea of the largest steamship organization in the world today, the United States Shipping Board Merchant Fleet Corporation, which is operating approximately 300 passenger and freight vessels reaching many ports of the high seas.

"Safety at Sea" is a very broad term. Our efforts are directed toward accomplishing everything possible to fully safeguard the health and well-being of those aboard our ships.

An incident occurred on board one of the passenger vessels of our United States Lines which indicates our caution in this respect. A young lady asked a member of the deck crew where she might find the captain. He answered, "He's forward, Miss"; and she promptly explained, "That's all right. I am not afraid, I have been out with college boys."

"Safety at Sea" demands, first, a seaworthy vessel, staunch of hull, fully equipped and mechanically sound. Second, the vessel must be properly and sufficiently manned with efficient officers and seamen. Third, the lifeboat equipment must be in first-class operating condition and qualified seamen properly drilled in their respective duties in the handling, launching and navigating of such craft. Cargo must be properly and securely stowed in order that the vessel sails properly trimmed, and with sufficient freeboard and stability to withstand all weather conditions which may be encountered.

The loss of the "Cyclops" was due to the hasty method in which the ore that was dropped in her hold was stored. During the heavy sea it shifted and

the weight was so tremendous that we never heard of that gallant crew again. All the seafaring men know the great danger of that.

The transportation of grain is an excellent example of the care that must be shown in the handling and stowing of cargo in bulk. Grain is loaded under the immediate supervision of an inspector of the National Board of Marine Underwriters under rules that are necessarily complete and compulsory. Grain may become a most dangerous cargo, if it is loaded in bulk and not securely confined by grain-tight bulkheads, and shifting boards. Shifting during the voyage frequently means the loss of the vessel together with loss of life. Many of those present will recall the case of a foreign vessel loaded with a full cargo of grain which sank with all hands two days out of Boston in 1925—a loss which was the more pathetic as a large passenger ship was at the scene but on account of the terrific storm raging could do nothing to assist. Dangerous commodities are always afforded special stowage under deck if necessary, or on deck if advisable, so that they may be readily cast overboard if an emergency arises.

Covering a period of four years, that is, 1922, '23, '24 and '25, the world's maritime loss was 1,691,272 gross tons, and of this amount the American flag losses were 190,642 gross tons.

When you figure the cost per ton to build a vessel, not counting the valuable cargo that was on board these vessels, you can see what terrific losses marine disasters cause to our nation and to the world.

Passenger Service Wonderfully Safe

During the same period there were 1,247,864,106 passengers carried on passenger vessels flying the American flag operating in ocean, coastwise and inland water services, that are required by law to report the number of passengers carried to the United States Steamboat Inspection Service. Of this number 267 were lost, or in other words 4,672,974 passengers were safely carried for each passenger loss. Since the inception of our passenger service, viz., the United States Lines, there has never been a loss of life through casualty.

As you know, the United States Lines are operated directly by the United States Shipping Board. We don't take any particular pride in that accomplishment, but it only indicates to you the care which we try to give to this great problem.

To speak directly of our own passenger service, we have fitted these vessels with every practical device for the elimination of accidents. We now have equipment which is conducive to accurate navigation and protects the ship regardless of its position and the weather she may experience. This is a device used in the pilot house, which due to its being all bronze has been nicknamed by mariners "Metal Mike." "Metal Mike" actually takes the place of the old seadog who stood at the steering wheels. While we must continue to honor and admire such helmsmen as we have had in the past, "Metal Mike" actually keeps the vessel on her course more correctly. All that is necessary is to set the required course on the indicating dial and "Metal Mike" will follow that course regardless of weather conditions. The officer on watch merely observes from time to time if there is any deviation from the course as recorded by the device of which "Metal Mike" is the boss.

During the old sailing vessel days, and up until recently, the lead line has been used and remained to an extent the unchallenged means of learning ocean depth. With steam vessels the use of the lead line, of course, continues to give the depth sounding, but in most cases represents the depth of water at that moment past.

The new sounding device is continuous in its action, and measures the time necessary for an echo of a sounding impulse to return from the bottom of the

sea to the ship's hull. A powerful sound is mechanically produced by an apparatus attached to the ship's hull. This sound travels through the water in all directions at a velocity of 4800 feet per second. Between the time of the release of this sound and the return of its echo a special device accurately measures the time, which is calibrated by a dial for that purpose which shows the number of fathoms or feet between the bottom of the ship and ocean floor which the vessel is then passing over. The operation of this instrument is entirely automatic, the depth is indicated directly and is recorded instantaneously, so it is unnecessary for the navigator to make any calculation.

When a vessel is traveling a speed of 20 knots, which is approximately 23 nautical miles per hour, and it takes several minutes to make a sounding with a lead, remember that she is a couple of miles from the place at the time the word gets up to the pilot house. In the pilot house a little button is pressed and instantly you see the exact depth of the water under keel. That is going to prevent, I am certain, many accidents that occur by grounding, particularly in a fog.

Finding the Ship's Position in Fog

Another device which we are using on our passenger vessels, is especially valuable when the ship is lying-to or traveling through a thick fog. This instrument which is called a distance-finding machine is used to determine the ship's actual position in relation to other vessels or the shoreline. This method of determining the ship's position is based on the difference in velocity of radio waves and submarine sound waves. Radio waves travel with the velocity of light, therefore, the time required for such waves to be recorded at a distance of 50 miles is negligible. Submarine sound waves have a velocity of 4,800 feet per second and there is a measurable elapse of time necessary for such submarine sound waves to travel over a similar distance. To make distance measurements at sea, radio and submarine waves or sounds are produced simultaneously on a light vessel, while the vessel whose distance is to be determined carefully measures the time elapsing between the reception of the radio wave or sound, and the reception of the submarine sound, thus obtaining a basis for computing the actual distance between the ship at sea and the light vessel, or a signal station located on shore. For example, if ten seconds elapse between the arrival of the two sounds, the distance is eight nautical miles. You are no doubt aware that the United States Government, through the various radio stations of the Naval Communication Service, renders this service without charge to all government or merchant vessels upon request. During the month of May of this year, a total of 3,797 radio compass bearings were furnished Naval vessels, and 16,990 bearings were furnished merchant vessels, 42 radio bearings were also furnished to 9 aircraft. A grand total of 20,829 radio compass bearings were furnished during the month in the average time of 2.79 minutes each.

In the event of the failure of radio communication or in the contact with the vessel without this modern invention, we still have the International Code of Signals. The far-reaching effect of this system was demonstrated last May when a Shipping Board vessel, the "Aquarius," sighted a four-masted schooner flying the international distress signal at its spanker peak—the two flags, N-C, meaning "In distress—want immediate assistance." When our vessel approached the schooner it was found that she was the French vessel "Boree" and that her crew could understand very little English. The schooner was laden with iron scrap and china clay and was barely floating, having encountered a heavy storm which caused her to become water-logged. The "Aquarius" stood by while the grateful members of the crew of the "Boree" made

their way to the safety of our ship and the schooner was left to go to Davey Jones' locker without the sacrifice of lives.

The average passenger embarking for a voyage to foreign shores has reason to be satisfied with a comfortable stateroom, the excellent service and cuisine afforded by the modern vessels, but seldom realizes the existence of the many devices which have been installed to make his voyage safe. He may use the radio to maintain contact with his business affairs at home, but the radio means a great deal more when used for the saving of human life. The two thrilling rescues during the past two years by vessels of the United States Lines may well be taken as concrete examples. About noon on October 19, 1925, the SS. "President Harding" received an "SOS" call from the Italian Steamer "Ignazio Florio" and upon learning she was the closest ship "headed" for the distressed vessel through mountainous seas and through a 70-mile gale. The next day about nine a. m. when the "President Harding" should, according to calculation, have been at the reported position of the Italian steamer, radio compass bearings indicated that the distressed ship was still ahead. The radio operator of the "Ignazio Florio" was then instructed to transmit radio signals every five minutes which enabled the "President Harding" to take radio compass bearings on which full reliance was placed. The "Harding" continued to steam at full speed, and about 11:30 a. m. sighted the distressed vessel which had been steaming ahead during the entire time at exactly three degrees off the starboard bow of the rescuing steamer, as indicated by the radio compass.

I had the great pleasure of presenting to the captain of that vessel in London recently, the Distinguished Medal for gallantry on the high seas, awarded by the Italian government, presenting it in the presence of some of the most outstanding and representative shipping men of England. That is only an indication, however, not only of what our own American seamen can always be depended upon to do, but an indication of the bravery of all of the seafaring men, as a rule.

Efficiency of the Radio Compass

During the rescue of the British Steamer "Antinoe" by the SS "President Roosevelt" in February, 1926, the radio compass was used in picking up the distressed vessel when it was found that her given position was some 75 miles in error, and although sight was lost of the "Antinoe" she was later on located despite the fact that her radio equipment was not working, and through the use of the radio compass she was reached during a heavy snow squall and the rescue of her crew was accomplished.

Recently the American SS "Malolo," while on her trial trip, was rammed during a thick fog by the Norwegian SS. "Jacob Christensen," resulting in the "Malolo" broadcasting an appeal for help. This was answered by the American Tanker "Gulfland," which was 38 miles away. Her bearing was observed on the SS "Malolo" radio direction finder and she was given a course to steer. Radio messages were sent to New York requesting tugs, and to the Coast Guard Base at New London, Connecticut, requesting the assistance of their fast cutters. The trawler "Fisher" reported her position near by and was given a course to steer. The bearings of the Destroyer "Shaw" and the steamer "City of Pretoria" were also taken by the "Malolo," and these vessels were given true courses to steer that brought them to the "Malolo" through the fog.

Equipping our vessels with numerous safety devices and aids to navigation which have been developed during the past 20 years has required of the officers

and crews a technical knowledge of radio and electric mechanics in order to efficiently operate these instruments. To aid in the development of our personnel, we maintain libraries of technical books on everyone of our vessels, and in this manner make it possible for the humblest member of the crew to acquaint and educate himself with these marvels of latter day science and inventor's skill, and in the last analysis it is on the human element that the policy of "Safety at Sea" depends.

When the Alarm Signal is "S. O. S."

Receipt of the international distress signal known as SOS by all vessels within listening distance strikes terror to the hearts of all those on board and you can readily visualize the prompt action taken by such ships receiving this distress signal to do everything possible to render assistance and while the perfection of these individual devices is wonderful the coordination and results obtained from the use of both of them is really marvelous. During the foggy weather heavy rains or snowstorms at sea, visibility becomes limited and there is, of course, grave danger in navigating a vessel through such weather, without taking every conceivable precaution to learn the approach or proximity of other vessels and in turn warn them of your position, consequently the blowing of a whistle or ringing of a bell intermittently has been the method employed from time immemorial, but this system has its disadvantages because sound as created by fog horns or whistles is often distorted to such an extent by deflection and absorption that at times it becomes impossible to locate with the proper degree of certainty the direction from which it is coming. It has been found also that there are silent areas of considerable extent where such signals are inaudible, although such silent areas may be closer to the whistle or bell and ships at a greater distance than those within the silent area may receive such signals. Because of this uncertainty of sound signal there has been devised a light signal which discharges neon gas at a high electrical tension and tests have proven these lights visible at certain distance when other lights are completely obscured by fog.

I saw recently that there has been an invention which really sends an electric ray through dense darkness.

The International Marine Conference of 1889, held in London, codified the rules for the safety of life at sea and prescribed international requirements for the preventing of collision. In 1914 another International Marine Conference was held which modified and added certain provisions to the former Conference.

On October 4 of this year, there is to be held in Washington an International Radio Telegraph Conference which is to consider and amend the articles of the International Radio Telegraph Convention of 1920. At this meeting, consideration will be given to the revision of the International Code of Signals to bring it up to modern requirements as it has not been revised since 1889. At this forthcoming Conference, interested Government Departments, of which there are a number—The Weather Bureau of the Department of Agriculture, the Coast Guard of the Treasury Department, the Department of Commerce, the Department of State—are working in co-operation with the commercial telegraph and radio organizations throughout the country. Some forty-odd foreign nations are to be represented. The Shipping Board, as the Government instrumentality interested in merchant marine and passengers, is lending its utmost aid.

A terror of the seas which demands every precaution is the menace of the iceberg. There are several ways of determining the location of an iceberg. One of the most simple is to run into it while trying to maintain the ship's schedule. After so locating the berg, it will be found the ship is fast aground

on a ledge which is worn just below the surface by the action of the ocean current. The cooling breeze wafting gently downward from the neighborhood of the ship's topmast will assist in proving that an iceberg has been located. I am glad to state, however, that icebergs have not been located in this manner by any of our vessels. The temperature of the atmosphere and the sea are recorded on an iceberg-alarm device located in the pilot house. To determine the direction of the berg an under-water sounding device similar to that used for determining depth of water beneath the ship's bottom is used, which gives the true direction of the berg by the echo of this sound.

It is quite interesting that in going through the North Atlantic where formerly there was great menace of icebergs, you seldom find now any of our great passenger steamers slowing down in the least, even during foggy weather, due to the installation of this wonderful device.

The Ice Patrol in the North Atlantic

Following the epoch-making disaster of the "Titanic" the Government of the United States offered to maintain an ice patrol in the North Atlantic during those months when the icebergs threatened the vessels running between North America and Northern Europe. In accordance with this arrangement, each year two United States Coast Guard vessels are detailed for this work, relieving each other at intervals of two weeks. In the early spring the vessel on watch takes up a position several hundred miles off the coast of Newfoundland and when the bergs begin to come down from Greenland the southernmost berg is located and the vessel drifts south with the berg, sending out radio messages at frequent intervals warning all ships of the latitude and longitude of this southernmost berg. In accordance with standard instructions all passenger vessels keep to the south of the point indicated by the patrol. When the berg has finally dissolved in the warmer water the patrol vessel heads north until another berg is encountered when the patient watch is recommenced.

The word "Fire" at sea causes the greatest fear and anxiety to the officers and crew, particularly in the event it occurs on a passenger vessel. Discipline of the sea obligates every member of the crew to make any sacrifice to extinguish a fire without it becoming known to the passengers.

Modern cargo vessels are equipped with steam lines to all cargo space for the smothering of fire by merely opening a valve. Passenger vessels also have these facilities. In addition fireproof and watertight doors make it possible to completely isolate any particular compartment in which there may be a fire.

Story of the Dumb Congressman

I will tell this anecdote as indicating often times the layman is unfamiliar with very simple things. During a congressional investigation of the sinking of one of the great vessels, a Senator of the United States, who was a member of the investigating committee, asked the first officer of the vessel why, when the vessel began to sink, the passengers didn't get into the water-tight compartments? That is an actual fact and is in the congressional record, indicating why I am calling attention to these things, although I hope none of my audience will ever try to crawl into water-tight compartments or suggest it to their friends.

In all staterooms on a modern passenger vessel a small device usually hidden in the joiner work gives immediate notice of an increase of temperature over normal and this is recorded on the master device located in the pilot house on

the bridge of the vessel. The officer and such members of the crew assigned to the particular station are summoned by signals and the fire is being fought within a very brief time after its discovery.

The smoke detector system, which consists of numerous small pipes running from the various rooms, compartments and cargo holds to the detector signal board in the pilot house is also used on all well-equipped ships. By the use of a small electric motor air is continuously drawn through these pipes from all sections of the vessel and exhausted in front of a reflector lighted by a small electric light. Should smoke be exhausted it immediately becomes visible similar to a beam of light entering a dark room through a small crack.

There are other numerous hand-operated fire alarms of the familiar "break the glass and pull the hook" variety located in all parts of the ship which likewise report an alarm to the central station. All of these fire-indicating instruments are grouped in or near the pilot house and a constant watch day and night is maintained by men detailed for that particular purpose and who do not perform any other duty during the period of the watch. For the machinery spaces a smothering blanket of liquid chemical is instantly released from large storage tanks by merely opening a valve.

Adequate Life Boat Equipment

The necessity of abandonment of a vessel at sea today is remote but vessels are prepared for this contingency. The lifeboat equipment is required by law to be sufficient to accommodate all passengers and the ship's personnel. The motor launches of the passenger vessels are equipped with radio sending and receiving apparatus. All lifeboats have automatic or semi-automatic releasing devices as one of the most essential parts of the lifeboat equipment. You will no doubt well remember the "Titanic" disaster which claimed so many lives. At that time the releasing gear was not perfected as it is today, and lifeboat after lifeboat loaded to capacity with human lives, capsized or was dashed to pieces against the steel sides of the vessel before it could be released from the tackle and pulled to safety by its crew.

To meet the emergency of abandoning ship and fighting fire, there are held what are known as "fire," "abandon ship" and "boat drills." There must be for each lifeboat or raft a certified number of capable seamen supervised by an officer, all of whom have had sufficient seafaring experience to enable them to qualify as certified lifeboat men.

Before a vessel sails a muster list is prepared, approved, and posted at designated places throughout the ship, especially in the crews' quarters for the guidance of all persons concerned.

Life preservers are arranged for easy access in every stateroom in accordance with regulations of the United States Steamboat Inspection Service. Small life preservers are furnished and are easily accessible for the use of children.

In the endeavor to minimize accidents to the members of the crews of our ships, I have recently arranged a special contract with a firm of safety engineers whose duty it will be to promote industrial education and accident prevention. We have found that on our United States Lines steamers that three out of every five accidents to the crew were sustained through human rather than mechanical failure. These losses have not been confined to new employees but are common to the older and experienced seamen due to their disregard of existing hazards and their willingness to assume an unnecessary risk. This contract which we have recently entered into is an additional expense in our operating costs, but I believe it will impress our seamen with that care

and scrutiny of their duties which will lessen the foolhardy risks they might undertake and in turn protect their fellow workmen. Such an expenditure reflects not only in the morale and humanitarian aspect but also in economy in claim settlement.

Among the perils a Master encounters at sea, is one peculiar to the Far East where our vessels contend with an Oriental maritime superstition. The small junks in the Chinese and Philippine waters deliberately cross the bow of steam vessels under way and as a result it is not uncommon to run down these small craft. There is a prevailing belief among the Orientals that in crossing the bow of another vessel, the local devils pursuing their craft will be transferred to the other vessel. They believe that the closer this passing is accomplished, the more efficient the transfer of devils is made, but very often their calculations result in the loss of their craft and perhaps some lives. This, however, is a problem in "Safety at Sea" which inventors must leave to the missionaries.

Under this broad title "Safety at Sea," I desire to mention the United States Shipping Board policy regarding the employment of seamen for our vessels, as I feel it will interest you. All seamen are required to undergo a thorough physical examination prior to employment.

I heard mention made by the previous speaker of the great danger of tuberculosis. We give particular attention to that. All of our waiters are very carefully examined. If there is the least indication that a man has tuberculosis, he is not employed, as you can readily see the great danger that would come from this white plague in being passed on to others.

A Safeguard for Passengers Also

The safeguarding of the whole of our vessel personnel in this manner protects others aboard the ship including the passengers. At New York, Baltimore and New Orleans we have our own medical staff with the necessary facilities for making these thorough physical examinations; at the other ports such as Boston, Philadelphia, Norfolk, Savannah, Mobile, Galveston, San Francisco, Portland and Seattle, thorough physical examinations of seamen are made for us through the courtesy of the United States Public Health Service. During the fiscal year ending July, 1927, there were 68,636 placements made by our Sea Service Bureau of seamen physically competent to properly discharge their duties. The employment of this large number of seamen will also give you a definite idea of why a thorough physical examination of every seaman is required, if we are to protect the health of not only our entire vessel personnel, but of our passengers.

We are not entirely satisfied with these precautions. Every effort is made to maintain seamen's quarters aboard ship in perfect sanitary condition. The discipline maintained aboard our ships demands this and we have greatly benefited the seamen on American ships by having practically revolutionized their living conditions, giving them comfortable bunks, with clean mattresses, linen and blankets, excellent light and natural ventilation, supplemented by electric fans and artificial ventilation. The food served is of good quality, well prepared, and in sufficient quantities. All water used for drinking and cooking purposes aboard ship is very carefully safeguarded. Our policy may appeal to you as being expensive, but the avoidance of a few cases of injury or death suffered by a passenger, or a member of our ship's personnel, or loss or damage to cargo fully offsets the cost.

I wish to refer to the La Follette law, a law that was passed to guard the American seamen in American ships. You cannot expect the youth of America

who choose to go to the high seas to work under any less favorable conditions than their brothers who stay at home in the factories and are fully safeguarded. We find many private ship owners and operators who complain about that law. It requires them to go to large expense to provide suitable living conditions, well-ventilated quarters, clean and decent sleeping accommodations, good food, and all those things that a decent, respectable seaman should have, in my opinion.

America is raising the standard throughout the world today and is demanding more and more comfort and safety for the men who go on the high seas.

Great Improvements for the Seamen

If that question ever comes up to you in any way, just remember that it is only an endeavor to give to the men on the high seas the same reasonable, comfortable working conditions that you are giving to the men on shore, who are protected by state laws, by federal laws, by municipal laws, in the factories and in the work shops. We are doing that in the Merchant Fleet Corporation today. It would amaze you if you could go through some of the quarters that are provided in the United States Lines for the members of our crews, and then go through some of the quarters provided in some of our foreign competitors' boats. We shall continue that policy. It is not only human, but it is the one thing that America must do. America must take the lead in these matters, as we have taken the lead in nearly every other field of industrial effort to safeguard our people, the men who work with their hands.

Time after time passengers will ask "Why is it that we never pass any large steamers?" The answer is this: one of the first moves to prevent collision at sea was the establishing of definite lanes of travel for passenger vessels crossing North Atlantic. These lanes are laid out for different seasons of the year, and westbound vessels maintain their course approximately 60 miles to the north of eastbound vessels. In this manner there is small opportunity for passenger vessels to meet even in the densest fog. There is no law compelling cargo vessels to keep off these lanes, but by custom of the sea, cargo vessels keep clear of the passenger lanes except when necessity compels them to cut across due to their ports of call.

I said that I was going to crave your indulgence for a few minutes to present to you a problem that I feel is of very great importance. It is one of the problems that has particularly come to the fore since the so-called failure of the Geneva Conference. That is the question of whether or not this great country of America, this great United States, shall have and shall continue to maintain a Merchant Marine Fleet that shall meet the requirements of her foreign commerce and keep the American flag flying upon the high seas, upon all those trade routes that are essential. That is a great problem; it is a problem which you people in the great Middle West are as seriously concerned with as those on the Atlantic and the Pacific coasts. This is a great country; it has been very difficult to make the people of this country sea-minded. It is not their fault, of course.

As I told the representatives from the Seaboard the other day, you are only traveling around the rim of a great coconut; the real milk of the coconut lies in the heart of America. As our industries are being built up in this great Middle West, as the center of population moves westward, as we develop more and more a great world trade, the necessity for an overseas route to all the present markets and the great future potential markets of America becomes more and more an important matter, to this great Middle West, the great heart of America, to the farmer, to the manufacturer, to the exporter, to the miller.

and to the lumber men, who are all engaged either in agriculture or in industry.

It is a lamentable fact that the bulk of our foreign trade is today being carried in foreign flag vessels owned and operated by the very nations who are our industrial and agricultural competitors in the markets of the world. Of all the great travel in the North Atlantic, 70 per cent of which is by Americans, we have five vessels flying the American flag today, headed, as you know, by the great "Leviathan." These vessels compose the fleet known as the United States Lines, which is operated directly by the Merchant Fleet Corporation, with the managing office in New York. Just think of that! Seventy per cent of all the travel on the North Atlantic is American, and American dollars are paid into foreign ship coffers, and those ships are built, they are repaired, they are victualled, they are supplied in their home ports. All of these dollars go where? They do not turn back to America that supplied them, but go rolling to the trough of Europe.

Other Nations Have Renewed Competition

That is an economic question. It is an interesting fact in this connection to note that the ship is only the carrier of foreign trade. America has advanced industrially to such a point that we must have markets for our surplus products, if we are to maintain our future national commercial supremacy and prosperity.

In 1914 we had \$3,850,000,000 of foreign trade, and our exports exceeded our imports by \$477,000,000, a very comfortable balance, a balance that you see was about 12 per cent. In 1916 our foreign trade had reached the stupendous total of \$9,250,000,000, and our balance of trade was less than a half a million.

The other nations of the world, as they are coming back to their pre-war productivity, are opening up new markets. We have hundreds of millions of people in Africa and South America; remember, there are 90,000,000 south of the Rio Grande. There are 180,000,000 in Africa, 500,000,000 in China, 500,000,000 in India, and untold millions scattered through the great Malayan Peninsula. As they are rising gradually in the scale of civilization they are demanding more and more the products of the Caucasian race, more and more the products of American civilization. America today is better equipped to supply those by reason of her high industrial development and mass production, than any other nation in the world. But we cannot reach those markets and we cannot hold those markets unless we have the carrying trade. We must have the vessels to transport them. How can we reach a market of another nation producing the same article, reaching for the same market, controlling a merchant marine service fostered by her people and by her government, if we must look to those nations to transport our surplus products?

I want to tell you what we are doing. We are operating today nearly 300 passenger and cargo vessels, including a small fleet of tankers, on twenty-four trade routes leading to every market of the world, operated by the United States Shipping Board about which you have heard so much talk, and rarely have our foreign competitors and those who are interested in foreign flag lines given us any real credit for what we honestly and conscientiously are trying to do.

There has been a challenge that America, who leads the world today in every field of industrial mechanics, cannot build, cannot operate and cannot maintain merchant vessels upon the high seas in competition with those of other nations. Gentlemen, that is a challenge to the militant spirit of America, and that challenge, I feel, is not going unanswered. I have an abiding faith in the militant spirit of America, in that same militant spirit that has transformed the wilderness into a great and prosperous nation, to answer that question and to put the American flag upon the high seas in every place that she has a right to

have the flag, not to dominate the seas, not to have commercial supremacy of the seas, but to give her, with due regard to the rights of other nations, that place to which she is entitled as a great nation and a great people. We are going to do that, and during these days of hard pioneering effort that the Shipping Board is passing through, have a little indulgence and a little kindness in your criticism. Remember that all great pioneering efforts are full of mistakes. We have only been engaged in this activity for seven years as against the other nations for 100 to 300 years.

As an example of what we are able to accomplish, last year we reduced the expenses of the United States Lines, which lost \$645,000 the year previous, and turned it into \$370,000 profit, and I think that shows that Americans can hold their place on the high seas. They are afraid of America, these foreign nations; they are afraid of our little United States Lines because it indicates what America will do when she makes up her mind to do it in the way that America has always accomplished all great enterprises that were essential to the prosperity and security of her people.

In regard to the cargo vessels, we were losing \$13,780 a voyage, on an average. During the past year, with a larger fleet, we have reduced the average to \$9,000 per voyage. That is some accomplishment. It indicates what we can do. So have faith in the agency that is trying to do honestly and conscientiously the task that you have set for it. Whenever you have any criticism, send it in. We want to be criticized. Any system or administration that won't accept criticism is not worth living. But give us constructive help, some constructive thought, some constructive suggestions. Ask all of the men who are shipping to look about and see if the American flag vessels can't give them equal service. We can do that.

Our Nation's Welfare Depends Upon Us

I just ask you again to bear in mind that America's prosperity and future security depend upon this. We must dream dreams and see visions of what the next generations will demand and must have to maintain this country in the great place that she has a right to occupy among the nations of the world. We must give serious thought to this question of creating an American merchant marine. Don't let the question as to government ownership or operation and private operation defeat the great object. That has defeated it continuously, and that is a question as old as government itself. I personally am in favor of governmental aid in some form that will permit private enterprise to carry out this great national work, but until that is solved by the American people and by their representatives in Congress, we who are charged by law with this great task shall continue to carry it on as efficiently and economically as it is possible to do under all the handicaps that surround direct governmental operation.

Give this some thought. It is a matter that is coming up in the coming Congress. We must have modern, up-to-date ships. No man or group of men, no genius in shipping, can any more take the nine and ten-knot cargo vessels that we are now operating and compete with the fourteen to sixteen-knot modern Diesel vessels of our competitors than you can establish a stage-coach service drawn by horses, no matter how efficient it may be, and compete with the modern motor bus. Therefore, we must have some method (and that method must be provided by you), of building a modern, up-to-date merchant marine fleet that shall be commensurate with that greatness to which we are entitled in world commerce, that shall spell security to the future generation.

As I said before, I have an abiding faith in the American people that they have the good judgment, the militant spirit and the business acumen to accomplish this great result.

Annual Address of the President

Walter G. King, American Optical Co., New York City

This is our Sixteenth Annual Congress and on behalf of the National Safety Council I extend a cordial and hearty welcome to everyone. We are glad you are here to renew friendship and acquaintance and we know the time spent at this conference will be fruitful and helpful to us in facing our daily problems in accident prevention.

The people of Chicago have done everything for our convenience and comfort and we desire to express the thanks of the National Safety Council to everyone who has worked to make this Congress a success.

On this, our sixteenth birthday, it is gratifying to report on behalf of our Executive Committee and officers a record of still further progress in the great National Safety Movement.

Another successful year has been added to the history of the National Safety Council with results accomplished that are real and important.

The National Safety Council now represents fifteen years of continuous history in loyal self-sacrificing service to its members, a history that stands for much in the life of our Council and the welfare of humanity.

To be a servant of the Nation is a privilege. It is our happiest occupation to serve the American people through the influence and activities of the National Safety Council. We are servants of the public, crusaders for the great cause of accident prevention and loyal members of an institution that has persevered faithfully in its efforts to conserve human life. Next to creating a life, the greatest thing is to save a life—there is nothing that can so well justify our citizenship as this gospel.

In reflecting upon the status of safety in America, we are impressed with the growth of the science of accident prevention. It has been truly said that as knowledge grows more extensive, it grows more intensive. Many of the safety principles discovered a decade ago are still recognized as dependable for both pioneer and development work, but our intensive knowledge is growing so rapidly that it is a serious question as to whether the National Safety Council and similar public institutions are not developing technical facts faster than the industries and the general public can absorb them. It is fair to state that if the knowledge obtainable from the present archives of the Council were carefully applied to the known accident hazards, that 95 percent of all kinds of accidents could be eliminated. As leaders, teachers and propagandists, our most serious task at the present time is to concentrate our efforts to impress upon the public mind the availability of this knowledge and the need for applying it.

We are keenly conscious of the fact that associations are judged by their achievements. The members of the National Safety Council can congratulate themselves that their years of wide efforts have created the most powerful and efficient safety organization in the world. This accomplishment has been due to many causes. First of all, to the loyalty to our humanitarian undertaking. The Council was conceived in the righteous thought that industry had social obligations and must conserve human life. Our thousand voluntary officers and committeemen have their own daily duties and many opportunities to serve their country, but their services to the National Safety Council is an expression of patriotism, the generous spirit of contributing toward the welfare of mankind; to save their fellow countrymen from premature death. Cecil Rhodes once said: "It is all very well to have a noble idea, but if you do not have enough money to make it effective, is the idea worth while?" The growth and effectiveness of the Council can also be measured in the terms of the business acumen of its members and responsible officers and committees. Business experience has been applied to the economical

administration of the Council affairs. It has always been realized by your selected officers that money, and more money, would be needed to carry out the aims and ideals of its founders. Membership dues have not been sufficient for our purposes. We have had to pave the way by charging for some forms of service, but your auditors have certified to you that every penny of income has been intelligently spent for promoting interest in safety. As the reports of the treasurer and managing director indicate, the Council is in an enviable financial condition; our reserve is sufficient for contingencies and we have a substantial income from many sources, but we must all work together to obtain more money to increase our effectiveness.

We point with pardonable pride to the work accomplished during the past year in the field of industrial safety. That a larger number of employers are making safety an integral part of their plant operations than ever before is revealed by the summarized accident records to the Council for 1926. These records increased approximately 50 per cent over 1925. The significance of this increase is understood more clearly when it is realized that the tabulation and analysis of records is one of the real fundamentals of success in accident prevention work.

If the cumulative experience of our reporting members is typical of American industry as a whole, then we know that the trend of industrial accidents is downwards. It is regrettable, however, that there is no one national agency to which all industrial accident records are reported. Such a reporting system would provide reliable statistics representing the experience of the entire country.

The appreciation of the Council is due to the American Petroleum Institute for its invaluable co-operation in assuming its share of the responsibility for the accidents that occur in the petroleum industry. It is only because of the generous financial assistance of the Institute that we are able to employ a full-time salaried safety engineer to "sell safety" to all petroleum companies. It is hoped that similar associations in other industries will follow the leadership of the American Petroleum Institute.

Credit for Sectional Officers and Committees

Our sectional officers and committee chairmen deserve unlimited credit for the efficient manner in which they have conducted their affairs. The Safe Practices Conference Committee has also merited our gratitude for the unselfish service which it has rendered in this essential branch of our work.

During the past year, regional safety conferences have been held in many leading industrial centers of the country. These, combined with the publicity in trade journals, newspapers, and other mediums are of inestimable value in presenting accident information and inspiration to industrial executives, many of whom could be reached in no other way.

Many books and pamphlets have been published from time to time making available vast funds of information concerning the principles and details of safety education and safeguarding activities. The past year, however, marks the beginning of a new epoch in the safety movement, for without in any way depreciating the values of education and safeguards, research has been given a well-deserved stimulus and scientific studies have been started to determine the fundamental causes of industrial accidents and diseases which should point the way to improvements in methods and processes that not only will minimize the accidents and diseases, but also have a favorable effect upon production.

Substantial progress has been made during the past year in the prevention of accidents outside of industry. It is a striking fact that while industrial machinery and factory methods existed for several generations before the birth of the industrial safety movement, the recent advent of the automobile on our streets and highways has been followed almost immediately by a popular demand for prevention of the accidents which have arisen from this new invention. Certainly the conscience of the American people is more alive today than ever before to the value

of human life and the necessity of conserving it. As we read in the newspapers, the daily record of public accidents, which in many parts of the country are still increasing, our hearts revolt at this continued slaughter. Approximately 2,000 children were killed in automobile accidents last year, fully 140,000 boys and girls were injured in the streets and highways by motor vehicles. Practically all of these youngsters were between five and fifteen years of age. The deplorable fact is that practically all of these accidents might have been prevented. We feel almost horrified at the ignorance or indifference which permits it. It is well that we, as leaders of the safety crusade, should be filled with this holy zeal. But we may also remember that it takes a good while to move 120,000,000 people and that seldom, if ever, in our history has any national need, short of war, aroused so quick a response as has been awakened by the need for safeguarding travel on our highways.

We must confess that if anyone expected the millennium to follow immediately upon the adjournment, eighteen months ago, of Secretary Hoover's second conference on Street and Highway Safety, he has been disappointed. The participants in that impressive gathering did not, as some perhaps expected, at once put into effect in every corner of the land all the remedial measures recommended by the conference. Of the state legislatures in session this year only one-quarter adopted any considerable part of the conference recommendations. Opposition appeared in unexpected quarters, but we must remember that all remedial legislation must travel a rough road. The results actually obtained, in motor-vehicle legislation for safety, were probably quite as great as might have been expected the first year. The efforts of our national and local councils and of our allies in this cause must go on unabated and with methods improved by what experience has taught us. After all, we put our trust in educational processes rather than in legislation; in voluntary co-operation rather than in coercion.

Cooperation for Safety in Aviation

Aviation, our most recently developed method of transportation, promises to eclipse all competitors for the expression of the spirit of our day and age—speed. It is earnestly to be desired that the same splendid qualities of engineering that made this wonderful accomplishment a fact will insure the greatest possible degree of safety in this new science. Proper governmental regulations should keep pace, protecting against unnecessary loss of life through careful licensing of pilots and their ships of the air. The National Safety Council stands pledged to cooperate in the development of a constructive policy for safety in aviation.

I want to call attention to the truly remarkable accomplishment of our Statistics Committee and the Statistical Bureau of our staff, secured by purely voluntary methods. Under their leadership, in less than three years, a uniform system of reporting the facts about automobile accidents has been adopted and put into use by cities and states covering over one-quarter of the population of the country. These jurisdictions, more than sixty in number, are making monthly reports to our national headquarters, possessing an accuracy and detail that were unknown in all but a few such jurisdictions three years ago. As a result we are rapidly building up, for the first time in the history of the world, a mass of accurate and valuable information about the real causes of accidents—*Why people get hurt*. With the recent enlargement of our Statistical Bureau, made possible through the contribution of Mr. John D. Rockefeller Jr., we are making every effort to live up to our responsibilities in this field by scientifically analyzing and interpreting the accident data thus secured for preventive purposes. Our statistical work furnishes a perfect example of what is the proper function of the National Safety Council which does not itself go out on the highways to collect accident reports, that being the proper function of the state and local governments; but works with the various officials, furnishing them the scientific assistance they desire, and helping them to coordinate their efforts for the common good.

An equally important contribution has been made by our engineers. In a community as in industry, preventive work must be based on a definite knowledge of the problem. The traffic problem has come upon our American communities over night and few, if any, of them have been prepared to handle it. Traffic signals, one-way streets, boulevard stops and similar measures are an aid to the safe and free movement of traffic when properly used, but when improperly used they are a tremendous nuisance and an unnecessary expense. Our larger cities have, as usual, been the first to recognize the need for engineering analysis of these problems and they can afford such service. The smaller cities realize in a general way their need for technical advice, but often they do not know where to get it and sometimes they cannot afford to pay for it. Within the past three years our engineers have assisted twenty-one cities in making scientific analysis of their traffic and safety problems through surveys directed by members of our staff, but utilizing to the fullest extent the participation of local officials and representative citizens. This is one of the most valuable services that the Council has been able to render to the American people.

Along with these community surveys we have continued to do our full share and more in working out engineering remedies for public accidents.

Education Division Doing Splendid Work

In the teaching and training of school children our Education Division has continued its splendid work. Through our school magazine *Safety Education*, field work, prompt correspondence with many cities, attendance at educational conventions and other means, the work of this division is undoubtedly getting results not only in the reduction of child accidents today, but in the rearing of a safer generation for tomorrow. For this accomplishment we again acknowledge our deep indebtedness for the generous financial support of the National Bureau of Casualty and Surety Underwriters.

The real application, the every day use, of all this service can only be brought about through the continuous efforts of local safety organizations in the larger cities at least. At the present time there are organized councils reaching a total population of 22,209,000, and we have considerably increased our efforts to organize community councils where fertile soil is found and more especially to assist those already in existence. Our staff is much better equipped than ever before to assist every local group to direct its efforts so as to achieve success and financial stability. For the year 1926 the local council cities reporting their accident records to us show a 7 percent better record in automobile fatalities than the other cities of the same general size and character. During the first part of 1927 the local council cities again showed a better record than the others.

It is gratifying to report that during the past year the prestige of the Council has been increased to a most encouraging extent. That the press of the nation has been impressed with the work of this institution is indicated by the fact that we have received more than 1,000 editorials mentioning the name of the Council. Thousands of articles inspired by the Council have appeared in daily papers from coast to coast. Thousands of pictures, presenting safety lessons have been published in daily newspapers. Hundreds of trade, technical and class periodicals have printed special safety features. Daily radio talks have been broadcast by more than eighty stations in various cities. Today the National Safety Council is recognized by editors throughout the world as the headquarters for accident prevention information. We also receive requests for data from publications in other countries. The leading press associations and news syndicates look to our organization for accurate facts. We have established a reputation for being more interested in spreading facts relating to the lowering of accident fatalities than in trying to procure publicity for ourselves, a policy that is respected by the press.

We have continued the most cordial relations with many other national and local bodies—the American Engineering Standards Committee, the American Association of Industrial Physicians and Surgeons, the various federal and state departments, the Safety Section of the American Railway Association, the insurance organizations, the national and local Chambers of Commerce, Associations of Motorists, engineering societies, the service clubs, and many others which are working continuously in some measure on the solution of the accident problem.

We members of the Council assemble only once a year for the valuable personal contacts and the values of our discussion, but the work of the Council must go on throughout the year, and I commend to you particularly the services rendered on your behalf by our national officers, Executive Committee, Directors, Headquarters Staff, and the many other committeemen whose faith and confidence you have established.

I am confident that the sessions of this Congress will be an inspiration to everyone of you to go back home and perform that kind of safety service which springs from the heart, that you will continue by your own personal efforts, by your day-by-day, hour-by-hour accident prevention work in your communities, a service which will result in great benefit to humanity during the coming year.

PRESIDENT KING: The Executive Committee having appointed three Inspectors of Election, the Chair will appoint these men also as tellers of this meeting. These gentlemen are: Fred M. Rosseland, Walter S. Smith, and D. K. Finley.

The next item on our program is the reading and disposal of the minutes of our last Annual Meeting. As the minutes have been printed, a motion will be in order to dispense with their reading.

ROBERT SCOTT (Atlantic Coast Line Ry.): I move we dispense with reading of the minutes.

(The motion was seconded and carried.)

PRESIDENT KING: The next item is the report of the Nominating Committee. Mr. J. E. Long, as chairman of that committee, will present the report.

Report of the Nominating Committee

Complying with your instructions, we, the Nominating Committee, appointed by you, with the approval of the Executive Committee and as provided for in Section 4 of Article VI of the By-Laws of the Council, and as further provided by Section 5 of Article VI of the By-Laws, present herewith the report of nominations for successors to the Directors whose terms of office expire at the annual meeting, September 26, 1927.

The following list has been approved by the Committee and is herewith submitted:

Nominated to succeed those Directors whose terms of office expire September 26, 1927:

Irving T. Bush, President, Bush Terminal Company, 100 Broadway, New York City.

William C. Dickerman, Vice-President in Charge of Operations, American Car & Foundry Company, 165 Broadway, New York City.

Alexander Forward, Secretary-Manager, American Gas Association, 342 Madison Avenue, New York City.

Dr. F. L. Hoffman, Dean of Advanced Department, Babson Institute, Inc., Wellesley Hills, Mass.

F. T. Singleton, Commissioner, Public Service Commission of Indiana, Indianapolis, Ind.

E. C. Spring, General Supervisor, Lehigh Valley Transit Company, 14th and Gordon Streets, Allentown, Pa.

Lucius S. Storrs, Managing Director, American Electric Railway Association, 293 Madison Avenue, New York City.

L. W. Wallace, Executive Secretary, American Engineering Council, 26 Jackson Place, Washington, D. C.

C. W. Berquist, Superintendent of Industrial Relations, Western Electric Company, Hawthorne, Chicago, Ill.

H. T. Martin, Manager, Health and Safety Department, Fisk Rubber Company, Chicopee Falls, Mass.

H. K. Ferguson, President, The H. K. Ferguson Company, 4900 Euclid Avenue, Cleveland, Ohio.

The names of the following Directors whose terms expire September 26, 1927, are submitted for re-election:

E. W. Beck, E. F. Blank, Dr. Louis I. Dublin, G. T. Fonda, I. V. Kepner, R. M. Little, Dr. L. A. Shoudy, Robbins B. Stoeckel, Prof. C. E. A. Winslow, and R. J. Young.

Very respectfully yours,

J. E. Lyng, Chairman.

PRESIDENT KING: A motion will be in order to accept the report of the Nominating Committee.

(A motion was regularly made, seconded and carried that the report of the Nominating Committee be accepted.)

PRESIDENT KING: Under the provision of our by-laws, a motion to close the nominations is in order.

MR. SCOTT: I move the nominations be closed.

(The motion was seconded and carried.)

PRESIDENT KING: As there have been legally nominated just enough men to take the place of those Directors whose terms expire and to fill the vacancies, the Chair suggests that in order to facilitate the transaction of our business, the Secretary be directed to cast one ballot for the candidates named for the terms for which they have been nominated.

(A motion was regularly made, seconded and carried that the Secretary cast one ballot for the nominees presented. The Secretary cast the ballot.)

PRESIDENT KING: The report of the tellers shows that 2,216 votes have been cast for the nominees, and none against. It therefore gives me pleasure to announce that these gentlemen have been unanimously elected Directors of the National Safety Council for the terms for which they have been nominated.

I should like to ask Mr. Charles B. Scott, Chairman of the Resolutions Committee, to report any resolution which in the judgment of that committee should be entertained by this conference.

CHARLES B. SCOTT, Bureau of Safety, Chicago: Mr. President, your Committee on Resolutions offers the following in memory of Judge Elbert H. Gary, honorary member of the National Safety Council.

Resolution in Memory of Judge Elbert H. Gary

"WHEREAS, In the death of Judge Elbert H. Gary, Chairman of the Board of the United States Steel Corporation, we have lost an honorary member of the National Safety Council, and

"WHEREAS, His loss not only is deeply felt by a multitude of friends and co-workers throughout this Council membership, but is shared by a grateful

nation, appreciative of his sympathy and powerful influence in furthering the pioneer safety work of his corporation, and

"WHEREAS, These distinguished services in the Safety Movement must have their continuing influence throughout the field of industry, in the betterment of working conditions, in the upbuilding of human happiness and in the saving of human lives, now therefore be it

"RESOLVED, By the officers, directors and members of the National Safety Council assembled in Annual Meeting, that we express by a silent rising vote our profound sorrow and regret at the passing of Judge Gary, and be it further

"RESOLVED, That a copy of this resolution be transmitted with our deep sympathy to Mrs. Elbert H. Gary and to the Board of Directors of the United States Steel Corporation."

I move you the adoption of this resolution.

(The motion was seconded and carried by a rising vote.)

MR. SCOTT: Mr. President, your Committee also offers two separate resolutions outlining the platform of the Council with reference to public safety and industrial safety, as follows:

Public Safety Resolution

WHEREAS, In the United States last year, some ninety thousand persons were killed and innumerable others were injured by accidents on the streets, highways and other public places, at home and in the industries, causing pain, sorrow, deprivation and an economic loss of billions of dollars, and

WHEREAS, A majority of these accidents could have been prevented as was demonstrated by the thousands which have been prevented through united efforts of those intent upon accident prevention, and

WHEREAS, Public officials and leaders of public opinion have become increasingly alarmed over the traffic accident problem in particular and have very properly determined that this wastage of life must stop, therefore be it:

RESOLVED: That the members of the National Safety Council and others greatly interested, assembled in Chicago at the Sixteenth Annual Safety Congress, pledge themselves to continue diligent and ever increasing efforts to prevent accidents and to further and make effective these efforts, recommend to the states and cities, the schools, civic organizations and all citizens, the following:

1. Adoption of the Standard Accident Reporting System in every state and city so that effective preventive measures may be based on accurate information.
2. A scientific, non-partisan study of the traffic situation in each city; the improvement of streets, revision of ordinances and regulations, and adoption of traffic control measures as shown necessary by such surveys.
3. Universal acceptance of the principle of uniformity in state and city traffic laws and regulations and in the design and use of signs, signals, and pavement markings, for both safety and convenience, and the generous co-operation of all interested officials and organizations to that end.
4. The licensing of all drivers, under state law, in such manner as will eliminate as far as possible the unfit and irresponsible.
5. The unstinted recognition by all users of the highways, both motorists and pedestrians, of the rights, the safety and the comfort of all other users.

6. The safety instruction and training of all school children and, to that end, the furnishing of necessary safety information and materials to all teachers.

7. The continued co-operation of newspapers and periodicals, as well as of all civic organizations, in giving the widest publicity to the consequences of accidents, to the specific means of avoiding accidents, and to the vital need for personal caution and law observance.

8. The impartial and certain enforcement of reasonable laws on that small minority of the population who cannot otherwise be brought to realize the rights of others.

9. The promotion and the co-ordination of all these measures through the formation, in each community, of a community safety council or committee, non-partisan, non-commercial, representing all groups and interests, mobilizing the forces of public opinion and supporting the public officials in the loyal and efficient performance of their duties.

Industrial Safety Resolution

WHEREAS, Some twenty-four thousand workers were killed and hundreds of thousands were injured in industry during 1926, causing pain, sorrow, destitution, interruption of orderly processes, slowing up of production and the economic loss of billions of dollars imposed upon employers and employees, and

WHEREAS, more than forty-three hundred employers, members of the National Safety Council, have demonstrated that most accidents can be prevented through organized prevention work, and

WHEREAS, it has been demonstrated, by members of the National Safety Council, that this achievement is possible in all fields of industrial endeavor, if all employers and employees will realize that accident prevention is a responsibility which should be shouldered by everyone, Therefore, be it

RESOLVED, that the members of the National Safety Council and others deeply concerned, assembled in Chicago, Illinois, at the Sixteenth Annual Safety Congress, urgently recommend the following:

1. That all employers make a survey of their respective establishments, both large and small, to ascertain the why, where and how of accidents and accident prevention.

2. That employers keep and analyze their accident records for the purpose of devising ways and means of preventing the recurrence of accidents.

3. That employers safeguard, in so far as possible, all mechanical equipment and revise manufacturing processes so as to eliminate these hazards.

4. That the personnel of all establishments be impressed with their individual need of safety and with the necessity of properly instructing their fellow-workers in Safe Practices.

5. That employers support efforts being made by community safety councils, the National Safety Council, federal, state and municipal officials and others, by conducting necessary organized accident prevention campaigns.

6. That employers encourage the inclusion of safety education in the courses of public, private and parochial schools and colleges.

7. That more colleges and universities incorporate Safety engineering in existing engineering courses.

RESOLVED: That those assembled at this Sixteenth Annual Safety Congress hereby express their gratitude to the many employers who have been conducting organized accident prevention plans in their establishments and supporting the public safety movement designed to protect the public, and acknowledge their indebtedness to the millions of employees and citizens generally and to other organizations, editors of newspapers, trade, technical and class periodicals and to radio stations, who have so whole-heartedly supported the safety movement.

I move you the adoption of those resolutions.

B. W. WHEELER (Duluth): I should like to suggest one little addition to the public safety resolution, if there is no objection. It should be numbered 6½, as follows:

"The unstinted education, by automobile clubs and commercial institutions, of all automobile drivers, and the same unstinted education of pedestrians by public officials, in careful, safe and courteous driving and walking on all public highways."

The President has just emphasized education and cooperation, and the education part of this public safety section has to do only with the school children, and adults should be educated as well.

MR. SCOTT: We offer the resolution with the amendment, Mr. Chairman, and I move the adoption of the resolutions.

(The motion was seconded and carried.)

MR. SCOTT: The Committee offers the following resolution in recognition of national organizations.

Resolution on Safety Recognition in National Organizations

"WHEREAS, The National Safety Council has, throughout its existence, greatly appreciated the opportunity of cooperating in a helpful way with many national departments and organizations having an interest in the safety movement, the list of which is too long to be here recited, and

"WHEREAS, There has recently been an increasingly marked and definite trend on the part of many influential engineering societies and commercial and industrial associations toward the inclusion of specific commitments in the interest of safety as an important part of their avowed purposes, and

"WHEREAS, The mutual helpfulness of these departments, societies and associations and the National Safety Council has distinctly advanced the solution of the safety problem, therefore be it

"RESOLVED, That we, in Congress assembled, do appreciate with great interest and with hearty commendation, the increasing determination to adopt safety activities as an essential part of the aims and purposes and as a part of the program of the national organizations, and pledge to all such our continued and increasing cooperation and support."

I move the adoption of that resolution, Mr. Chairman.

(The motion was seconded and carried.)

MR. SCOTT: The Committee on Resolutions offers the following resolution:

Resolution Concerning Aviation

"WHEREAS, Aviation has already become and promises to still further become a matter of extreme importance to our national welfare and calls for the highest order of federal, state, municipal, civic and individual cooperation, be it

"RESOLVED, That the National Safety Council urges the most intensive study and earnest cooperation of all of the aforesaid agencies, and pledges the fullest cooperation at its command to that end."

I move you this as a part of the last resolution presented and move its adoption.
(The motion was seconded and carried.)

MR. SCOTT: Your Committee also offers the following resolution:

Resolution of Thanks to the City of Chicago

"WHEREAS, The holding of this Sixteenth Annual Congress of the National Safety Council in the City of Chicago, Illinois, and the notably successful arrangements made for it are distinctly due to the sincere interest and support of the public officials, civic organizations and leading citizens of Chicago, and

"WHEREAS, The National Safety Council feels that the exceptional interest and ability which these agencies have shown in coping with the accident problem of Chicago is a demonstration of successful safety work which makes a most valuable contribution to the cause of safety, and desires to express its appreciation and to pay tribute to those responsible for this demonstration, therefore be it

"RESOLVED, That a vote of thanks be extended to the City of Chicago, its public officials, civic organizations, industries and leading citizens for the inspiration and help which their demonstration of the possibilities of successful accident control has given to the entire national safety problem, and be it further

"RESOLVED, That the National Safety Council extend to the City of Chicago, through its mayor, through the various sub-committees of the General Congress Committee, and the Chicago Safety Council, its thanks for and appreciation of the opportunity now afforded those attending this conference of observing the practical methods employed in furthering accident prevention and their results, and of the hospitality of a City and people deservedly and far-famed as hosts."

I move the adoption of that resolution.

(The motion was seconded and carried.)

MR. SCOTT: Now, Mr. President, it gives me pleasure to offer this final resolution:

Resolution of Appreciation to President Walter G. King

"WHEREAS, Walter G. King has served the National Safety Council as President during the past year, with marked ability, faithfulness and earnestness, and

"WHEREAS, Much of the credit is due him for the continuous success and expansion of the Council, therefore be it

"RESOLVED, That the Sixteenth Annual Safety Congress assembled at Chicago, Illinois, expresses to Mr. King, by a rising vote, its sincere appreciation of his services as President and of his helpful contribution to the cause of safety."

(The resolution was unanimously adopted.)

PRESIDENT KING: It would be useless, fellows, for me to tell you how much I appreciate that. It is wonderful. It is a great satisfaction to be associated with a group like this. I don't think there is a group like it on the face of the earth. I look forward, as you all do, to meeting these old friends, and seeing these familiar faces.

The expression you made in that resolution touched me very deeply. It is a tremendous reward for all I have tried to do in the work in which I believe so thoroughly. I thank you sincerely.

Is there any unfinished business to come before the Council? Is there any new business?

E. B. LEFFERTS (Automobile Club of Southern California, Los Angeles): We

in the Automobile Club have been very much disturbed by the increasing tendency that we find today in national advertising to emphasize speed in automobile operation. We may not agree as to whether speed is the main cause of accidents, but I think we will all agree it is a contributing factor. It is not in an unfriendly way that I bring this up, but I do believe it is something that should receive the attention of the National Safety Council as the outstanding safety organization in the United States, and that they should, through its Executive Committee, take this up with the motor manufacturers. If it is in order, I should like to make such a motion.

PRESIDENT KING: If you could make that as a part of the resolutions, I think we would all be in accord with it.

MR. LEFFERTS: If that is the proper way, I should like to bring it before the Resolutions Committee and let them draft it.

PRESIDENT KING: I think you all understand this. Do you make a motion to the effect that this be embodied in the resolutions?

MR. LEFFERTS: I make such a motion.

(The motion was seconded by several members and carried.)

PRESIDENT KING: If you will draft that, we will see it is included in the resolutions.

Annual Report of the Managing Director

W. H. Cameron, Managing Director, Chicago, Ill.

During the past fiscal year 693 new members have joined the National Safety Council. A comparison of the total membership for the past two years shows:

Membership July 31, 1927.....	4,359
Membership July 31, 1926.....	4,224

New Gain	135
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The net gain in membership revenue was \$14,144.34. The total annual dues now being paid by 4,359 members is \$252,026.13, or an average of \$57.81 per member. The solicitation of new memberships through the voluntary committees and other ways has been continued unabated.

The NATIONAL SAFETY NEWS has gained in circulation and importance. The quality has improved and the number of special features and articles has increased. The minimum number of pages has increased to 80 per issue. There has also been an increase in the number of extra copies ordered by members. The advertising has doubled. The circulation has been checked by the Audit Bureau of Circulation. The "Safety Exchange" and sectional articles have proved popular. The aim of the NATIONAL SAFETY NEWS is to provide practical information and to keep before safety workers the vision of the worthwhileness of their work.

The Safety Posters have been published regularly and have been steadily improved in quality. Four hundred and eighty posters have been prepared during the year. This includes eight 17x23 inch posters and thirty-two 9x12 inch posters each month. More time and money have been spent upon their preparation, and well-known artists have furnished illustrations. All posters have been made more attractive by the addition of a third color; the circulation has increased 25 per cent and the new varieties have emphasized the growing appreciation of safety posters as an educational medium to lessen accidents. A 34-page catalog of 252 selected posters was mailed to members January 1. A new service of seven sectional catalogs was inaugurated. Poster inserts for every package of posters were distributed on alternate months. Prizes were awarded to workers in contests for opinions on posters. The Council's street posters, distributed through community councils, have filled a need for con-

tinued education of the public in the safe use of the streets. The members and the sectional poster committees contributed generously to make this poster service possible.

The Safe Practices Pamphlets have appeared bi-monthly under the supervision of the Conference Committee of 75 safety engineers. Eighteen of the series have been revised and reprinted during the year. Six new pamphlets have been produced. This "Safety Encyclopedia" now includes 89 separate treatises on the fundamentals of safety engineering practices. One sectional Safe Practices pamphlet for the Quarry industry was produced during the year. New members are ordering complete sets of these pamphlets for reference purposes. Three hundred and thirty-six sets have been ordered by members during the fiscal year.

The Consultation Service has answered 6,266 requests for information. For the fiscal year ending July 31, 1927, there were 2,677 such inquiries. There is a marked increase year by year in the use of the facilities of the Library and Information Bureau. During the fiscal year 50,308 pieces of information were distributed in answer to 6,266 inquiries, including books, pamphlets, clippings, photographs, blueprints, posters and similar material. Forty-one thousand eight hundred and forty-one new pieces of material have been added to the Library files during the year. The largest number of exhibits was prepared for regional and national conferences than during any previous year. The information files have been systematically built up by the acquisition of up-to-date information on all phases of accident prevention, industrial health and hygiene, and allied problems.

Slides and the Safety Calendar

Films and Slides have been in demand by members in increasing quantities. Five new stereopticon machines have been purchased for use of members and the entire glass slide collection has been converted into film slides. There is a continued demand for the Council's films "Ask Daddy" and "Hindsight and Foresight." The Film Committee has prepared a scenario for another new film to be ready for exhibition at the 1927 Congress. The list of motion picture films was revised and reprinted during the year.

The Safety Calendar increases in popularity as a medium for reaching the worker and his family, school children and the general public. Six hundred and fifty thousand copies of the 1927 Calendar were distributed. The 1928 Calendar was ready for sale January 1, 1927, and an effort was made through salesmen to interest non-members in the distribution of this safety information. The information on the reverse sides of the 1928 Calendar sheets relates to fire prevention in the homes.

The 1926 Congress and Exhibit eclipsed every previous Safety Convention in attendance, number of speakers, exhibits and interest. The transactions of that Congress were published in three volumes with complete alphabetical index. The 1927 Congress program, now ready for mailing, will contain 72 pages.

National Safety Codes have continued to receive the careful attention of your committees and staff. Representatives of members of the Council are assisting in the formulation of 40 of the national standard codes. The Council is now sponsor, or joint-sponsor, for 15 codes. The Council continues to contribute toward the expenses of the American Engineering Standards Committee.

Editors of Employee Magazines have continued to receive a special service including original safety cartoons and accompanying stories. Other special material and assistance have been accorded members publishing plant magazines or contemplating the establishment of this type of publication. An attractive program has been prepared for the annual meeting of these editors at the Chicago Congress and the special feature in the NATIONAL SAFETY NEWS giving editorial advice to the publishers of employee magazines has been continued.

The Industrial Sections have been more active than ever. All of them have held Executive Committee meetings and have continued intensive service to the members within their groups. There has been an increase in the number of sections issuing monthly news-letters. Many of the sectional committees have conducted energetic membership campaigns and performed invaluable service to fellow-members by stimulating the furnishing of statistical data, material for posters and an interchange of safety experiences. There were 18 regional safety conferences during the year. Seventeen hundred plants contributed their accident records for 1926 and the tabulation has been printed in a pamphlet and distributed to the contributing members and others. The officers and committees of the sections held a mid-year conference in New York. The first salaried secretary for a section has been made possible through the generosity of the American Petroleum Institute. Another notable addition to the service has been the contribution by several sections of special articles published in the NATIONAL SAFETY NEWS.

The ASSE-Engineering Section has participated in the regional safety conferences, as well as the Fourth Pacific Coast Safety Conference. Five research committees have been at work. A new safety engineer was employed during the year to assist the technical committees with their research problems and the preparation of reports. The amalgamation of the American Society of Safety Engineers and the Engineering Section, which took place at the Louisville Congress, has proved the wisdom of cooperation and has continued the unity of effort and strength necessary to win respect for the safety cause.

General Sections: Nineteen industrial sections have been rendering service to the members during the year in addition to the health, education, engineering, public safety, plant publications and employees' benefit associations.

Work of the Public Safety Division

Public Safety: The Advisory Committee of the Public Safety Division has held three meetings during the year. The Council has continued to assist the National Conference on Street and Highway Safety to accomplish its purposes by stimulating legislation based on the Uniform Motor Vehicle Law. State conferences were organized and followed through for this purpose. Your staff recommended to the conference the preparation of uniform local ordinance and committees are now at work. Much of the Council's activities for safety on the streets and in the home has been directed toward the formation and upbuilding of community safety organizations. The staff of the Public Safety Division was materially increased during the year through the contribution of Mr. John D. Rockefeller, Jr. This extra money has made possible the publication of the monthly bulletin, *Public Safety*, distributed to 10,000 public officials, automobile clubs, chambers of commerce and others. Twenty-two community traffic surveys have been completed to date. The 1927 statistical report has been completed and distributed. The Statistical Manual for reporting street and highway accidents has been revised, reprinted and distributed. An increasing number of communities and states are reporting to the Council their public accident experience. Forms have been completed for reporting home accidents. The pamphlet "Safe Use of Gas in the Home" has been reprinted and distributed. Six Home Safety lessons were prepared and printed. The Dash Board Card service has been continued. Service has been given on several committees, including "Traffic Signs and Signals." Complete revision of material for the Boy Scouts' handbook was contributed. Special engineering studies were made on drowning accidents, on decentralization in cities, traffic courts and bureaus, and effect of parking restrictions. Other similar studies are in process. A special leaflet was printed and distributed through the General Federation of Women's Clubs. Special articles were contributed to many magazines, and conferences and meetings were attended.

The Education Division has made progress through the leadership of Mr. Albert W. Whitney and the generous support of the National Bureau of Casualty & Surety Underwriters. Through the school magazine, *Safety Education*, field work, constant correspondence with many cities, attendance at educational conventions and improved. A catalog of sample posters was printed. Cooperation has been continued other means, and especially through the services of the executive secretary and field representatives, the work has been advanced. A special survey was made of the safety teaching methods in Massachusetts. The school safety posters have been with other national bodies, such as the Playground and Recreation Association of America, the National Congress of Parents and Teachers, and numerous others. This Division was represented at the meeting of the National Education Association and other similar conferences of educational authorities.

Our Educational Publicity Service in the industrial and public safety fields has been considerably increased. Scores of news articles, special articles, seasonal safety lessons, photographs, charts and other propaganda have been used by hundreds of daily and weekly newspapers, magazines, trade, technical and class publications. Dispatches and feature stories have been cleared through the national news distributing agencies. Daily radio talks have been broadcasted through a special service sent to more than 80 radio stations in different cities at their request. Special material has been given to community councils and members for local publicity campaigns. Numerous periodicals have published editorials commending the Council's work. Our news release sheet service is now printed and sent to more than 1,600 newspapers and 500 trade, technical and class periodicals. The mat service is sent to 235 newspapers on request. A national poster contest has been inaugurated among cartoonists and money prizes offered.

Work Among the Community Councils

Community Councils: Our intimate contacts with the services to the community councils have been increased. There are now 60 affiliated local and state councils. These councils reach a population of 22,209,000. Twelve hundred volunteer committeemen are rendering service, the salaried staffs aggregate 110 people, and these councils are spending \$435,000 annually. The Council's service has been concentrated on existing councils but efforts are made to enlist the interest of other communities in local council activities. A new director of this division of the Council's service was employed during the year and another field representative added to the staff. The 10-volume loose-leaf encyclopedia, "Standard Practices for Community Safety Councils," has been kept up to date, and complete working standards have been developed for our field representatives, insuring a more coordinated method of approach in handling this work. The monthly News-Letter of specific information to community council officers, with enclosures, has been continued. Three field representatives have given all of their time to the organization of and service to state and local safety councils. A Summer Institute, lasting one week, was conducted for council managers and prospective managers. The quarterly conferences of managers were continued. A Speakers' Manual was prepared, printed and distributed during the year. Detailed standards for Inter-Fleet and Inter-Plant Accident Reporting Contests have been developed and are now being used by 17 councils. The service and experience of the National Safety Council and local councils on many recommended activities have been organized and prepared as memoranda.

External Relations: Friendly relations have been maintained with other institutions interested in safety, such as the American Red Cross, American Museum of Safety, Chamber of Commerce of the United States, Canadian Safety League, American Association of Industrial Physicians and Surgeons, the Safety Section of the American Railway Association, American Gas Association, the Safety Bureaus of the Insurance Companies, National Fire Protection Association, National

Education Association, Joseph A. Holmes Safety Association, International Association of Chiefs of Police, Playground and Recreation Association of America, National Child Welfare Association, American Automobile Association, National Automobile Chamber of Commerce, Associated General Contractors of America, International Labor Conference of the League of Nations, the State and Federal Government Departments, as well as the American Engineering Standards Committee and the National Bureau of Casualty & Surety Underwriters. The Council has maintained its policy of cooperation with these institutions and has looked for opportunities for closer contacts with those leading the safety movement in their respective spheres of influence. A great many safety exhibits have been furnished on request for trade association meetings and similar affairs.

General Activities: The Research Committee to study the health problem due to the use of spray guns has completed its work and the final report, with appendices, is now in the printer's hands; approximately \$10,000 has been spent on the field investigation and printing. One hundred thirty-one bulletin boards have been distributed among members. A new but simple bulletin board has been designed for new members. The distribution of the pamphlets "Make It Safe" and "Safety-Ize" has been continued into thousands of copies. Assistance has been given in the drafting of a Model State Safety Law for safety codes. A monthly News-Letter has been sent to members. A new service department has been organized during the year. The printing division has been augmented by the purchase of a second printing press. The Council is now printing all its posters, as well as miscellaneous printing jobs, on its own printing presses. A new cost accounting and bookkeeping system has been devised. A new magazine for workers has been planned. A domestic accident committee is studying the home accident problem. The entire offices of the Council have been re-arranged and furnished to accommodate the increasing business and staff of the Council. The foreign membership has increased and the Council has augmented its foreign service.

The Council Headquarters Staff

Staff: The real staff of the National Safety Council is the membership, a large number of whom have contributed to the National Safety News, the safety poster service, the Safe Practices pamphlets, the upbuilding and service of the sections, the Annual Congress, the film and slide collections, and all of the committees, both sectional and local. More than 1,000 persons now serve on these committees. The headquarters staff now numbers 80 persons. The leaders in this staff are:

William H. Cameron, Managing Director.
 Sidney J. Williams, Director, Public Safety Division.
 Julien H. Harvey, Director, Territorial Councils Division.
 W. Dean Keefer, Director, Industrial Safety Division.
 Willard L. Wheeler, Director, Business Division.
 Arnold A. Mowbray, Director, Public Information Division.
 Lee H. Gardiner, Director, Poster Division.
 Paul F. Stricker, Field Representative.
 Ernest W. Corn, Field Representative.
 Robert C. Haven, Field Representative.
 Carman T. Fish, Editor, NATIONAL SAFETY NEWS.
 Guy M. Briggs, Associate Editor, NATIONAL SAFETY NEWS.
 Stanley H. Kershaw, Safety Engineer, Industrial Safety Division.
 George E. Burns, Safety Engineer, Industrial Safety Division.
 Stewart J. Owen, Jr., Safety Engineer, Industrial Safety Division.
 Harry N. Blakeslee, Field Representative, Petroleum Section.
 Earl J. Reeder, Supervising Engineer, Public Safety Division.
 Bruce I. Whiting, Engineer, Public Safety Division.

Reuben L. Forney, Statistician, Public Safety Division.
 Carroll E. Robb, Statistician, Public Safety Division.
 Gordon L. Lewis, Advertising Manager.
 Richard H. Porter, Director, Service Extension Department.
 Herbert H. Greenwald, Accountant.
 George O. Lindquist, Director, Publication Service Division.
 Roy H. Olson, Director, Membership Service Department.
 Idabelle Stevenson, Executive Secretary, Education Division.
 Marian L. Telford, Field Secretary, Education Division.
 Florence Nelson, Editor, *Safety Education*, Education Division.
 Mary B. Day, Librarian.
 Mary M. Wells, Assistant Librarian.
 Myrtle H. Mollan, Chief Clerk.

Annual Report of the Treasurer

H. M. Webber, Vice-President and Treasurer, Chicago, Ill.

COMPARATIVE BALANCE SHEET—JULY 31, 1927 AND 1926

Assets				
	As at July 31, 1927	As at July 31, 1926	Increase	Decrease
Current Assets:				
Cash	\$ 27,562.40	\$ 13,954.26	\$13,608.14	
Investment Securities	19,833.75	19,913.75		\$ 80.00
Accounts and Notes Receivable	27,470.61	23,216.30	4,254.31	
Advance Traveling Expense....		4,575.00		4,575.00
Inventory of Supplies	5,341.82	3,640.45	1,701.37	
Deposit with Postmaster.....	285.80	364.29		78.49
			<u>\$19,563.82</u>	<u>\$4,733.49</u>
Total Current Assets.....	\$ 80,494.38	\$ 65,664.05	\$14,830.33	
Prepaid Membership Dues				
Reserve Investment	82,840.88	59,990.94	22,849.94	
Office Furniture and Equipment	15,512.94	15,726.11		\$ 213.17
Printing Department Machinery..	9,930.54		9,930.54	
Deferred Charges	25,009.94	11,412.28	13,597.66	
			<u>\$61,208.47</u>	<u>\$ 213.17</u>
	<u>\$213,788.68</u>	<u>\$152,793.38</u>	<u>\$60,995.30</u>	
Liabilities				
Current Liabilities:				
Accounts Payable	\$ 290.84		\$ 290.84	
Current Accounts (Local Councils)	235.53	\$ 246.25		\$ 10.72
			<u>\$ 290.84</u>	<u>\$ 10.72</u>

Total Current Liabilities.....	\$ 526.37	\$ 246.25	\$ 280.12	
Accrued Expenses	240.00	220.00	20.00	
Sustaining Membership Fund.....		9,350.00		\$ 9,350.00
Unexpended Balance, Education Division		3,740.66		3,740.66
Deferred Income	28,557.76		28,557.76	
Prepaid Membership Dues Reserve	82,840.88	59,990.94	22,849.94	
Surplus	101,623.67	79,245.53	22,378.14	
			<u>\$74,085.96</u>	<u>\$13,090.66</u>
	<u>\$213,788.68</u>	<u>\$152,793.38</u>	<u>\$60,995.30</u>	

STATEMENT OF GROSS REVENUES AND EXPENDITURES

Fiscal Year Ending July 31, 1927

Gross Revenue

Membership Dues:	
Active	\$251,778.09
Sales of Calendars, Pamphlets, Bulletins, Chauffeur's Lessons and Miscellaneous Receipts	268,235.86
Contribution of National Bureau of Casualty and Surety Underwriters Toward Expense of Education Division.....	24,000.00
Education Division—Sundry Receipts	6,991.46
Gross Revenue, National Safety News, advertising and sales extra copies (Dues from Council Members not included).....	26,591.26
Interest Earned	1,070.92
	<u>\$578,667.59</u>

Gross Expenditures and Disposition of Net Revenue

Annual Congress Expense	\$ 10,494.57
Annual Congress Exhibit	1,649.05
1926 Annual Congress Proceedings.....	14,529.37
Automobile Dash Cards.....	566.69
1927 Calendars	93,193.35
Chauffeurs' Lessons	248.70
Depreciation of Office Furniture and Equipment.....	2,952.34
Depreciation of Printing Department Machinery.....	767.41
Exchange	456.80
Field Work, including Salaries.....	20,845.40
General Local Council Expense.....	332.45
General Bulletins	17,409.17
General Office Expense	5,472.43
Library Expense	373.52
Membership Solicitation Expense	13,940.41
Miscellaneous Publication Expense	1,624.09
National Safety News	45,565.96
Office Printing and Supplies.....	6,343.04
Postage	4,736.09

Annual Meeting of Members

45

Publicity	6,696.12
Rent, Light and Power.....	21,560.43
Safe Practice Pamphlets.....	2,275.12
Salaries of Officers and Staff.....	141,004.86
Sundry Activities	38,652.80
Taxes and Insurance.....	390.65
Telephone and Telegraph.....	2,498.08
Traveling Expense—Administrative, including National Committee Expense	4,456.03
Loss on Exchange of Equipment.....	157.54
Sectional Activity Expense, including Printing Bulletins.....	47,227.20
Education Expense from Contributions of National Bureau of Casualty and Surety Underwriters	24,000.00
Education Division—Sundry Disbursements	6,991.46
	<u>\$540,411.15</u>
Transfer to Prepaid Membership Dues Reserve.....	15,878.30
Transfer to Surplus	22,378.14
	<u>\$578,667.59</u>

H. M. WEBBER, Vice-President and Treasurer.

We have examined the above Comparative Balance Sheet of the National Safety Council as at July 31, 1927, and July 31, 1926, and the Statement of Revenues and Expenditures for the year ending July 31, 1927, and have compared them with the books and vouchers and have found them correct.

ARTHUR YOUNG COMPANY.

Chicago, Illinois, August 20, 1927.

Certified Public Accountants.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



General Session

Monday, September 26, 1927

COLONEL A. A. SPRAGUE, Chairman
Chairman of the Board, Sprague, Warner & Company, Chicago, Ill.

The General Session was called to order at two-twenty o'clock by President Walter G. King.

PRESIDENT KING: Our chairman this afternoon is a very distinguished Chicagoan. He has many accomplishments in both business and public life. His name is associated with many public enterprises. His civic interest is supreme. His business ability and leadership have very high respect in Chicago.

Colonel Sprague is a graduate of Harvard University. He is the leader and director of the Sprague, Warner & Company organization, a director in a number of large business enterprises, a trustee of the Chicago Field Museum of Natural History, the John Crerar Library, the Art Institute, the Children's Memorial Hospital, and Rush Medical College.

He served with distinction in the World War as Lieutenant-Colonel. He has been the Commissioner of Public Works in Chicago since 1923, and gives very liberally of his time to public enterprises.

It is indeed a very great honor to this convention to have Colonel Sprague sponsor it by accepting the directorship of this meeting. It gives me great pleasure to introduce him to you as your chairman for this afternoon.

(Col. A. A. Sprague took the Chair.)

CHAIRMAN SPRAGUE: I think for a person to venture to be chairman of a meeting with as little knowledge of the subject as I have would be regarded, usually, as a foolhardy adventure. However, as Commissioner of Public Works of the City of Chicago, which I no longer am, I became so interested in the necessity for safety education and safety campaigns that when I was asked to preside at this meeting, I accepted with considerable alacrity.

I understand there has been a change in the program in that General Dalton who was to have been the first speaker this afternoon had to leave town, so he spoke this morning. However, I think you will find that the paper you will hear which will be read by Past-President Lew Palmer, and which was prepared by Mr. Harry F. Guggenheim, will be of great interest to you. I think it is rather unnecessary, but it gives me great pleasure to introduce Mr. Palmer, who will read the paper of Mr. Guggenheim, President of the Daniel Guggenheim Fund for the Promotion of Aeronautics, New York City.

MR. PALMER: We have a telegram here that disappointed us. We received it from Mr. Guggenheim last evening.

"Regret exceedingly that illness prevents my going to Chicago. Deeply appreciate

compliment Council paid me and am disappointed at losing opportunity personally to cooperate with you in emphasizing need of safety.

"Harry F. Guggenheim."

We are not all airmen, or it would not be necessary, perhaps, to explain to you here today in detail who Mr. Guggenheim is. Every one directly associated with aviation is familiar with his past record, but it would be interesting to know here that he had several years' flying experience in France during the war. He is president of the Daniel Guggenheim Fund for the Promotion of Commercial Aeronautics.

As a member of the National Safety Council's Aviation Committee, I attended the dedication of the new research laboratory given by Daniel Guggenheim to the New York University, a gift of more than \$500,000.

We regret very much that Mr. Guggenheim is ill. Not knowing whether he would be able to be here in person, he arranged that Rear Admiral Cone was to take his place. The Rear Admiral is the Vice-President of this Fund. He advises that the Admiral has been called unexpectedly to Washington, so they have drafted me, as Vice-Chairman of your Aviation Committee, to read Mr. Guggenheim's paper.

Safety the First Essential for Progress in Air Transport

Harry F. Guggenheim, President, The Daniel Guggenheim Fund for the Promotion of Aeronautics, New York City.

Flying under properly organized conditions can be made as safe as any other form of modern transportation. People are beginning to realize this as they learn more about airplanes and airplane operation.

The past few months have witnessed a miraculous change in the public's attitude toward aviation. From a state of apathetic curiosity people throughout this country, and for that matter, throughout the world, have been transformed as if by the wave of a magic wand into enthusiastic worshippers of the "Flying Gods." The magician performing this miracle was a blond-haired youth of 25 who with faith absolute and courage sublime demonstrated by glorious effort that man can fly where he will.

The inspiration given by Charles A. Lindbergh marked the turning point in the American public's interest in aviation.

With this interest will come knowledge—and understanding by the public of flying and flying operations which is today the greatest need in America to assure permanent progress by sane and sound aeronautical development.

When Lindbergh successfully accomplished his flight hundreds of thousands said, "If he can fly from New York to Paris, I guess I can try a little hop some day."

Then came a summer of spectacular, and for the greater part, entirely useless flights—some good, some bad and some indifferent.

The net result has been perhaps greater confusion in the public mind about aviation than ever before, but there has been aroused a conviction on the part of the majority of people that aviation has "arrived" and they now want to understand the whys and wherefores of any disappointments.

Coincident with this inquiring mind, however, the public is developing an insistent demand for safety. There is no better illustration than the turn of public opinion against trans-oceanic flights which were causing so many tragedies. More people every year are using our aerial transport facilities, but we cannot expect great progress until we make our airplanes relatively as safe as our automobiles and our railroads.

This public skepticism is not disheartening—such a view is always to be expected. Sir Samuel Hoare quotes an old newspaper clipping of 1843, which, commenting on the railroads, said "the largest item in railway returns ~~is~~ ^{is} to be the list of

killed." The railroads proved they were safe and the traveler today has no worries when he steps abroad the fastest train.

In making the airplane safe we have to start almost at the bottom of the art of flying, since we must remember that aviation is yet an infant industry in many ways.

It seems obvious that a pilot would not overload his plane, yet a number of fatalities have been caused within the last few months merely because the plane was overloaded. We wouldn't think of putting the load of a five-ton truck on a roadster or of fitting such a truck with the motor of a roadster. Overloading an airplane results not only in structural strain but entails a flying condition that is abnormal and naturally dangerous.

It is often a simple and preventable error of this kind that causes a fatality. It cannot be charged against the airplane any more than can a death resulting from a careless pedestrian walking in front of a motor car be charged against the qualities of the automobile.

If we examine the hazards of flying we find they can all be traced to physical sources. Flying is nothing more than counteracting the law of gravity. Safety in flight, however, involves much more than the mechanics of the plane itself, but, unless we center our attack on some one problem we can only touch the surface. For this reason we are trying to solve the problem of the plane itself. In April the Daniel Guggenheim Safe Aircraft Competition, with prizes totaling \$150,000, was announced and entries are now being received.

This competition grew out of the realization that airplanes, to be aerodynamically safe, must land more slowly, roll only a short distance after landing, be able to glide steeply and in safety over obstacles surrounding a field, take-off quickly and on a steep path, remain in perfect control at the stall and in all other flight attitudes, and be inherently stable when, owing to weather conditions, the pilot cannot himself maintain an even keel.

The Airplane Structure Seldom Fails

The modern airplane is a light, but excellent structure and it is very rarely that we hear of a structural failure in the air. The air-cooled aviation engine is now a highly reliable mechanism. Careful installation of the power plant has eliminated fire hazard to a large extent. But while the airplane has made marvelous progress in speed, economy and load carrying since its early days, it is still lacking in safety from an aerodynamic point of view. Improvements in aerodynamic safety characteristics have in fact been sadly neglected by designers who have bent their energies largely to progress in performance.

When engine failure does occur in cross-country flying, safety depends on the availability of an emergency field. The emergency field may be broken up in surface and very small. The average airplane lands too fast and rolls too far in such terrain. Moreover, the field may be not only small, but surrounded with obstacles such as trees and wires. The only possible approach is then on a steep glide. But a steep glide on the airplane of today on landing frequently means disaster.

In getting out of the small field with a present-day airplane the converse of the above circumstances is found. The take-off run is too long, and the plane while climbing rapidly may not climb steeply enough to clear surrounding obstacles.

A frequent source of accident exists today when a plane is climbing rapidly and the engine suddenly fails. The plane may "stall" and the pilot lose control, the plane fall off on one wing, and go into the dreaded "spin."

In fog flying, the pilot no longer has the horizon to guide him. He is completely blind, and gusts of wind and disturbances may make his instruments no longer reliable. He may then be flying in the most extraordinary and dangerous altitudes without being aware of it, unless the plane is such that it is always stable, and will keep an even keel independent of the pilot's efforts.

Most of these problems have been solved individually in different planes and it is the purpose of the competition to coordinate them into one plane, which will be "safe airplane."

For instance, we can obviate to some degree the necessity of forced landings because of engine failure by fitting our planes with more than one motor, so that the plane can fly with one of them disabled. All planes carrying passengers should be multi-engined, which incidentally is one of the requirements for the passenger-carrying planes which will be bought under the equipment loan plan announced some time ago by the Fund.

Further progress is indicated by one of the remarkable aeronautical inventions of recent years which may have a marked effect in stimulating our efforts to obtain safety in flight. This aircraft, the Autogiro, invented by Senor de la Cerva, contrary to common belief, is not a helicopter. It cannot rise vertically and its revolving wings are not power driven, but in many respects it is just like an ordinary airplane. It has the usual engine-driven propeller to pull it through the air, the customary fuselage housing the engine and crew, the usual form of landing gear and tail surfaces to provide up and down and side steering. Its fundamental difference is that its lift is obtained from a sort of giant windmill with four blades. When once this windmill has been set in rotation and forward motion is attained, the windmill continues to rotate. In so doing, it provides an upward reaction or lift.

The Autogiro Is Safe and Stable

There are two great advantages to the Autogiro. With an ordinary fixed surface, the wings must meet the air rapidly in order to give sufficient lift. In the Autogiro the craft may be flying or gliding very slowly as a whole, yet the blades will be revolving fast and thereby providing all the lift necessary. Therefore, the Autogiro is an aircraft which can fly and land very slowly and never "stalls."

The second great advantage is found in the fact that the blades are not only free to revolve round the vertical shaft, but are also hinged at the inner end, so that they can adjust themselves in any required fashion without the windmill introducing any sideways tipping forces.

The Autogiro is therefore very safe and stable, and remarkably easy to fly. It has not yet demonstrated the efficiency and high speed of the airplane, but it has aerodynamic safety characteristics which every aircraft should embody.

Another example of fundamental progress in safety is Mr. Handley Page's slot and aileron control, which has gone a long way toward allowing complete control of a plane at low speeds. Captain G. T. Hill's tailless airplane is an important step in the direction of inherent stability.

Fundamental research work of this kind and experimental planes now in operation indicate a complete solution of the problem of aircraft safety not only is possible but may not be far distant.

However, even when we have found our "safe airplane," we still have other obstacles to overcome such as the nature of the terrain, clouds, darkness, wind, fog and sleet.

Most of these obstacles can be overcome by improvement of equipment and by organization and skill of operation. The more experienced a pilot becomes the better is he able to cope with the atmospheric conditions. There are still many things to be done to help the pilot, however, Commander Byrd's experience in his recent oceanic flight brought vividly to the attention of the world the necessity of finding safe ways of flying in fog, and more especially, of landing in a fog.

Concerted efforts are now being made by scientists to devise some way of solving this problem. Perhaps it will be some way of dissipating the fog, of penetrating it with light rays, or of perfecting instruments to guide the pilot in flight and in landing.

Closely associated is the subject of weather and other meteorological reports. Only recently we organized a committee of representatives of the Weather Bureau, the War, Navy and Commerce Departments and the Guggenheim Fund to co-ordinate research work in this field. Eventually we must have frequent and accurate weather reports from wide areas, available at all fields, and we must have a communication system to bring these reports as soon as possible to the pilot in flight.

The scope of these weather reports, incidentally, demonstrates just how large the field of aviation really is. Weather conditions in the United States must be reported in Canada. Storms along our coasts must be reported to Europe. Professor Hobbs of the University of Michigan is now in Greenland studying the effect of Arctic weather on Atlantic weather. When the day of regular trans-Atlantic flights arrives, there will doubtless be a regular Weather Bureau station in Greenland reporting by radio the inception of any storm that will make transit over the ocean dangerous or impossible. Aviation has wiped out boundaries and is international.

Absolute safety, of course, will call for a complete system of well equipped and maintained airports and airways, lighted when necessary and dotted with emergency landing fields. We can expect installation of this ground organization just as soon as the demand arises.

There Are Virgin Fields for Research

In the improvement of equipment there are several almost virgin fields for research, such as, for example, shock absorbing aircraft in which crashing will not entail injury to occupants of the plane, but in the long run we have made tremendous progress, greater, I believe, so far as the time element is concerned, than has been accomplished in any other field of transportation. The wonderful performance of the Air Mail Service is only an indication of the possibilities of commercial aircraft.

It is well to remember that we have been attacking this question of commercial aeronautics only for a few years. The war interrupted our commercial development and concentrated all attention on military planes, which must have speed and maneuverability rather than safety as primary requirements.

Government orders for military planes still form the backbone of the aeronautical industry, which is a costly business and cannot finance experiment in commercial fields to any great extent until there is a market for the product.

When we solve this problem of safety, however, people will want planes and by quantity production they will be in the reach of the same people who today own automobiles.

In conclusion, let me say that there have been, to my mind, surprisingly few aviation accidents in the United States during the past year in view of all of the circumstances. Hardly any of the accidents can be attributed to commercial development. Most all of them can be traced to stunt flights, reckless private flying, experimental flying and military and naval aviation. These latter services are obviously dangerous and accidents in them must be accepted as the price of preparedness for war.

Aviation development in the United States in the past eighteen months has been extraordinary. Only as recently as May, 1926, did the Federal Government officially recognize that such a thing as aircraft existed and at that time first passed legislation to foster and protect aviation. When at that time the Air Commerce Act was passed the public was little interested in aviation, and manufacturers, operators and pilots were fearful lest too much legislation might interfere with aviation development. At the present time the public is vitally interested in aviation and their views in regard to safety and development are of paramount importance. This is a healthy sign of progress and is a good omen for aviation.

The Bureau of Aeronautics in the Department of Commerce during the short time of its existence has made remarkable strides and has been of inestimable value

in aviation promotion. In the light of experience more legislation is undoubtedly needed at present to control flying and prevent accidents. Every aircraft and pilot flying in the United States should be licensed by the Department of Commerce which the present law does not require. In addition regulations providing against the overloading of aircraft are essential.

However, legislation will never be a panacea for accident prevention, or if it is, all progress will stop. In the last analysis such organizations as the National Safety Council, through its wide influence on public opinion, can be the greatest service to aviation safety and development.

A. T. MOREY, General Manager, Commonwealth Steel Co., Granite City, Ill.: I move you that the Congress express its regret at Mr. Guggenheim's absence, and appreciation of his paper that we have just heard read, and that our managing director convey that expression to Mr. Guggenheim, together with a copy of the resolution on aviation adopted this morning.

(The motion was seconded and carried unanimously.)

CHAIRMAN SPRAGUE: I think the foundation of the Guggenheim Fund for the increasing of knowledge and safety in aeronautics is a tremendously patriotic thing, and I believe it is going to be a very productive thing for this country.

It isn't alone on the Atlantic Coast that this work is being done. This summer I saw in Seattle, at the University of Washington, a large building for the study of aeronautics and all of the sciences that pertain to that, erected by a Washington family whose boy had been in the aviation service in the war. I wondered at that time what would have been the result if in the early days of railroading the railroads had been helped by this sort of study. I think Mr. Guggenheim is right when he says that it will mean a very immediate solution of many of the problems that now terrify the public.

Our next speaker came from Cleveland to address this meeting. He has an enviable record for public service. He has been a newspaper editor, a manager, a leader in many civic movements, a well-known advertising man, and an author of many books. He has a national reputation as an orator.

Mr. Rose is the President of the William G. Rose Company: he has been a trustee of the Welfare Fund of Cleveland, a vice-president of the Advertising Clubs of the World, the manager of the Cleveland Industrial Exposition, the Detroit Industrial Exposition, the Cleveland Art Exposition, and the Cleveland Electric Exposition. Mr. Rose has already addressed several of the largest meetings of the Community Council, and he was invited partly on the demands of the members of the National Safety Council who insisted on hearing his exposition of the quality of enthusiasm in safety work. It gives me great pleasure to introduce to you Mr. William Ganson Rose, of Cleveland, Ohio.

Putting Enthusiasm into Safety

William Ganson Rose, Cleveland, O.

It is indeed embarrassing to be asked to talk on the subject of enthusiasm to what (I am told) is the most enthusiastic gathering in the sixteen years of annual meetings of the National Safety Council. Yet I do not feel as much embarrassed as did the Cleveland politician who spoke a short time ago in one of our political campaigns in a colored church. The colored minister introduced him, and he said, "Breddern an' sisters, I want to present to you a good friend of de colored people of Cleveland. Dey ain't no better friend of the colored folks of Ohio dan our speaker tonight. Why, he don't know no color, he don't know no creed, he don't know no religion, he don't know nothin'."

Speaking of embarrassment, you can imagine how I felt this afternoon when I came into this hall and was handed a poster which told me how to prepare my

speech on Tuesday morning and give it on Thursday morning. But this safety device, like many others, has come too late, and I am going to pass it on to my good friend Statistician Cattell, of Philadelphia, believing that he can use it to advantage, as he delivers only 1,000 addresses a year.

"Safety!" That word has had a strong significance for me, ever since boyhood days when I fell off my first safety bicycle and punctured a floating rib with a safety pin. That was some time before my first scrape with a safety razor.

My subject is "Putting Enthusiasm into Safety." I can't tell this group anything new about enthusiasm; but I might remind you that Emerson said, "Nothing great was ever achieved without enthusiasm." Enthusiasm discovered America, it led to the Declaration of Independence, it made the United States the greatest nation in the world; and enthusiasm has been a dominant quality in all leaders of men—Alexander, Hannibal, Caesar, Napoleon, Washington, Lincoln, Sprague, King and Cameron.

Enthusiasm Is the Headlight of Progress

Enthusiasm is the headlight on the train of progress, and, by the way, enthusiasm is contagious. If the head of a house has ginger germs, the rest of the establishment catches enthusiasm. That is, they should become inoculated, and if they don't it is because they are immune. You know the kind of humanity that is immune to enthusiasm. They are human wet blankets, Job's comforters, and the rest of the cheer-up-the-worst-is-yet-to-come crowd.

Enthusiasm sells goods. You know that an enthusiastic salesman can sell horse liniment to a man who owns an automobile. An enthusiastic real estate dealer can sell a swamp to a man with inflammatory rheumatism. An enthusiastic builder can sell a fireproof building to a merchant who needs the insurance.

The problem of the National Safety Council is a selling problem. The theory of this organization's work is unchallenged. The plans devised by the many divisions of the Council are admirable. The program of this wonderful convention to be addressed by more than 300 speakers will be crowded with helpful recommendations; and yet the real success of the work will depend upon the enthusiasm of the American people in accepting the Council's great plan. It is a problem of selling, selling ourselves, selling every member of the association; and, through the schools and homes and factories, selling the American people. We all know what a difficult job it is to sell safety to a nation where the people love to take a chance.

I suggest that enthusiasm be made the keynote of this great convention, for without enthusiasm, no matter how good your plans, you cannot sell safety.

One of the best essays I ever read on selling was headed, "Don't sell things; sell effects." I am going to read just a few sentences from that: "Don't sell pianos; sell music and pleasant evenings. Don't sell automobiles; sell travel and the great out-of-doors. Don't sell books, sell the joys and profits of knowledge. Don't sell things, but sell ideals and effects and self-respect."

So in this great safety movement, don't sell safety, but sell the happiness of the people, sell the care of little children, sell the well-being of the other fellow, sell peace of mind and protection and the gratification that comes from doing the right thing.

It is difficult to sell a public where nearly everybody is thinking along several lines at the same time. This calls to mind the story of Arnold Bennett when he came to Chicago during his recent trip to America. They gave a large reception for him here in this city, and at the reception a very effusive young woman ran up and thanked him for his works and said, "Particularly I want to thank you, Mr. Bennett, for your wonderful article on concentration."

"That is fine," said Mr. Bennett. "I am pleased to learn that I have helped you. May I ask upon what you are concentrating?"

"Oh," said the effusive young woman, "upon lots and lots and lots of things." I am afraid that is the way most of the American people are concentrating today. If all the industrial institutions would only sell safety with the enthusiasm that happily marks thousands of companies, the total industrial fatalities would drop from the annual figure of 24,000, and the time lost through accidents would no longer be equivalent to 700,000 men continually disabled and off the pay roll. If we could only sell, with enthusiasm, the idea of safety first to parents and little folks, the awful toll of 21,000 nieces and nephews of Uncle Sam would not be taken, and 20,000 fatalities in American homes would be reduced to a comparatively small number.

If we could only sell to motorists the idea that it pays far better to stand up for safety than for our rights, automobile fatalities would drop far below that sickening figure of 25,000 a year. Putting enthusiasm for safety in the hearts of the American motorists would materially decrease that economic loss due to street highway accidents now totalling some \$700,000 a year. Of course, no observation of safety rules can be expected of the intoxicated driver, who is one of the greatest menaces on this earth. He is just as bad as an insane man, without the excuse. He is a potential murderer. Members of the National Safety Council, let's get rid of him!

When is a Pedestrian Safe?

It is a pity, but nowadays a man doesn't know when he is safe. Let's get a picture of the pedestrian of 1927 trying to cross the street here in Chicago at an intersection.

Chug-chug-chug-chug—an automobile is running toward him from the north. Pip-pip-pip—a motorcycle is coming at him from the east. Whirr—!—a fire engine is rushing at him from the west. Honk-honk-honk—a truck is coming up from the south. Brrrrrrr!—an airplane is falling down upon him. He stoops down, pulls up a manhole cover and jumps through—just in time to be run over by a subway train!

This is an appropriate time to recall the words of that distinguished jurist who recently passed away, Judge Elbert H. Gary, an honorary member of this Council, an industrial leader, humanitarian. You remember he said: "The question of safety calls for vigorous and aggressive action, and its results are expressed in most precious terms—human lives."

A leading merchant of Cleveland told me the other day that one of his chief functions is inspiring enthusiasm in his traveling salesman. "First, I give them all the information they need," he said, "and then I pump them full of enthusiasm. And when I think the spirit is beginning to die out, I call them home and then I pump again." Pump enthusiasm into a pessimist and you will have an optimist. Pump enthusiasm into a quitter and you will have a winner. Pump enthusiasm into yourself, and it will give you greater strength and courage and confidence.

The enthusiastic minister is the most persuasive—Henry Ward Beecher, Rabbi Wise, Cardinal Gibbons. The enthusiastic actor is the most inspirational—Irving, Mansfield, Bernhardt. The enthusiastic business man is the most successful—Carnegie, Schwab, Gary. It is the same in every line.

But going back of enthusiasm in business, what do we find? Enthusiasm in self! Here is something worthwhile. If you think you don't need enthusiasm as a social attainment, why, get it for purely selfish reasons. There's nothing like it for a cheer-up tonic. It quickens the brain, stirs the circulation, warms the cockles of your heart. Enthusiasm contributes to true happiness. Of course, there are different ideas concerning happiness, a fact that calls to mind the story of the Irishman with seven daughters. A friend was congratulating this head of such a large family, and he said to him, "Most people believe that the possession of wealth is happiness. But

tell me, which do you consider the happier—a man like yourself, the father of seven daughters, or a man with a million dollars?"

The Irishman thought for a few minutes and said, "Sure, I giss the fayther of seven daughters is the happier."

"I'm glad to hear you say so. What is your reason?"

"Well," said the Irishman, "the man with the million dollars always wants more."

It is different with boys. The Irishman, father of seven sons, was being congratulated. "Sure," he said, "and they're a fine lot o' boys. I niver had to raise me hand against one o' them excipt in self-defense."

Enthusiasm contributes to optimism, and optimism happily has been a dominant quality in this Council ever since it was created. The organization has always endeavored to make things better and has never used as a slogan, "It might be worse." That calls to mind the story that Cardinal Hayes of New York told me some time ago. He was illustrating a point in optimism. He told about an Irishman in New York who, no matter what adverse conditions might arise, would always draw a long breath and smile and say, "Well, thank God, it might be worse." That grew to be tiresome, and finally a priest told the Cardinal that he would cure Pat of this habit. So he met Pat on the street a few days afterward, and he said: "Pat, I had a dream last night. I dreamt that Judgment Day came and you were condemned to hell for all eternity."

The Irishman was taken back. He dropped his head for a moment; he couldn't speak. But finally he drew a long breath, looked up and smiled, and said, "Well, thank God, it might be worse."

"How could it be worse?" asked the priest.

"Well" said Pat, "your dream might come true."

The Optimist Who Lost a Ten-Dollar Bill

The chairman alluded to the fact that I am interested in advertising, and let me say that enthusiasm plays a large part in the advertising business. I happen to recall a story that I think of when I think of advertising, the story of the ten Chicago men, each of whom lost a ten-dollar bill. Nine of these men were pessimists and they said, "The money is gone. Well, let it go." But one of them was an optimist, so he advertised, and the next day eight men came to his office each bringing a ten-dollar bill. He gave to these men each a one-dollar bill for his honesty. The other two bills fell into the hands of thieves, who naturally kept the money. So, you see, the nine pessimists got nothing, the two thieves got ten dollars apiece, the eight honest men got a dollar, and the optimist got seventy-two dollars. The moral is, honesty may or may not be the best policy, but it certainly pays to advertise.

There is probably no other nation that has made as scientific a study of safety in many lines as our own nation. This is possibly largely due to the fact that we have so many unsafe inventions and institutions, but no sooner is an unsafe idea born than American brains start a safety device as a remedy.

I heard of one company that manufactured a hair tonic that caused dandruff, and then quickly put on the market a dandruff cure.

Enthusiasm, unhappily, leads to many fields that lead to accidents. Take golf as an example. I understand there are many golf players here at the convention, and some of them on the links this afternoon. You know, golf leads to accidents, even as played by our best citizens. I know that President King, according to the report that was given me this morning, is an ardent golf player, and he himself is guilty of leading to an accident on the links—that is, if I am properly informed. He inspired the poet, by this incident:

I shot a golf ball into the air
It fell to earth I knew not where;
For so swiftly it flew, the sight
Could not follow it in its flight.

I kicked my caddy into the air;
 He fell to earth, I didn't care;
 For nothing I know can make one rile
 Like a supercilious caddy's smile.

Soon, soon after, I found the ball.
 It hadn't moved from the tee at all;
 And the caddy was standing sardonically grim—
 I had kicked my opponent instead of him.

I am sorry to see Colonel Sprague smile because I understand that he was responsible for another accident. You know, he made a hole in one once. As I understand, it went something like this.

He teed the ball up in the hall
 And only swung in fun.
 The mirror has no glass at all,
 He made the hole in one.

By the way, speaking of golf, I am sure Dr. Haggard will be interested in the definition of golf given by a Cleveland socialist, who said, "Golf is an institution for needlessly prolonging the lives of worthless citizens."

Men need enthusiasm. Somebody has said that no opportunities will make a two-legged animal a man without enthusiasm.

A Big Job for the National Safety Council

I spoke, a few moments ago, about promoting the publicity of safety through the schools. I think that is one of the biggest jobs before this Council, because if the children of today are thoroughly informed about the real significance of safety, then the men of tomorrow will understand, and it will be an easy task, comparatively, from that time on. I notice that the children are to play a big part in the pageant on Friday. I hope you will all be there to witness it. There is one point where I think we ought to give attention to safety in connection with the children, too, and that is in the matter of prevarication. I remember only a few weeks ago in Cleveland there was a little boy who started as a story teller, became a prevaricator and finally a regular little liar. They did everything they could for him. Finally one day the teacher called him up before the whole school and said, "Willy, do you know what happened to Ananias and Sapphira?"

"Yes," said the little boy. "God struck them dead for lying, and I saw them carried into the drug store."

Cities need enthusiasm. In their case we call it civic pride. Remember that everybody can do something with enthusiasm for his own city. Some men can give their city a library, some a museum, some a hospital; some can't afford these things, but everybody can do something for his city. I heard this morning of an absolutely worthless vagabond who did the best he could do for Chicago; he moved to Detroit.

Speaking of civic enthusiasm, let me congratulate the committee in charge of arrangements for its consummate nerve in bringing the nation's seekers for safety to Chicago, city of gatherings, altruistic, evangelistic and pugilistic.

Nations need enthusiasm. Be thankful that we live in the nation that stands first in enthusiasm, and let's use that enthusiasm to keep our nation first in national safety. Enthusiasm wins battles in business or in war, and it can put to rout the whole army of pessimism, commanded by General Apathy, General Indifference and General Debility.

It wins battles on the football field. This is the football season and I am going to tell you a football story about the coach who went to the college president and said, "Young Brown has been dropped off the team. I don't know how important it is to you, but without Brown we can't win another game this season, and I believe with Brown as the center of our plays we will win every game on the schedule."

The coach went away and the president thought it over. He sent for the head of the chemistry department and said, "I understand young Brown failed in chemistry."

"Yes," said the head of the chemistry department. "He stood nothing in his last examination."

"I am sorry," said the president. "He is a fine young fellow and I should like to encourage him."

"Well," said the professor, "let's give him another examination."

A few days later the president learned that Brown was back on the football squad. He stopped the chemistry professor and said to him, "I understand that Brown passed his last chemistry examination."

"Yes," said the professor, "I knew you were interested in the boy, so I gave him another examination. I cut the passing mark to fifty, and I gave him two questions. The first question was, what is the color of blue vitriol, and he said yellow, and that was wrong. And the other question was, what is H_2O and he said, "I don't know," and that was right."

I want to leave with you this suggestion, that we make enthusiasm the keynote of this convention, and that we sell with enthusiasm the wonderful program that will be developed here this week.

On a recent trip through fifteen nations of Europe and the Near East, I was proud to find that there is universal admiration for those two great Americans, one of whom established the safety of this nation and the other who preserved the safety of this nation. I was over in Budapest on the Fourth of July, and much to my amazement I found an Independence Day celebration there in the great City Park at the foot of the monument erected to the memory of George Washington. After the ceremony, I translated the inscription on that monument. It is one of the finest things I ever heard of Washington. It says: "George Washington, not a king among men, but a man among kings."

Only a short time after that I was in London and went, on a rainy day, over to Westminster Abbey and wandered for hours among the British tombs of the great in all walks of life, and then I came out on the porch, and I noticed the rain had stopped and the sun was shining through a cloud, and I saw the figure of a man across the way looking over at the old Westminster Abbey. America is young. Her list of statesmen is small indeed compared with that of Britain, but the figure that stands there all alone in the most conspicuous spot in London is that of an American fully worthy of that signal honor—Abraham Lincoln.

When I returned to Cleveland I found that in my city Mr. W. G. Taylor, one of our veteran real estate men, owned the original photograph of what is either the first or second picture of Lincoln, and today I want to present to you, Mr. Chairman, this picture of the American who preserved the safety of the nation.

Officer Mulcahy Interrupts

CHAIRMAN SPRAGUE: I am sure, Mr. Rose, that the president gratefully receives this.

OFFICER MULCAHY (F. L. Madden, St. Paul, Minn.): I have enjoyed this talk about enthusiasm and this traffic situation, but us fellows who stand out on the corner trying to deal with these enthusiasts would like to hear something more practical about the situation. Ladies and gentlemen, if I had the amplifying horns in this great room on my corner I could increase my efficiency 50 per cent and I could

decrease my vocabulary the same amount. I beg your pardon for buttin' in, but you see it was this way. I'm glad to see so many people interested in safety, particularly in street traffic safety, because that is the thing that I am mainly interested in; and I have come to the conclusion, after much observation, that any man who don't take an interest in traffic safety ain't going to live very long to take an interest in anything else.

I have found, in my observations, that every guy that's got a brain in his head thinks he knows something about this question of safety. The trouble is that most of them think of it in terms of a great flow of motor trucks and automobiles and Fords and taxicabs and street cars and horses and buggies and the like o' that. In other words, they think of it somewhat in terms mechanical, and whether you know it or not, I'm here to tell you that there's nothing mechanical about traffic at all. It is intensely and entirely human.

Now as far as I've been able to observe, there's no automobile that ever did anything to anybody of its own accord. It's only when you take the mechanical perfection of the automobile and then add to it this human intelligence we brag so much about that you begin to have trouble. It always required a human being to steer that car into the grand panorama of painful accidents that traffic history presents to you.

It seems to me that if we give that matter any thought we will find that most of the difficulty lies in the individual. Every minor or fatal accident that I have ever seen—I don't care what the results may have been, I don't care how many people and much property damage figured in it finally—was caused by an individual, either one or two of them; and the sad part of it is that neither one of those guys wanted that accident. They probably never met before. It's safe to say they wasn't mad at nobody when they reached that spot; and I never met a guy yet—and I'm speaking now of the fellows I don't like as well as those I admire—that left home in the morning and included in his plans for the day an accident that would blast one of his fellow beings into another world. But you see, they accomplish the same results through their thoughtlessness or their carelessness, or what have you, as though they planned the thing, don't you see? It is all due to the cuckoo notion that they can handle a ninety-horse power buzz-wagon through traffic and still have their mind engaged on something else than what they are doing, all at one and the same time.

Just Supposin' You Lived Where Automobiles Ain't

One of the reasons for that situation is that the whole street traffic problem, as I understand it, has come along sort of gradual, and we take it in its present motley condition as part of the general scheme of things. If you stop and think, now, of the impression that you will get, supposin' you lived in some remote place where automobiles weren't in excess of the number of bath-tubs or the birth rate, and supposin' you were suddenly taken from that impossible place and planted in the middle of the Loop District in Chicago and you had never seen a situation before like is going on in these here streets. Can you visualize to yourself what your impression would be? If you don't know I can probably tell you. After the first panic had passed away and you still survived, you would come to this conclusion; you would say, "Begorra, 50 per cent of the population is ridin' crazily around on wheels and the other 50 per cent are pop-eyed from leapin' from place to place for safety."

We consider that we live in a civilized country. We get very red in the face when anybody says we are not. Yet according to these long-haired or heavy-browed guys that call themselves statisticians, (whether they are wrong or right I don't know or care), we killed off about 25,000 people last year in street accidents in the United States of America, the home of the free and the brave, and those

25,000 people all were dragged up to the back door of a morgue because of something they didn't intend to get into and had no argument with anybody about; nobody wanted it. Did you ever stop to think that if you went into a barbarous country or a country whose people we loftily look down upon as savages, if they found out that 25,000 people were being killed off in that country for no reason, they wouldn't even stay there? That means, if you are good at mathematics, that about once every 20 minutes in the United States of America some poor guy is gittin' bumped off through a street accident. If you have watched them drive the way I have, backin' out of allies and zippin' around corners, you would wonder why they wait 20 minutes to bump anybody off.

It ain't my idea at all that all of the responsibility for this situation should be pinned on this here car driver, you understand. We have that peculiar and perplexing being who, in my judgment, was put on earth to try the patience of traffic cops, known as the pedestrian. You can remember the time, and so can I, when walking was looked upon as a very beneficial and healthful exercise. Physicians used to prescribe it, particularly when they were up against it to know what else to prescribe. But if a physician should prescribe it today, you know what would happen: you would get suspicious of him, you would think he had surgical aspirations, or something of that kind.

When the Baby Walked It Was An Event

I can remember in my own lifetime, by golly! when the baby learned to walk it was an event in the family. We used to call the neighbors in to tell them about it, we used to wire to the relatives and write the news to them; and today if the little divvil at three years of age don't know the gearshift on at least five cars he's considered a backward child.

I appreciate, just the same as you do, we gotta have both of these guys in the world. There's the motor car driver. He has come to stay, at least as long as we let him live. There's the pedestrian. He has come to stay as long as the motor car driver don't interfere with him. But to the traffic cop, the guy that stands out on the corner, pedestrians all look alike to him. There may be great differences in these people, but we ain't got time to analyze them. We just put them in two general classes, one that are going to live their allotted span of life and those that won't. Both these people have rights under the law, and it is proper that they should have. The trouble is we make the mistake (and I'm talking now to people who are enthusiasts about presenting this safety idea) of stressing too much the idea that they have laws which govern the situation and also that they have rights of way and all that kind of stuff; and it is perfectly proper that those things should be there. Nobody wants them taken away.

But the thing you have got to stress, in my judgment, and that is what I do on my corner (I don't usually have a chance to talk to a gang like this, but I talk to them individually), is to tell them that this is nothing more nor less than an individual responsibility; and if you can't get that into their heads you are never going to cure the situation, because 999 guys can go along minding their own business and one guy can put a bomb under the whole gang of them. If you can make them understand that there is an individual responsibility to every guy who gets into the highway, whether he is on his own two feet or is driving a buzz-wagon, and he's got to observe that in order to be safe, we find that if a guy minds his own business and succeeds in getting past himself without causing any trouble, we don't know of any instance where he has dragged anybody else into trouble.

The only thing that I can see as a cure for this situation is to try to bring home to the individual the fact that he is the boss of this job; because, as a matter of fact, traffic is you and a lot of other people trying to get some place; and with the aid of a kind Providence and some traffic cops, sometimes you get there safely.

There is only one word more I would like to leave with you, because the most misunderstood institution in the world is the traffic cop. A traffic cop isn't out there for the sake of argument, at all; he isn't out there to interfere with any man's institutional rights, although that is a very hard thing to put over with most people. His purpose out there is to help you to get where you are going as quickly and as safely as possible. But I would like to say this, and I would like to put great stress on it, that when the argument once starts—you understand, once the argument begins—it is a historical fact that 999 times out of 1,000 the traffic cop wins.

CHAIRMAN SPRAGUE: The gentleman who has just spoken to you is Mr. F. L. Madden, business man of St. Paul. For nearly a year he has been giving weekly talks on traffic and safety under the name of "Officer Mulcahy," over Station WCCO, as well as speaking at numerous meetings of various organizations in that district. Our friends in St. Paul tell us that Officer Mulcahy in his talks has done much to educate the people in safety.

Our next speaker, Dr. William D. Haggard, of Nashville, Tenn., was the President of the American Medical Association in 1925, probably the highest honor any physician can hold in the world. Dr. Haggard has a medical inheritance. His father was the first president and one of the founders of the Southern Surgical Association. Dr. Haggard has held many important public positions, including membership on the advisory board of the division of surgery during the World War. He served as a major and lieutenant-colonel, saw service in France, and since then has devoted much of his time to the advancement of medical education. He is now Professor of Surgery in the Vanderbilt University at Nashville, Tennessee, and represents the South in our advancing medical science.

What Price Health

Dr. William D. Haggard, Professor of Surgery, Vanderbilt University Medical School, Nashville, Tenn.

I imagine that when you see a doctor get up you will say, "Now we will suffer." I am one of those who believed that my immediate predecessor on this platform was a traffic cop. I labored under the same delusion that the famous English actress did when, in rehearsing her play before Mr. Frohman he undertook to give her some general suggestions about the difference between the English stage and the American stage. In high dudgeon she walked down to the footlights and said, "Sir, I'll have you understand that I'm an artist."

Mr. Frohman said, "Madam, I'll keep your secret."

I don't know how you think a doctor can touch the question of safety and of fire prevention, but one of my surgical colleagues after leaving the operating room to see his patient, found the curtains very closely drawn in her room and asked the nurse why. She said, "Doctor, there's a fire across the street, and we thought if your patient came out from under the anesthetic and saw that fire she might not know whether or not your operation had been entirely successful."

What price health? I don't believe, among all the statisticians of the world, one can compute the wonderful gift and joy of vigorous health. We never appreciate it as much, however, as when we lose it, and then it is not to be computed by all the rubies and all the riches of the world.

It is said that the sick bill of the United States each year is a billion and a quarter dollars in lost wages; and that for hospitalization, medical care, nursing, etc., it is another billion and a quarter dollars. That means that every man, woman and child in this great nation loses \$22 a year for sickness. the

greater part of which is preventable. Can anybody compute the value of a little child's life? Can anybody estimate the stupendous service to humanity of the loving care of the devoted mother? And still the statisticians say that a child at birth economically is worth \$7,000.

I wonder if you ever stop to think how much we, as individuals and through our government, have expended upon us by our state and municipal authorities for the prevention of disease, for the throttling of contagions, and for general sanitation. A hundred cities in this country averaged a dollar per capita; they are the best cities in the country. The average is less than ten cents apiece for your life and mine that the taxes we pay go to defray.

I want to say something to you today that I hope you will take home with you. The best investment that any community can possibly have is an all-time, highly specialized, splendidly trained health officer, who looks after the general health of the community, who prevents epidemics, who takes care of the cleanliness, the water supply, the food supply, the milk supply.

The Volume of Preventable Diseases Is Astounding

Montreal, the beautiful, our neighbor, has just gone through a terrible epidemic of typhoid fever. It is supposed to have come from the pasteurized milk plant that really did not operate properly. As a consequence, there has been a terrible epidemic of typhoid fever in Montreal, so great that the slogan has been, "Don't go to Montreal." Did you business men ever stop to think what that means to a community, commercially and economically, when every tourist, every visitor, every business man, everybody who gets off a steamer, hears "Beware of Montreal?" So it could be said of any other city in this country.

The number of cases of preventable disease is perfectly astounding. Formerly, one little baby in every four died before it was a year of age. Thank God! now it is only seven out of a hundred; and I think the time is not far distant when only two out of a hundred will perish before they reach the first milestone.

Unfortunately, at the present time 30,000 young men and women die unnecessarily of disease in this country which costs an average of six billions of dollars. So I say that it behooves every one of us to do our entire and complete duty in putting over the public and private health program of this world.

I am very highly in accord with the splendid efforts that this magnificent Council, this national organization, is making for people in industry and in commerce throughout the country, but I want to appeal to you gentlemen to look more after the general health. You lose every five minutes only one man from an accident; but every six minutes one person dies of cancer alone; and think of all the other diseases. Cancer is a curable disease. Hitherto you have not realized that, perhaps, but cancer is always local, it is always in one spot, you can take it out like you can the rotten part of an apple. Cancer is like a coal of fire that rolls out on the hearth-rug. In the beginning anybody can stamp it out; after it is neglected and gets through the house, nobody can put the fire out, and that is all there ever was to the cancer problem.

Nearly half the people who are operated on for cancer of the breast are alive and well five, ten, fifteen years afterward. You don't hear of those. You only hear of those who die.

Some years ago I was in one of our largest cities; one of the surgeons was showing a group of colleagues some successful cases, as a matter of scientific interest. He presented a very distinguished looking gentleman from whom he had removed half of the tongue for cancer. The man answered his questions.

You could scarcely detect a lisp in his enunciation. After he left, I said, having noticed he was a man of great presence, "Who is this gentleman?"

The surgeon replied, "Why, he is the mayor of this city," and if I were to call his name everybody here would instantly recognize it, but no one knew that he had cancer. Such a murderous, such a horrible disease we shrink from. "Doctor, don't tell me if I have cancer," we hear every day. But it is the man who has the sharp tooth that rubs on the tongue who has cancer, it is the cigar smoker or cigarette smoker who has cancer on the lower lip, never on the upper lip. Woman never had it, although she is beginning to smoke more and more and will have it later. Cancer never occurs on a baby's skin; it always occurs on some place that receives great irritation, like the mouth, the alimentary canal, the stomach, the organ in the body most unmercifully handled. One man in every forty-five who is forty-five years of age will die of cancer of the stomach in spite of the fact that it can be removed with seven per cent mortality, and one-fourth would be alive and well after five years.

The progress of science has been very great. In the last fifty years the whole of medicine has changed, because the infectious diseases have all been unraveled. Think of the time when we had the terrible scourges in this country due to epidemics of scarlet fever, typhoid fever, cholera, small-pox. When the Panama Canal was first begun by the Frenchman, Ferdinand de Leseps, so many people died that they had to abandon it. Then the American surgeons in the Army found out that the mosquito infected with yellow fever could be inoculated against, and demonstrated this through the splendid sacrifice of Walter Reed, who gave his life to prove it. Then General Gorgas cleaned up the Panama Canal, and instead of a terrible charnel house, it became the cleanest place in the world. So Roosevelt and Goethals and these great Americans built the Panama Canal, but they could not do it without medical knowledge to protect the individual. There is no more yellow fever in the world today.

Typhoid Fever Is Now Under Control

Typhoid used to be such a horrible thing. We had a million men on the border before the war, with not a single case of typhoid fever. Sanitation, pure water, vaccination, were the answer. We had 4,000,000 men on the other side, with less than a hundred cases of typhoid. We would have had 268,000 cases if we had had the same conditions that existed during the Civil War. I mention this to show what tremendous strides have been made in medical protection for you and your loved ones.

Still the half has not been told. You can hardly recollect when some family circle has not been broken up by some lovely child dying with diphtheria. Now, with the use of antitoxin, it averages only nine per cent—on the first day one per cent, on the third day six per cent, after the fourth day thirteen per cent.

We can take every child as it comes to school and give it the Shick test and see whether or not it is immune. Many of us are. Perhaps those of us who have not had it were normally immune, but if the little child, yours and mine, is not immune, let's immunize him. Don't let him strangle to death with the products of infection and inflammation in his throat. I have seen the time when a surgeon going through a ward would see a child strangling with membranous croup, would pull out his knife and do a tracheotomy that the baby might breathe. That is a relic of the past. Heroic, wonderful, unnecessary.

The same is true of scarlet fever. We can immunize children against that.

So I want to say to this company that the medical profession also is interested in safety, your safety, but we want you to go a step further with us. We have

already added, in the last 50 years, a decade and one-half to the span of human life. In the sixteenth century man on the average lived to be 20 years of age. This gradually lengthened and now the average age in this country is 56 years. In New Zealand it is 65 years. Why not here? Why not in America? We have everything else the best. It is up to the citizenry of this country. The medical men have the knowledge and the willingness and the wisdom and the enthusiasm if you please, to put over this great national program of health, the prevention of disease and the alleviation of human sickness. But it is going to take intelligent cooperation of great bodies like yours to equalize and disseminate the knowledge that should be for all peoples all over the world.

We have already cut down in the last 12 years the death rate from tuberculosis nearly three-fourths, from diphtheria, from typhoid, and from these terrible scourges. The time must come in the next 50 years when we must add 20 more years to the span of human life, and, as Dr. Mayo said, the time ought to come within the century when we should live to be 100 years of age.

Infant Mortality Is Greatly Reduced

How are we going to do that? It used to be infant mortality was a dreadful thing. That is wiped out. Then these pests and scourges that I have told you about took dreadful toll. We don't have any more of that. Vaccination against typhoid and these other disease I have been telling you about has done away with it. But what are you and I going to die of? We have already passed the measles stage. We are going to die of the degenerative diseases of the heart, of the kidneys, of the blood vessels, of the brain. How can we prevent it? We can prevent it by the same safety devices that you use in your large industrial plants. You can do it for the men that are under you; but don't neglect yourself. Everybody believes every other man mortal but himself.

No business can exist without an annual audit. The balance sheet, the survey, accompany business. Do you ever have a thorough-going audit of your body and its functions? Do you know what your balance sheet would show? Do you have any idea of how your gearshift is working, and your batteries? You have your car tested. You won't neglect that. Every time I ride on a Pullman car, when we pull into the station I hear a man knocking on the wheels to see that everything is all right for that car to go to the next station. I think about the fellows in the other berths, 32 individuals, perhaps, and I wonder if anybody has ever tapped their wheels to see whether they are seaworthy or ready to go on with active life.

When we came to examine the flower of the youth of America for the draft, we found that one-third of them were defective. Some of the defects were small, errors of vision, bad tonsils, bad teeth, hernia, flat feet, things which could be cured, but many of them had heart disease. Why do you have heart disease? It is an infection. It gets in through your tonsils a great many times, rheumatic fever, and then attacks the heart. It is a wonderful engine, the heart, but it is subject to the same mechanical problems that you have to deal with. When it gets out of order you can't get to it to fix it, but you can prevent that trouble.

A man never thinks there is anything the matter with him. "If you doctors had to depend on me for a living you would starve to death," he throws out his chest and says. He gets a life insurance examination. There is a little albumin there, and he comes running hotfoot. "What in the world is the matter with me, doctor?"

"Why weren't you examined before this? Why did you have to be knocked

down by a life insurance agent before finding out what was the matter with you." Is your body, the temple of your soul, to be so neglected?

My plea to you for safety, gentlemen, is this: Have an annual physical health examination at least once a year on your birthday by your family doctor, head to toe. Let him examine everything about you, and if there is anything wrong, have him tell you what to do and what not to do, how to live.

The trouble we have with individuals is that they come too late. You don't think of sending for the fireman after the house has burned down. You wouldn't sit and look at a fire for a long, long time before you would ring up for the nearest fire department; but we do that habitually with our lives and our health.

I feel, gentlemen, that we are very close akin, the medical profession in its great efforts in your interests, and the splendid work you are doing in prevention. I want to call your attention to the analogy between your efforts and our professional endeavor.

I want to tell you that Oliver Wendell Holmes, the greatest writer whom you think of as the author of *The Autocrat of the Breakfast Table*, was a doctor, Professor of Anatomy in Harvard University, and he wrote these lines, which, I think, are applicable to the beautiful, the wonderful principles, the humanitarian aspects of this assemblage and what it is trying to do today for humanity.

As life's unending column pours,
Two marshalled hosts are seen,—
Two armies on the trampled shores
That death flows black between.

One marches to the drum-beat's roll,
The wide-mouthed clarion's bray,
And bears upon a crimson scroll,
"Our glory is to slay."

One moves in silence by the stream,
With sad, yet watchful eyes.
Calm as the patient planet's gleam
That walks the clouded skies.

Along its front no sabers shine,
No blood-red pennons wave;
Its banner bears the single line,
"Our duty is to save."

CHAIRMAN SPRAGUE: Some of the older members of the Council will remember our next speaker, because he took a prominent part in the 1916 Congress of this Council in Philadelphia. Edward James Cattell is known throughout the country as Philadelphia's grand old man and the city's greatest asset. He has earned this reputation through 25 years of service to the city government of Philadelphia, and during that time has worked under seven mayors. He has been a traveler all his life and has worked in many foreign countries. He has been an active and prominent member in a list of organizations that would take several minutes to read. He is a speaker of international fame and has probably made as many speeches in the United States during the past dozen years as any other single man in America, having the record of making more than 1,100 in twelve months.

Mr. Cattell has come from Philadelphia for the special purpose of addressing you.

Bigger Men, Broader Views, and Better Business

Dr. Edward James Cattell, Philadelphia, Pa.

I am so full of these remarkable addresses which it has been my privilege to listen to this afternoon that it is hard to think of what I want to say. Dr. Haggard's wonderful tribute to the work of the physician in saving life appeals to me tremendously. During my 28 years of service to our city we had an epidemic of typhoid that ran us up to some 14,000 cases, and I traveled to Minneapolis for the sole purpose of meeting a body of waterworks engineers. I wanted them to come to Philadelphia to stimulate public interest so we could raise a large loan to put in a new filtration plant. Other cities were also inviting them and offering them every temptation. When it came my turn to present a plea that they should come to Philadelphia, all I said was this:

"We have 380,000 homes. If you have ever been in a little home where death has wiped the color from the beautiful face of a loving mother, if you have seen those deepened lines in the face of a father when the light went out with the death of a little child, you know why I put my heart in my words when I say that the shadow hangs over 380,000 homes in my native city. If you will come to us we can lift that shadow. Will you come?"

And they came unanimously because they were men whose hearts were in the great work of saving life.

I feel in the same mood as I come today before you men who are doing one of the greatest works possible for a man to do, and that is to safeguard life. I have a right to say this because I have sampled it longer than anybody in the room. Honestly, I want to live to be 100 years old, renew the lease, and do my own repair work. There is no such thing as getting old when life gets better the longer you stay. The rustle of calico stirs me just as much now as it did 70 years ago.

I believe the prophet Jeremiah expressed a truth as true today as when he wrote it, when he said that a woman is only as old as she looks and a man is never old until he quits looking. I haven't quit.

I am delighted to be here today, but I am not going to talk along your scientific lines. Each one here knows more than I do on that subject. I am going to speak of the value of life, especially in this present day. Whatever my life is for length of years, God has been good to me. But on the scientific side, years ago I got my lesson in that. I was to speak on the tariff. I was young, inexperienced, ambitious. I had to take a train to the town where I was to speak. The train was an hour late. A man met me at the station and said, "Cattell, cut out the tariff speech. The meeting is on the second floor. We had to put up substitute speakers. They threw one of them out the window. The only way to save the day is to pretend you know Dr. Simmons. He's a prominent citizen, and if they think you know him you're all right."

I had never heard of Dr. Simmons, but I was young and up against it. When I went to the front of that turbulent audience, I said, "I came here, gentlemen, to talk about the tariff, but the moment I entered your town I thought of Dr. Simmons, and as I drove here every lighted window framed his kindly face. Under those splendid trees in your main avenue I re-enacted those talks that shaped the whole course of my life." They were with me. Then I went too far. I said, "If I were to forget Dr. Simmons I would be a brute. He brought me into the world."

"You darned idiot," my friend said, "he was a veterinary surgeon."

But I believe in life. I love it more every year I live. I have a grudge against the doctors, too. One of them is limiting me to 30 cigars a day, and it is hell. I am kept poor sending flowers to the graves of the men who tell me what to do to keep from getting sick.

But I think—and that is the thought that has been running through every speech today—that individual responsibility in using our God-given powers will help us to be safe. The Lord will do one-half the work, but it is the last half. We have to do our part first.

Years ago I wasted two solid hours, because I had read a learned book telling me to go to the ant and learn to be wise. I went out to the woods and watched an ant struggle for an hour and a half to get over a little bit of stone. He succeeded, but if he had used his head he would have walked around it in ten seconds.

We want to get into the minds of men and women that sense of personal responsibility not only for themselves, but for others. They are not the only persons on this earth. Emerson said a thing that is unforgettable: "We are strong by our relatedness, not our power of penetration." It is not how deeply my mind can go or imagination fly; it is, can I take the gifts which God has loaned me, and, linking them up with the gifts he has loaned to other people, lift the burden from the heart of the world. We are strong by pulling together and having an object in life.

Men Who Had No Excuse for Living

In the last twelve months, in the club where I live, I have seen a dozen men fade out of life because they had no excuse for living, no reason, no desire, over-introspection, thinking only of self.

I love music. A friend of mine said to me, a long while ago, "Go to the Symphony Friday afternoon and you will be in heaven." I did, and for ten minutes at least I was in heaven. I never heard such music in my life. Then the man on my right leaned over and began to talk about his liver to the man in front of him, and the man on the other side began to discuss his kidneys with the man next to him. I didn't hear any more music.

When I saw my friend later, he said, "How did you enjoy the Symphony concert?"

I said, "It wasn't a symphony concert, it was an organ recital."

Let's get away from this organ recital business. Think of the other fellow, not the man who has more, to envy, but the fellow who has less, to sympathize.

Don't jump too quickly to conclusions. I was driving along a country road in New Jersey one day, and I rounded a curve in the road and came upon an over-turned load of hay which blocked my way. A man 65 or 70 years of age was in the road laboring to right the load. It was a very hot day, and I said to him, "My friend, come get in my car and cool off a bit and then we'll both get at it."

He looked me in the face and said without a smile, "I can't stop. Father wouldn't like it."

When I was afraid of my father it made a marked impression upon me in early life, but I wasn't 70 years old. I said nothing to him for a few moments, and finally I said, "Come and rest, and then I'll help you."

"No, father wouldn't like it."

I said, "Where is your father?"

"Under the hay." I thought the father was home on a cool porch and could wait. He was where he couldn't afford to wait.

In thinking of the other fellow, we can put our heads up against great problems with the prayer of my dear old friend Phillips Brooks, Bishop of Massachusetts when he died: "O God, do not give me tasks equal to my powers; give me powers equal to my tasks." Never let the fact that a problem is big frighten you. Ask for the power to solve it. By tying my arms to my body I do not save my muscle, I lose my arm. He who wrestles with me strengthens me. Big problems make big men. That is why I believe we are coming to the dawn of a very bright day, because in my memories that go back 65 years, just as vividly as I see the things that happen today

I see the things that have happened in that time, and I have seen a wonderful advance, oh, a marvelous advance in mankind. Superficially, we seem to be traveling in a circle. Closely observed, life to me is a spiral. We seem to repeat, but we are going higher and higher with each revolution and the world is getting better.

No boy today is half so bad as I used to be, and if I had my life to live over I would be a darned sight worse, there is no question about that. Let's be honest with ourselves. My grandfather was old enough back in the sixties when he died to have talked with Washington. He said, "You boys of this generation are ten times worse than we used to be." That has been going on and on. Each generation has a new way of showing and getting rid of its superfluous energy.

We have had good mothers, good fathers, and the world is getting better. Go back in your own minds. Some of you came from country districts, as I did, to a big city. You recall the time when you went home at Thanksgiving or Christmas and everybody was glad to see you. Then by and by when the excitement was over, dear old mother got you across the shadowy hall into the shadowy parlor and on bended knee, with her arm about you, she thanked God that her boy was home again.

You have gone back to the city. The day has come in the life of every man when he thought the fight was lost, opposing forces were stronger than he had estimated. Then a little miracle happened. The kind Father, if the mother had gone home to God, released that voice of the Choir Invisible and you felt that arm around you, you rallied, you won. What was it? Mother love, home influence. There are 26 million home circles under Old Glory. That is a pretty good anchor for the Ship of State. I am not a bit afraid of it. I have seen and written about every form of government that exists, and I have a greater belief in our government than ever before in my life.

The Smile of God Is Country-Wide

I have just come from an extensive trip, covering the Pacific Coast, and up into New England and down in the south, and I have never seen the smile of God more clearly showing on the face of this dear old earth than I see it now, from one end to the other.

We are realizing what you illustrate here in the concrete, that no man liveth to himself alone. We are coming to recognize the sovereignty of divine right is not an empty legal phrase, but the expression of the mightiest thought ever conceived in the mind of man. Each man touches with a quickening finger what the living God has given him, a work that nobody else can or will do.

Here our ruler is an agent and not an owner, as he is in Europe. I lived fourteen years of my life there, and the difference between Europe and America you can put in a phrase. There they labor under the lash of necessity, looking down; here we labor under the lure of opportunity, looking up. We are growing better and we are growing higher in this wonderful age. Oh, how I envy the younger people the mighty heritage of unused years, how I envy you men coming in daily contact with man. God's finest exemplar, here on this dear old earth.

Optimist? Of course, I'm an optimist! I hate a pessimist. He is nothing more than a blind man in a dark room looking for a black hat that ain't there. If he stays at it too long he gets like the man who swallowed an egg, afraid to move for fear of breaking it, afraid to keep still for fear of hatching it, he doesn't know what in hell to do.

Years ago a little fellow fell downstairs in the city hall opposite my office. I ran out and picked him up and said, "Hurt?"

"No, I was coming down anyway."

My philosophy of life is, if you can't get what you like, like what you've got. Its a good rule, even for married people. There's a whole lot in it.

Don't talk about luck. I'll back pluck against luck any day. Stop kicking. Every time you kick you lose a step. You've got to stop walking to get ready to kick; you lose two steps when you kick, and the other man is three steps ahead of you.

Love your town or leave it. That is what every American owes to his community. He will never succeed in the town he hates, and he is a detriment to other people. Get out into some other place. When you get away from it you will find the other place isn't half so bad. A darky said he loved to have the toothache because he felt so good when it quit hurting. We need contrasts. Don't be a fault-finder. People will measure you by what you create, not what you correct.

Keep the young people busy doing right and they haven't time to do wrong. Don't stress the wrong. My old mother used to say to me, "If you're going to New York you needn't look up the time table to Washington; it's the other direction; you're not going that way." Tell people what is the right thing to do, just as this learned doctor has told us today.

I got into trouble at a medical society meeting one time because I repeated an innocent remark made by a colored coachman. I went out and found him looking kind of blue. I asked him what was the matter. He said, "I'm going to lose my wife."

"What makes you think so?"

"The doctor says so, and he knows what he's giving her."

He didn't mean to accuse the doctor of homicide, it was just his awkward way of putting it. So many of our mistakes and frictions come from not understanding the other fellow.

But beyond and above all that we say, there come discouraging times. In our first canvass in Pennsylvania for good roads we had sixty-six counties against us, I think, and only one in our favor. In the last one there was only one against us and sixty-six with us. Keep working. I have watched you work for years. You are doing God's work.

The Immense Value of Laboring Men

I sat on the balcony of the Bellevue one night (I am fond of using my mind at figuring big problems without the use of paper), and I figured up that taking the wages of our great body of workers, you would have to take a sum twice, (and some say three times), the value of our total national wealth to equal the value that our laboring men are to this country. Economically you are doing great things.

In my conscious life, I have watched the growth of this country's wealth from seven billion dollars to 355 billions. That is a miracle that never has been paralleled in all history. In that period the population has only increased four and one-half times, and the wealth 55 times. In other words, I have lived through a period when the wealth in this one country has multiplied eleven times as fast as the number of people to divide it. That is the answer to any pessimistic thing you can bring forth.

Here is another little fact that fits in as the basis of my optimism. Before the war we had 174,000 people holding government bonds, and therefore a financial interest in the stability of our government. Today we have 18 million. We have 32 million people in America who hold securities and have something to lose if anything should happen to the stability of the government. Isn't it the part of folly to talk about three million who haven't, upsetting the 32 million who have?

In this age, in this country, where we are multiplying power, where we are cutting out the undesirables from abroad and so developing machinery that the

higher the type of work is done by those who remain, human life becomes more valuable and more necessary in our economic structure. And you, in doing that which preserves human life, are doing the greatest work in the line of patriotism that men or women can engage in.

It is terrible, when you love a city as I love Philadelphia, to see thoughtlessness and carelessness in our great industrial establishments bringing the shadow of an unforgettable and incurable sadness into a whole row of little homes. I have gone there to try to comfort them. Oh, I wish I could put into words the depth of my feeling and the honor I experience today in having this opportunity to look into your faces and say God help you, God give you power to broaden and deepen the influence of this mighty effort, this wonderful movement that is going to lift man nearer God and bring God nearer man and bring a little heaven down here on earth.

Luck Is No Longer a Belief of Men

I said I didn't believe in luck. We are getting that belief in luck out of the minds of men. Science is killing that old idea of luck. I had a friend who lived down in that old Democratic state of Alabama years ago. He had been in eight different kinds of business and had failed in each one and thought he was unlucky and born to continue that way until death. He made up his mind he would get out of the world and make room for a lucky man. But he had lost faith in everybody and everything, including himself. He had decided to buy a bottle of poison, but he said to himself, "Everything is adulterated these days; that won't work at the critical moment; I'll fail, I'll be ridiculous." So he bought a pistol. Then he thought, "They're making pistols out of anything in this day and age; that will break or won't go off; I'll fail, I'll look ridiculous." So he bought a rope to have three ways out. But in thinking it over his deep-rooted suspicion of everybody made him reach the conclusion that ropes were made of any old thing; that would break, he'd look awkward, he'd be ridiculous. So he got in a leaky boat on one of those little rivers down in the old Democratic state of Alabama. He drifted down until he came to a point where there was an overhanging branch, tied the rope around the limb, swallowed the poison, pulled the trigger and fired the pistol. The bullet struck a glancing blow and cut the rope, he fell into the river and swallowed so much water it was an antidote to the poison, was pulled out by a friend and elected to Congress on a Republican ticket.

Don't talk about luck. I don't believe in it, my friends.

Little things count. You may work and work and work and think that your work is lost, but it never is. No impulse comes from the human heart along lines which point Godward that is ever lost in this wonderful universe.

I met a friend on a trip in the West last year that I hadn't seen for thirty years. We had a wonderful talk, as you have with old friends, and he told me the saddest hour of his life was when he had to go home and tell his little wife that the bank, his bank, would have to fail on the morrow. Chicago wouldn't give him any more credit, Philadelphia wouldn't give him any more credit, there was nothing to do but fail. His wife said to him, "Tom, you go to bed and get a good night's sleep. I know you are troubled, but I have worked out a plan whereby I can save the bank."

He said, "I knew that little woman didn't talk unless she had something back of it." The next morning she went down to the bank, opened the box in the safe deposit vault, and handed him \$100,000 in currency. He said, "Kate, where in the world did you get that sum of money?"

She said, "Years ago when you married me, you said every time I kissed you it was worth a dollar. I made you pay it. I've saved it all up. Here it is."

He threw up his hands and said, "Oh, if I had only done all my kissing at home

I would have been a millionaire." You might take that home and think it over as a safety first principle.

Being an old bachelor I am a great expert on matrimony and the care of children.

There is only one trouble with this country; it lacks some of the old courage that has characterized it from the start and has been the secret of our great development.

To go back to that first Thanksgiving day in old New England, half the company dead, only seven or eight answering the roll call on the day before. What did they have? A day of fasting and prayer? No, a day of thanksgiving. We need that today. All over this country I have found—north, south, east, west—a little doubt, a fear of something, they know not what, coming from they know not where. I preach courage and a return to the old idea that one with God is a majority and that the solution will come if we jump into the problem.

I have cited that illustration in New England, and I have dared to say that I thought they got their inspiration for that wonderful bravery from that little incident recorded in the twenty-second verse, the eighteenth chapter of Deuteronomy. They were loading the Ark, and a little flea going up the gang-plank in front of an elephant turned around and said, "Who the hell are you shoving?"

Men Who Sacrificed on the Altar of Courage

Oh, my friends, you don't know how far a little courage will carry you. You seem to place that biblical quotation so quickly that I am tempted to give you one more. When I was over-praised in the introduction by your great, good chairman and I knew I would have to disappoint you, there flashed before me as a warning of what I should do, that I ought just to rest my reputation on his kindness and not speak. As a warning to me to keep still, there appeared before me in what seemed to be letters of fire, that wonderful eighth verse of the fourteenth chapter of Genesis where Jonah said to the whale, "This thing wouldn't have happened if you had kept your damned mouth shut." I can't keep mine shut. I have had to talk, and I have spoken from my heart to men who are doing what I (because I have long passed the three score and ten), haven't the physical power to do. I am doing all I can.

Saturday night I was at the ninth anniversary of the 314th Infantry in Harrisburg. There were a dozen men in the room on crutches, and there were plenty of armless sleeves. I have been with them at all their meetings—happy, brilliant, plain men, all kinds, but all united in a common love for a common country, this nation whose foundation is a God-fearing people.

I was with a man who had lost his only son. I looked at those men and remembered speaking at Gettysburg 50 years ago. There came the thought: In every crisis America rises to the great issue and shows the God in her.

I feel the radio is coming in now to help us solve two great problems. I know Russia, I have written about it, I have traveled through it. Eighty-five per cent of its people are illiterate. You couldn't reach them by the written word, but the radio will go to them; they have honor and honesty down in their peasantry, and they will respond. The radio, that brings you within three-tenths of a second of every human being, is going to teach China, with her immense resources, how other people live. A new buying demand is going to be created, greater than the restored supplying power of Europe and America. There will be even brighter and better things than that.

I was speaking to a body of men in New York a couple of years ago at the Commodore. There were 2,000 men in front of me and 20 million out in the darkness. I happened to remember in the middle of my talk that it was the anniversary of the greatest sorrow that ever came into my life 40 years ago when the mother I idolized went home to the God she had tried to serve. I couldn't help

speaking of her work in the hospital, in the orphan asylum, with the poor and the needy. It had no business in the speech. I felt, the next day, that I had failed.

A week later the president of the American Telephone & Telegraph Company sent me a little letter saying: "Cattell, I am enclosing a letter that I wish had been sent to me." It was only a short letter from a woman who had made a splendid fight and failed. She was in a little farming town in the southwest. Her husband had been ill for a long time; he had had an accident in his employment. When he recovered, his courage was gone and the little funds exhausted. Her nerve broke, she said, and on the last page she wrote, "I provided myself with a little powder that would bring me what I thought would be the oblivion I wanted, the end of it all. I was on my way to my little bedroom to find that forgetfulness of life, and I passed through our little dining room and kitchen combined. Force of habit made me tune in on the little radio set we have. Dr. Cattell was speaking of his mother who was gone. I remembered my own mother with the Master. I am alive this morning because of the message which came to me out of the darkness and led me to light."

Friends, when the call comes for me, that little lantern is all I can offer as the fruit of my life, and I won't require anything more.

You are doing great work, you have got back of you the power of the universe, you cannot fail. God be with you until we meet again, here, or where accidents never happen, old friends are found, and heartaches cease.

CHAIRMAN SPRAGUE: We still have one other remarkable feature for this appreciative audience, and I will give only a word in introduction. Your program calls this number "The Intruder" and the characters are to be represented by Mr. Ernest Domfield and Miss Mona Smith, of Chicago. Let us pass into that atmosphere of solemnity and realized responsibility for the misfortunes of others, which this powerful little playlet demands.

"The Intruder"

A PLAYLET

(Bell tolls, GRIM REAPER appears in midst of audience, unannounced.)

REAPER: Welcome to our annual conclave. (Bell.)
 Hear the constant tolling of our bell.
 What pleasant thought its monody compels. (Bell.)
 Hear the groaning of the bell,
 Tolling the doom of the millions—
 Aye, and will forever toll. (Bell.)
 Ye have crowned me king,
 Autocrat of all I survey.
 My abject slaves . . . All
 Blindly stumbling towards my dark abyss.
 Your mothers, brothers, aye, you yourselves,
 Soon must come to my realm.
 Nor wealth, nor glory,
 Can stay thy doom.
 The flower-decked grave, the tearful eye,
 But dimly veil my omnipotence. (Bell.)
 (Exultingly) Ring out ye bells,
 And let every stroke proclaim to the world

Its ignorance. (*Bell.*)
 Ring out ye bells, and let every reverberation
 Flaunt back to the boastful world
 Its shame of tolerance. (*Bell.*)
 And let your melodious dirge o'erthrow its chaotic
 Jangling, false ambitions, delays,—
 Aye, its sins. (*Reaper exits.*) (*Bell.*)

REAPER: (*Enters with report*): Hold! A report I wish to render.
 From the blood-soaked fields of Europe:
 We gleaned nine million deaths
 And many million serious injuries. (*Bell.*)
 Is it not glorious? Now an important amendment
 The woman in industry. (*Pause.*)
 No one discerns my sinister grasp, hovering over her.
 To clutch at will, dragging her down to thralldom. (*Subdued laugh.*)
 (*Bell.*)

Harken, to our never-ceasing pacans. (*Bell.*)
 Welcome, thrice welcome, this year of 1918.
 The past industrial harvest has indeed been a glorious one—
 The toilers, the children, aye; the mothers of children.
 Our New York conclave last year was naught in comparison
 There and then you boastfully recited the record of how
 You had deprived me of my harvest;
 There and then, flushed with pride, you made glowing
 Speeches extolling what you had accomplished.
 Humiliated was I, but silent.
 There and then you proclaimed the many toilers
 Who had escaped my scythe:
 The toilers whom you had armed to combat my prowess.
 Chagrined was I, to be apparently so thwarted
 By mere mortal men,
 But this year, here and now, I COME INTO MY OWN.
 Last year you confidently spoke of what you proposed to do,
 And in the meantime, stealthily, I reaped the grand harvest
 OF SIXTY THOUSAND DEATHS AND ONE AND ONE-HALF
 MILLION ACCIDENTS

Think of it! Go on, lay your plans,
 Still unheeding that "the best laid schemes of mice and men
 Gang aft a-gley." (*Subdued laugh.*) (*Bell.*)
 And now I must bid you adieu.
 Next year will I come e'en with a greater report. Adieu.
 All is most propitious,
 Our subtle pitfalls are now well laid,
 Naught can thwart me.
 Mortal man is impotent,
 His antique laws, decaying and weak,
 And e'en the Great Jehovah on high is powerless,
 And weeps for his children. (*Subdued laugh.*)
 The world is doomed,
 Who, who can stop me now?

SPIRIT: (*Appears*) I will.

REAPER: You, who are you?

SPIRIT: My name? At creation's dawn the simple herdsmen called me Brotherly
 Love,

Through the dark ages, the martyr's blood e'en was shed that
I might live, and smilingly with their last breath they whispered the hope
of the oppressed, Christianity.
Here and now it matters little, my name.

REAPER: Words, words, empty words. Your name?

SPIRIT: I am the personification of Love, Truth and Justice!

REAPER: Disciple of evil, your name.

SPIRIT: (*Throws off mantle*) UNIVERSAL SAFETY! And with today's setting sun, we swear to baffle you, Grim Reaper.

REAPER: And with tomorrow's rising sun,
Ye are all one day nearer to your graves.
My dark chasm is built and paved with such good intentions.

SPIRIT: They were. But henceforth we shall *live* our belief.
THINK IT. BREATHE IT. TEACH IT. So that after us the good work will go on.

REAPER: You will surely FAIL.

SPIRIT: In the bright lexicon of UNIVERSAL SAFETY, THERE IS NO SUCH WORD AS FAIL.

REAPER: Bombast—why, with these my ministers, my dupes, my helpers, will I—

SPIRIT: These? What have they done for you, Grim Reaper?

REAPER: Not what they HAVE done, but what they have NOT done.

SPIRIT: The sins of omission.

REAPER: Aye, the sins of omission.

SPIRIT: Forty-five thousand of God's creatures—

REAPER: One and one-half million and forty-five thousand! I struck them down.
Now they wander aimlessly in my dark cavern.
The blooming bud, the full-bloom flower,
The sere and yellow,
I gather them all.

SPIRIT: Nay, we saved one and one-half million. These were not struck down.
These were but accidents.

REAPER: Accidents! (*Laughs*) The blind! The maimed! The lost and crippled limb! The shattered nerve! The emaciated countenance! The palsied hand! The distorted mind! Living deaths. *I claim them all.*
With boots if whether a gear, a shaft, molten metal, a deadly wire, an open switch, mistakes,—

THEY ALL FILL GRAVES.

The tears of the widow and orphan attest my imperialism.

SPIRIT: Nay, new aid is pledged here.
And our hopes now blossom anew.

REAPER: Your aids will fail anew.
My true and tried destroyers are invincible—
CARELESSNESS, THOUGHTLESSNESS, RECKLESSNESS, IGNORANCE!

SPIRIT: And I have but one aid—UNIVERSAL SAFETY. And as the most acceptable service to God is doing good to man, I call on you, my helpers here and now, to place your left hand over your heart—so—and with hand uplifted—so—repeat after me:

Sixteenth Safety Congress

"Our Father who art in heaven,
Vouchsafe and preserve us,
That we may promulgate to mankind
Thy message of universal safety;
That we may safeguard and protect
Our mothers, brothers, children,
From untimely death, accident, and disease.
Give us life and strength to preserve mankind,
Created in Thy image and likeness,
Unto all generations.
For ours is the happiness,
And Thine is the glory."

Nay, nay, keep thine hands uplifted. See, Death, defeated, sneaks away.
Nay, hands still uplifted, promise never to forget thy vow, keeping it like
unto a frontlet between thine eyes. See, see, stalks away the Grim Reaper,
dejected, baffled. Thus we vanquish untimely *death* and win the *victory*.
Thus, you shall save the world.

And now march on to happiness and victory. (*Exit.*)

ADJOURNMENT

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Annual Banquet

Wednesday, September 28, 1927

WALTER G. KING, Presiding Officer
President, National Safety Council

LAWRENCE McDANIEL, Toastmaster
Attorney at Law, St. Louis, Mo.

The Annual Banquet of the Sixteenth Annual Safety Congress was held at 6:15 o'clock in the Grand Ballroom of the Stevens Hotel, Mr. Walter King, president, National Safety Council, presiding.

PRESIDENT KING: We have a few announcements to make at this time. We have received a letter from the National Safety First Association of London:

"The National Safety First Association of Great Britain unite with your Counsel in wishing continued success to efforts of your Congress toward eliminating waste of life and limb in avoidable accidents."

The American Gas Association extends best wishes for a successful Safety Congress. They say, "It has been and is a pleasure to work with the National Safety Council."

"The Directors of the Province of Quebec Safety Association, in session assembled, wish to extend their sincerest wishes for a most successful convention and assurance of their wholehearted support for the success and extension of the accident prevention movement."

"The Southern California Society of Safety Engineers extends greetings to delegates attending the National Safety Congress. With sincere wishes for a successful meeting we extend heartiest invitation to all who attend for the Pacific Coast Conference and Fifth Annual First Aid Meeting in Los Angeles, October 24-25."

At this time it is customary to announce the newly elected officers for the coming year. The following is a list of the elected Executive Committeemen at Large.

Elected Executive Committeemen at Large

Ernest W. Beck, United States Rubber Co. New York City
Frank Austin, W. E. Wood Company, Detroit, Mich.
Harry M. Webber, Illinois Bell Telephone Co., Chicago, Ill.
Arthur M. Tode, The Texas Company, New York City
S. E. Whiting, Liberty Mutual Insurance Co., Boston, Mass.
W. H. Winans, Union Carbon and Carbide Corp., New York City
George Opp, Detroit Edison Company, Detroit, Mich.

W. B. Pettibone, Willard Storage Battery Co., Cleveland, Ohio
 Chas. J. Moore, Retired, Springfield, Mass.
 Henry A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.
 C. E. Hills, New York Central Lines, New York City
 C.-E. A. Winslow, Yale University, New Haven, Conn.
 Miller McClintock, Erskine Bureau, Harvard University, Cambridge, Mass.
 George E. Sanford, General Electric Company, Schenectady, N. Y.
 A. W. Whitney, National Bureau of Casualty & Surety Underwriters, New York City
 C. E. Pettibone, American Mutual Liability Ins. Co., Boston, Mass.
 G. T. Hellmuth, Chicago North Shore & Milwaukee Rwy. Co., Chicago, Ill.
 Homer E. Niesz, Commonwealth Edison Company, Chicago, Ill.
 George Kelday, International Harvester Company, Chicago, Ill.
 Ethelbert Stewart, United States Bureau Labor Statistics, Washington, D. C.
 J. M. Woltz, Youngstown Sheet & Tube Co., Youngstown, O.

The following is the list of the elected Executive Committeemen, Community Council Representatives.

Elected Executive Committeemen—Community Council Representatives

A. J. Van Brunt, Representing Newark Safety Council
 Frank A. Morrison, Representing Detroit Industrial Safety Council
 Paul Van Cleef, Representing Chicago Safety Council
 T. G. Brabston, Representing Birmingham Safety Council
 John V. Hanna, Representing Kansas City Safety Council
 Dana E. Jones, Representing Erie Safety Council
 R. F. Redfern, Representing Providence Safety Council

The following is the list of elected Executive Committeemen, Sectional Representatives:

Elected Executive Committeemen Sectional Representatives

R. McA. Keown, Representing ASSE-Engineering Section
 Leonard Greenberg, Representing Chemical Section
 A. R. Bush, Representing Marine Section
 J. A. Northwood, Representing Metal Section
 C. A. McDowell, Representing Mining Section
 John B. Grier, Representing Woodworking Section
 E. R. Cott, Representing Steam Railroad Section

The following is a list of executive officers who have been chosen to serve you and I will kindly ask that as their names are read, if they are present, they will rise so we will know who they are:

Executive Officers

E. W. Beck, Vice-President for Industrial Safety
C. E. Hill, Vice-President for Local Councils
Miller McClintock, Vice-President for Public Safety
C. J. Moore, Vice-President for Public Relations
C. E. Pettibone, Vice-President for Finance
H. A. Reninger, Vice-President for Membership
G. E. Sanford, Vice-President for Engineering
A. W. Whitney, Vice-President for Education
Prof. C.-E. A. Winslow, Vice-President for Health
G. T. Hellmuth, Treasurer

Now, friends, the great question about the next announcement has caused a great deal of anxiety among the prominent families in Chicago as to whether this man would be elected for another term. We have tried him out and he is all right. The man we have selected for our managing director, to me, is the finest man I have ever known. I have never seen such patience, such kindness, such willingness to serve, and after getting together and discussing this thing at some length we finally agreed for this coming year we would try out again our good friend, W. H. Cameron, of Chicago.

(The audience arose and applauded.)

PRESIDENT KING: The man who has been chosen as our new president is loved and respected by all of us who know him. He was born in Ohio, the home of Presidents, and educated in an institution of learning in Ohio. He moved to Chicago, his present home, becoming associated with the Edison Company, starting in the construction ranks of this great company, filling the positions of assistant construction superintendent, superintendent, assistant to the president, manager of the Cosmopolitan Electric Company and, finally, his present position of trust and responsibility, manager of Industrial Relations of the Commonwealth Edison Company of Chicago. He is past-president of the Chicago Engineers' Club, a member of the American Institute of Electrical Engineers, of the National Electric Light Association and the Chicago Athletic Club. Our new president is fundamentally a big executive, schooled in the exact science of engineering. He has been our vice-president in charge of finance, and has rendered invaluable service at all times giving freely of his time and his energy.

It is indeed a privilege and an honor for me to introduce our new president, our co-worker and my very dear friend, Homer E. Niesz, of Chicago.

(The audience arose and applauded.)

Acceptance of Presidency of National Safety Council

Homer E. Niesz, Manager Industrial Relations, Commonwealth Edison Company, Chicago, Ill.

I would, indeed, be less than human if I did not feel a sense of deep appreciation of the honor of being elected president of this wonderful organization.

I would be lacking in sentiment did I not thrill through my whole being from the glowing tribute your president has given me and the enthusiastic reception accorded me at your hands on this occasion.

To be the executive head of the National Safety Council is not only an honor but an opportunity and an obligation. This opportunity and the attendant obligation can be met with confidence because of the splendid cooperation of the Directors, the Executive Committee and the officers of the Council—men who

devote their time and energy, their brains and their hearts to this great work which is humanitarian as well as economic in its nature.

Your elected representatives are prepared to assume the duties delegated to them by the membership, which is at the same time the inspiration and the medium of accomplishment of the purposes of the Council.

The work of the Council through its various Sections, and Division and Local Councils includes the promotion of safety at work and at play, on the streets and highways, in the schools and in the homes—in short—universal safety.

The scope of its activities is as wide and as encompassing as human life whose protection and preservation constitute its high objective.

The men and women attending this convention and the thousands of others engaged in safety work all over this land are the most enthusiastic, the most willing, and the most devoted body of workers to be found anywhere and their fidelity and heart interest approximate consecration to the cause.

With this splendid support, we who are to lead and guide the destinies of the Council for the ensuing year can be encouraged to take up the burden and carry on with a feeling of confidence that we are constantly progressing toward our final goal—the elimination of accidents and the attainment of safety, prolonged life and happiness for all mankind.

PAST PRESIDENT KING: My time is short. This year has seemed a very short one to me. It has gone quickly, but I can assure you, ladies and gentlemen, I have been conscious all through this entire year, every day, of the wonderful honor it is to represent this magnificent body, a wonderful experience, and it has been the happiest year, I think, of my life.

Now, I am stepping down, but I am not stepping out; I am with you, always will be with you.

There is a questionnaire before you and we are going to try to find the answer tonight. "Consider the Toastmaster. Why is a Toastmaster?" I understood I was expected to introduce this gentleman to you. He slipped in quietly this afternoon. I don't know his background and couldn't find out anything about him, but I heard some one call him "Larry," and in looking him over I made up my mind he was a regular fellow. I think we are going to be very greatly entertained tonight by the toastmaster who has been selected to take charge of this meeting, and it is my pleasure to introduce to you Lawrence A. McDaniel, of St. Louis, Missouri.

Toastmaster McDaniel Takes the Helm

TOASTMASTER MCDANIEL: I want to see if I can't make you hear without the use of the "mike" as they call it. I don't like the echo that comes back. It makes me think of an echo that my friend Cameron found out in Colorado last summer. A guide took him to a mountain pass, where a wonderful echo could be heard, and Cameron, at the direction of his guide, yelled into the hills, "Hello," and the echo came back "Hello." Cameron yelled, "Are you there?" and the echo came back, "Are you there?" Cameron yelled, "Come down and have a drink," and the echo came back, "I will be right down."

I will tell you why the president knows nothing of my background. When I got in this afternoon I couldn't find the committee in charge of this meeting. So finally I saw a waiter with a tray. Upon that tray was soda water and ginger ale. I followed that tray. The committee was in session.

Now I don't know who the author of this book is. He wants to know why is a toastmaster. Why, ladies and gentlemen, the toastmaster is the spice of the meal. He is no good, whoever wrote this book. I say to him, as did the minister of the gospel who had trouble with his flock, and they asked for his resignation; while

the quarrel was pending the Governor of his state appointed him the chaplain of the penitentiary. He accepted and announced he would preach his farewell sermon and he took for his text these words: "I go to prepare a place for you that where I am ye may be also."

Now the duty of the toastmaster is to say a few kind words to the audience and a few kind words about those who will entertain you and address you. I think of the man who went into a dining room in this hotel this morning and said to the waitress, "For breakfast give me two soft boiled eggs, a cup of coffee and a few kind words." In due time she brought the eggs and the coffee. He looked at them and said to her, "Now give me a few kind words."

She looked around and then leaned over his shoulder and whispered, "Don't eat the eggs."

I am going to play safe. I am like a Scotch friend whom I took out to the dog races the other night. Do any of you have dog races in your communities, where greyhounds chase an electric rabbit? My Scotch friend watched the first race without betting. Then as the time drew near to place bets on the second race he approached the window of the ticket seller and said, "Give me ten dollars on the rabbit to win."

"Now, Just One More," Says the Toastmaster

Now just one more. A Jewish gentleman sent his boy to college. Now, you understand the dog race I know. He heard that in college his boy wasn't behaving himself. He was doing many of the wild things that he shouldn't do. So his father thought if he could just bring his religion back to him once more he would straighten up and behave himself. So he wired him, "Dear Ikey: The passover starts tomorrow." And in a little while he got a telegram back: "Dear Papa: Put ten into winner for me."

Now, ladies and gentlemen, I am going to introduce the first thing on the program. Many of us are radio fans. We get out of the air the voice, the music, the speech. The radio is a wonderful thing. You set here and listen to me, and if you don't like it courtesy demands that you stay and listen to it anyway. If I were talking over the radio and you didn't like it, by that (*indicating a turn*) it is gone. Sam 'n' Henry are known to all of us who listen over the radio. They speak, they act over WGN, the Chicago Tribune Station. They are in business here in Chicago. They are in the transferring and drayage business here in Chicago, and their horse, Grandpa, is the chief asset of that business. We are not going to have them in person; we are going to have them over the radio. Our first selection is by way of the air, not hot air that you get from this table, but out of the ether, Sam 'n' Henry of WGN, the Chicago Tribune.

(The broadcast of Sam 'n' Henry was then heard.)

TOASTMASTER McDANIEL: Two telegrams of compliment have come in, one that I can't be heard in San Francisco and the other in New York, so I will use this. It makes me think of the wonderful society wedding in New York, a church decorated with orchids and beautiful flowers. As the bride came tripping down the aisle, it seemed that all the loveliness, all the sweetness in the world had been rolled up in this one beautiful creature. As she came down the aisle there were the usual Ah's and Oh's and so on, and as she got about half way down, this beautiful, lovely creature, who seemed to be almost sprouting wings, tripped over a lily pot that stood in the aisle, and in a voice which could be heard all over the church, she said, "Ain't that a hell of a place to put a lily pot!"

The next on the program is the International Harvester Company Choral Club. The International Harvester Company has been a pioneer in safety. They have ever supported the safety movement; they have given the best, and this wonderful choral club is recruited from the office of this company in Chicago. We will now hear this wonderful choral club.

(Several selections were sung by the International Harvester Company's Choral Club, amid general applause.)

TOASTMASTER McDANIEL: Mr. DeYoung, will you please stand while I introduce you as the director of this wonderful choral club?

Now we know why the music center of the world is moving westward to Chicago.

The next on the program is a young man who comes to us from that mighty center of industry, the largest city in the smallest state in the Union, Providence, Rhode Island. This young man is the president of the Safety Council of his school, known as the Junior Safety Council. He was born in the shadow of that little church where Roger Williams first sowed the seed of religious freedom. He comes to us as a sample of what the youth of this nation are now doing in the interest of safety. With a great deal of pleasure I present to this magnificent audience, Mr. Prendergast, from Providence, Rhode Island, who will now address you.

Your Job and My Job

James Prendergast, President, Junior Safety Council, Oxford Street Grammar School, Providence, R. I.

I am certainly getting a great kick out of being here tonight, and a part of it is being allowed to say a few words to you about the safety of all the boys and girls of this country.

Providence, Rhode Island, is certainly a long way from Chicago but we have the same safety problems there that you have here. We have over 80,000 school children in Providence who are in danger of some kind or other all the time, and we are doing all we can to keep them from getting crippled or killed so that they will grow up and be able to have the good times every one should have.

It is a much harder job to do this than it was a few years ago, pretty much on account of the automobile which is now used so much. There is no doubt that the automobile is going to stick around because it is so useful, but it has given you and me a new job—the job of keeping ourselves and others out of its way.

When you stop to think that nearly 7,000 children under fifteen years of age have been killed in automobile accidents during the past year and hundreds of thousands of others badly hurt, you can begin to realize the size of our job. I say "our" because, big or little, old or young, we can each do something that will help the situation—in fact we must do it if these deaths and injuries are to be stopped.

While your job is the same as mine, I feel that each of us has different things to do. What is *your* job, as we children see it? First, to set a good example; and second, to give your support to safety work. I wonder if you men and women realize how much the boys and girls look to you for ideas and help in all that we do. I don't think you appreciate how much we want to grow up like father and mother or you would be more careful in what you do and say—particularly when we are around to see or hear.

Take this matter of automobile accidents, for instance. We learn at school that about 75 per cent of these injuries are caused by persons crossing the street in the middle of the block and nearly 70 per cent of them are children. It may be fairly safe for you to cross in this way because you are better able to judge how fast the car is coming than we are. We in Providence, are being taught that the corner is the place to cross and this idea is being spread through the Junior Safety Councils that are organized in all of the schools. If we were not allowed to play in the streets we would also avoid many of the accidents. But seeing our elders cross the streets any place and using them for their play at times, does not help us to heed these

warnings and look out for the dangers that exist, and all this makes it harder to sell "Safety" to all of the children. If we are going to do as you say, you must "practice what you preach."

Another thing—if you just have to break traffic rules when you are driving, don't do it while your boy or girl is in the seat beside you. He knows the rules even though he can't drive. He knows the makes of all the cars and can tell you a lot about the machinery, and when you do these little things it makes it all the harder for us to really get safety over to him.

Your second duty is to support the organizations that are teaching safe practices to people on the streets, in the homes or at work. It takes money to carry on work of this kind successfully and it is up to you, especially those who have children, to see that the work is not hampered by the lack of funds. The need for this work is easily seen, and it has become a duty, as well as a privilege to help even in only a small way in providing the necessary means to enable such organizations to "carry on." The safety movement is still young but the need for it cannot be questioned and no citizen can escape his part of the job.

For our part, our job is to follow the teaching and example of our elders with whom we come in contact, and in so far as we are able show our playmates and companions that safety is a serious matter. And then, too, it is up to us older boys to set an example for the little folks who need the most protection. We are pledged to do that for them just as we want you to do it for all of us children. This is all we can do until we have reached the time when we are ourselves in your shoes, and then I am sure our experience will make us want to shoulder our part of the job so that the information may be passed on to others who are as yet unborn.

It does seem too bad that the present generation cannot indulge as freely in the games our parents played without running the risk of getting hurt, but such is the case. It is true that we can still play the same games, but in the face of things as they are, we must choose the time and place so that the dangers can be overcome. Our slogan at home is, "Use the playgrounds for your games," and I wish that slogan could be impressed on every child under fifteen years of age in the country today. This, coupled with the desire to live and work and play the safe way rather than the unsafe, or "take a chance," way is the answer to the child accident problem of today.

As I have said, all our work is done through the Junior Safety Councils and with the aid of the schools. Do you have Junior Safety Councils in your city? If not, you should take an active interest in getting them started. I could talk to you for a long time about the work of the Junior Safety Council, but time will not permit. However, I would like to recite the pledge of the Junior Safety Council which every one of you could well afford to use as your safety motto. Here is the

Pledge of the Junior Safety Council

I will work for the safety of others as I would want them to work for my safety.

I will try to be careful, all the time, everywhere.

I will not take unnecessary chances of getting hurt and will warn others against doing so.

I will do MY PART to help reduce the number of accidents this year.

All this I will do for the sake of humanity and the honor of my school.

I am just a boy, nothing more, but I want to live and enjoy life just as every other boy and girl in this country wants to do the same thing. You were all children yourselves at one time and many of you have children of your own; and I know you wish these things for us just as strongly as do we. And so I appeal to you to go back to your different cities and do even more than you are now doing to make life safe and happy for the children of America.

TOASTMASTER McDANIEL: Jim, we thank you for this wonderful, inspiring address. The rest of us wish we could do as well.

Did you ever meet a man and immediately like him?

Did you ever meet a man whose first words to you marked him as a man you would like to have as a friend? I had that experience today with the next speaker, the distinguished president of the University of Chicago. I wondered why it was I thought of the insane asylum where they had had so much trouble with superintendents, and finally the Governor appointed a new superintendent and he seemed to get along fine where others failed. One day, in talking to some of the inmates, one of them said to him, "Do you know, you are the best superintendent we have ever had at this institution?"

Out of curiosity he said to the patient, "why do you think that I am the best superintendent you have ever had?"

The patient said, "Well, I guess it is because you are so much like the rest of us."

Dr. Max Mason, president of the University of Chicago, who was born in Madison, Wisconsin, where nature painted one of the most beautiful spots on the face of the earth, is a graduate of that wonderful University of Wisconsin. Going from there to Europe he completed his studies. Coming back to the United States he filled many places of honor in eastern higher educational institutions. During the great World War he served his country in many ways. He was the inventor and the perfecter of an instrument to locate submarines. That instrument is now used by all the navies of the world and is known as Mason's Hydrophoto. (Is that right?) It is near enough, he says. It doesn't make any difference between friends.

It is a credit to Chicago that in 1925 the University of Chicago called him to that great institution, and with a great deal of pleasure I present our distinguished guest, who is the next speaker, Dr. Max Mason, president of the University of Chicago.

The Highest Common Factors

Max Mason, President, University of Chicago, Chicago, Ill.

If the time were not so short I should deem it my duty to start an argument with the toastmaster as to the validity of the facts which have been presented, but I thank him more for his generosity than I appreciate his judicial mindedness.

I find that I am down for the topic of highest common factors. I know that I chose that. It was at a distant date, however. I have tried to reconstruct the reason for choosing it. As I look at this audience and appreciate the work that you are doing and the temper in which you are doing it, I am convinced that I made a more or less rational choice of a subject, as I will try to show you.

In the first place, it was a familiar subject. I started from mathematics and physics in my work and I like to take a run before I jump into the unknown of public speaker; so the highest common factor gives me a sort of familiar feeling to begin with. You remember in school what it meant. Probably you took your work home and asked father or mother how to find the highest common factor of certain numbers. It was always more or less dramatic to me. You take a series of numbers that apparently have no relationship to one another, take 42, 70, 91, 105. If we threw them down on the table you wouldn't think anything common belonged to all the numbers. Study them a little and you find there is a factor running through all; in this particular instance the number seven is the factor common to all of them, a trivial example of the emergence of unity out of a set of different things; and that is the sort of theme I want to speak to you about.

The broader type of the highest common factors, the sort of thing that the scientists do, that they find out of a vast array of disconnected facts, is that common thread by which they become understandable, by which the orderliness of nature is

shown, by which we may use those facts, and in a way attempt to give you the feeling I now have, that one of the most pronounced influences of our generation, and of the past two or three, has been the emergence of common factors in our knowledge and particularly in our daily life.

It takes me back as well to the teaching days, and I have a favorite anecdote. It actually happened to me, so perhaps you will pardon it since it illustrates the state of mind and the state of preparation in which I appear before you this evening. I taught physics at the University of Wisconsin, and one time a student came back, a man who had graduated from our department several years before. He was always noted for his frankness rather than for his tact, and when he appeared at the laboratory I found he had not changed any since he left us. He visited with me until five minutes before the hour at which I was to lecture. I then had to excuse myself saying that I had to look over some notes before I lectured at eleven o'clock, and this student said, by way of apology, "I am sorry that I kept you so long. I should have known that if you didn't look over your notes you wouldn't be able to give your lecture." After he said that it didn't seem very gracious to him, so he corrected it by saying, "Of course I don't mean that. Why, I took your courses for years here and I know that you often lecture without any preparation at all."

Great and Simple Unities Emerging in Life

We are very familiar with the phrase that life is becoming complex. I should like to enter into controversy (start an argument, as we have learned to say this evening), on that subject. While the individual facts that we must know are perhaps becoming greater, it seems to me that the trend of science and the trend of human life is decidedly in the opposite direction. In place of an unreasoning complexity which seems to be appearing, great and simple unities are emerging. Life in its broader aspects and science in its broader aspects, instead of becoming more complex, are vastly more simple, vastly more understandable, vastly more rational, vastly more nearly a unit. That is to say, the highest common factors of knowledge of endeavor are emerging rapidly.

Take the science I am most familiar with, physics. Who would have dreamed a thousand years ago of the unity of the falling stone on the earth, the tidal effects on the globe, the rotation of the planets in their orbits, the motion of all the planets on the celestial sphere, the briny star, the laws governing the motion of all the stars, of all the planets, of all the heavenly bodies in this universe? Who would have believed that they are all united, that there is a simple concrete unit, an orderliness, coming out of those motions, by which anybody can understand, can predict them?

Superstition has been removed in regard to their motions, and the understandable, simple orderliness of nature has emerged by virtue of the scientific study of the motion of heavenly bodies. Indeed the whole science of physics has become vastly more simplified, for we have learned that all the physical behavior of matter can be accounted for by the hypothesis of the Electra, a constitution of matter, and each sound electric magnetism is an evidence of the same sort of thing, not unrelated phenomenon, not unrelated qualities of matter, but all to be explained, to be understood on the great hypothesis of the electric constitution of matter.

Physics has come to a marvelous simplicity, and chemistry has come to a marvelous simplicity. All of the elements, although different structures, different problems, are understandable; their combinations understandable, their chemical problems, their physical problems a simplicity that is understandable, and all the nature of matter and the interaction of matter that would have been incredible 100 years ago. A great unity is emerging from the scientist's study of the law of nature, physics, chemistry, biology, or what not.

No more do we seek oracles, no more do we give incantations, no more do we

trust in superstitions, but our mind is clear and our mind is free to believe in simplicity, to believe in orderliness and to find new truth; we are relieved from our fear of finding truth.

It is for this that universities exist. It is for this that we train men to work quietly, silently, through their lives, unselfishly, to push forward the boundaries of knowledge, that more highest common factors may emerge, that more unities may appear. For that we graduate our doctors of philosophy. I wonder how much the average man appreciates the doctor of philosophy. I think perhaps the attitude of many of us is something like that of the servant girl who evolved an epigram quite unexpectedly to herself as well as to others a short time ago. A friend of mine who was a physicist—by the way, this reminds me of the response of an old lady when she was introduced to Professor Pickelson. She said, "What strong words you are using these days. We used to call them sody water clerks."

Not the Right Kind of a Doctor

This friend of mine, Trowbridge, was down on the Maine Coast for the summer and was known as Dr. Trowbridge. He was a doctor of philosophy. People there didn't know him or what kind of a doctor he was, but they called him Dr. Trowbridge. One evening an excited man rushed to the door of his house. The maid came to the door. He said, "Is Dr. Trowbridge in?"

"No, sir," the maid replied.

"I must find him right off. Where can I find him?"

"I don't know where he went."

"I must get the doctor, my wife is very sick."

The maid said, "Dr. Trowbridge wouldn't do your wife any good."

"What is the matter? Isn't he a doctor?"

That stumped her. She knew they called him Dr. Thowbridge, but she said this on the spur of the moment, "Yes, he is a doctor, but he ain't the kind of a doctor that does anybody any good."

That, I think, is the average opinion of many people. I want to put in a plea for these doctors of philosophy, for these people who work silently in quiet places, devoted and unselfishly, that new truth may emerge, that we may understand the laws of nature and the behavior of men; that they may find more of the highest common factors that govern the universe and that govern man.

More important than all of the scientific discoveries in their application, seems to me to be the temper of mind that the success of science has produced in all of us. We are really living scientific lives. We are determining our actions in the scientific manner. Science is a long word. It means nothing but common sense. It means nothing but the orderliness and the discovery of orderliness. It means really fact-finding and generalizing, but today that is the word of the day. Even the boy on the street has the scientific temper. He wants to find out how it works and why it works and discover the laws.

We constantly hear that many of the problems of life are to be solved by education, and to my mind it means the inculcation of this scientific temper of mind. It is simplicity itself. It means, first, that you can conceive of life as a set of interesting problems, that you rejoice at the problems. It means the removal of the attitude. It means that difficulties present problems and that a problem gives the greatest source of happiness that there is for mankind, for it gives him a chance to test himself, and of reward as he solves the problem; so that life is a set of problems, it seems to me, problems to be solved happily, and solved in what manner? By the manner that we have learned only in the last 300 years, by finding the facts of the situation, by forming a judicially minded conclusion from those facts and then by acting on the facts. It is so simple that you wonder at my stating those things about fact-finding, honest conclusions and action; and yet when we say that this or that

or the other evil of today is to be cured by education, don't we mean that this or that or the other evil is to be cured by applying that technique of living? If we are training our boys and girls to that method of thinking and that way of living we can look forward with equanimity to the future—honest fact-finding, impersonal judicially minded conclusions from the facts and action, and that is the scientific temper.

In colleges, in universities, in life, in business, in industry, the greatest problem of all is the problem of teaching these highest common factors of successful performance.

I said I thought in the last generation or two, we had seen emerge many simplicities, many things which in point of fact appear as compromises but in reality are the units emerging from two opposed tendencies. We see a unity emerging from the scholarship and daily life. It was only a short time ago that scholarship was looked upon as a decoration for life. Scholarship was encouraged, and in many cases was pursued, I really believe, largely to furnish a mental sitting room in which one could retire from active life. One became educated away from tangible performance. One became educated away from the stress and turmoil, the rough and ready fight for existence, and in education was seen a relief and a vacation from the sordid reality of the work. That heaven, that temper, has changed. Education, learning, scholarship has been taken out of its cloister and put to the service of man in the daily life of the worker, and out of daily life and the attitude of the scholar has emerged that unity of scholarly life that is our ambition for today.

When There is a Real "Kick" in Business

Industry and philanthropy. "Business is business" was the old phrase. Now, to quote the words of my eminent colleague, Mr. Prendergast, a man gets a real kick out of business when he combines it with philanthropy. He gets a real kick out of philanthropy when it is businesslike and tangible. He is not a church member on Sundays and a schemer and cheat on six days of the week. He has got a unity of life which combines his performance with his expression.

Business and scholarship have become the great unit. Business is no longer rough and ready. It no longer sneers at attitude. It no longer sneers at a reasonable expert. I will admit that some experts go pretty far. It reminds me of the last definition I heard of an expert which applies the limit process familiar to those of you who remember your Euclidean geometry. This man said to me, "When a man starts to learn a lot about very little, he learns more and more about less and less until he finally reaches the limit and learns everything about nothing."

But business no longer sneers at the scholar, business employs the scholar and business is scholarly. The scholar no longer sneers at business, no longer sneers at business methods, and scholarship has become business life, and in fact our business life is emerging into the scholar business.

It gives me the greatest happiness to greet this Congress, one which has evolved a remarkable unit, a remarkable highest common factor, an activity in which your enthusiasm is self-evident of responsibility. I know your enthusiasm for the work is as intense today as it was when you were starting the pioneer enterprise; and no wonder, for you have evolved this rational unity. You have found this great highest common factor, an organization which is businesslike and concerns itself with business as well as with every activity which is scholarly, which promotes research, which studies to the bottom of problems, problems demanding (as they will demand still more from decade to decade) an understanding of the physical laws of chemical behavior of human psychology. Business, scientific research and high idealism, humanitarianism of the highest type.

Can you ask for a finer unity? Can you ask for anything more typical of America today, in which idealism and practicality are merged for the benefit of the

future? The word of America is tomorrow. You are working for it, we are working for it in our colleges and universities, and we stand shoulder to shoulder with you in the daily life of performance, with a longer perspective in looking still further ahead, that our children may live happier, more useful, more understanding lives, and that tomorrow may be better than today. And so we proceed in the belief that we are but beginning the greatest social experiment the world has ever known, this experiment of the intellect, of the heart, of the soul, in which we work with tangibility, with the practicality and inventiveness that are American, with the heart and sympathy that is American and with the skilful hands that are American.

I have spoken of natural science, of the contribution of the scientist to the temper of mind in producing among all of us that which today is as ordinary, as usual as air, the water we drink, the scientific technique of living: but the natural scientist now has shown the way to another group of students, to those who are studying social science, studying man and his work. You are social scientists, practically applied social scientists. You are making the world safer, better and happier, and men are studying the very mentality of themselves and of human beings, to the end that without prejudice and without superstition we may gradually, hopefully and clear-mindedly build for the future with courage.

The Council a Forerunner of Tomorrow

And so I greet the Council as a part of today and as a forerunner of tomorrow. I feel that we all should be optimists, happy and hopeful. Civilization in this world never before saw such a combination of the work of the head and the heart and the hand, of the emergence of that great unity of the intellect and the heart, of the intellectual with sentiment, abandoning sentimentality without an intellectual basis, abandoning the cold intellectuality without the guiding spirit and the warm blood of the heart and the soul. From that union, intellect directed with sentiment, and with heart, we are building our knowledge of man and we are directing our events, we are participating in the great adventure, in the evolution of a civilization of a society, even of a race. We are educators, every one of us, whether we will or no, for our influence is felt on every younger person with whom we come in contact; and so we look forward with happiness to the future that lies before man as he applies with deference, with sympathy and with sentiment, the scientific spirit of finding facts and acting on them. Man is but well started on his journey, the great end of all these marvelous evolutionary processes that have existed on the planet; he has started evolving this civilization and we are all co-workers.

It is as though we were in a vast and dim cathedral. We sense its beauty, but we know not the details; and we stumble on an organ, the organ of intelligence. Our clumsy fingers until now have only stirred that organ to produce a few shy notes, but the sweetness of these notes is so piercing that we tremble in ecstasy at the thought of the glorious harmonies that are to come.

TOASTMASTER McDANIEL: Turn backward, turn backward, O time in thy flight; make me a boy again and let me go to Dr. Mason's university.

The next feature on the program comes from St. Louis. You know, I read today of a missing millionaire who had been found in St. Louis last evening. Coming from St. Louis, as I do, I didn't appreciate part of that story in the Tribune this morning because, according to the Tribune, the lost millionaire said in his interview that he came to Chicago to see the fight, that he wanted a nice, quiet place to rest and he went down to St. Louis.

The next on the program is Safety Sam and the Careful Twins. They are going to arrive by airplane. Down in St. Louis we have a habit, if we want to go to Chicago, if we want to go to New York, or to Paris, we just fly over.

They have finished their broadcasting over KMOX, the voice of St. Louis, and

will be here shortly. Safety Sam and the Careful Twins broadcast six nights a week over KMOX. They have organized a children's safety club. That club now has over 400,000 members. Almost as many members as belong to the Democratic party. Each one of the members of this safety club has received a button, a pledge card, and a copy of a verse of song which they sing each night as the program is broadcast. They are going to come up here tonight in the "Spirit of St. Louis." As you know, Colonel Lindbergh was besieged by many who would have him write a testimonial that might be used in advertising some product. He has only written one testimonial and I will give it to you. He writes: "On my flight to Paris I used the Atlantic Ocean exclusively and found it satisfactory."

As you note from the program, Safety Sam is Mr. Girard C. Varnum, manager of the St. Louis Safety Council. Handy Andy is Mr. William F. Yorger, also associated with him in the management of the St. Louis Safety Council, and Ready Eddie is H. J. Brammeier, also associated with Mr. Varnum in the management of the St. Louis Safety Council. We will be quiet just a moment and see if we can hear the hum of the "Spirit of St. Louis." Ah! They have landed on the roof of the Hotel Stevens. They will be here in just a moment, as soon as they can come from the eighty-fourth floor.

Safety Sam and the Careful Twins—Handy Andy and Ready Eddy

Broadcast During the Banquet Session, Hotel Stevens, Chicago

SAFETY SAM: Good evening, my little friends; and here is your old friend, Safety Sam, not in old St. Louis as he generally is, but up in a sister city, Chicago. We have had a very pleasant trip, the Careful Twins and I, up here tonight to the Hotel Stevens, and I only wish you could be standing where I am, looking out upon this great audience of smiling safety enthusiasts. Oh, how I wish everyone in this hall this evening could do something that even I can't do, and that is, look into the hundreds of thousands of homes where all of you boys and girls are sitting before your radio. Some of you may be standing up; some of you may even be lying down in front of the grate fire listening. I wish we could see how many of you have your safety pledge hanging near your radio where you can get it and read it often to be sure you know all that it contains. Truly, radio is next to safety, one of the greatest things of the world.

It has been a long time since Handy Andy, Ready Eddy and myself appeared on a single program and had a nice, friendly chat with our club members. We are going to make affairs of this kind more frequent in the future, and as the days go by I am getting more and more jealous of the opportunity that is so often extended to the Careful Twins to have an evening's fun with many of the boys and girls of our club. I think I am going to make them load me in the old aeroplane with them and bring me along every once in a while, and then I wouldn't be surprised but what I am going to get a little particular myself, and I am going to fly off and leave them so I can have the chance of talking to you all by myself.

However, both Handy and Ready Eddie told me as we came over here tonight, that they had some very important things they wanted to say to our club members, so I am going to introduce them to you again tonight, just as I did on September 13, 1926, when we had our first program and when you heard all of our voices for the first time. First I am going to introduce Handy Andy. I should not have said introduce, I am going to say to you boys and girls: "Here's our old friend, Handy Andy who has something to say. Alright Handy.

HANDY ANDY: Hello, boys and girls! How are all of my little friends this evening? Safety Sam was just telling you about the wonderful gathering of men and women who are here solely because of their interest in the safety of all of you

boys and girls, our mothers and fathers, and all of your friends; and maybe you don't think Safety Sam, Ready Eddy and myself are proud of all of you because of the wonderful work you have been doing to prevent accidents not only to yourselves, but also to your many friends. We are especially proud of all of the boys and girls in St. Louis. During the month of July a number of our club members who reside in St. Louis carried on their own program. From information they had received from Safety Sam they learned that a large number of boys and girls are killed each year during the months of August and September by automobiles. Resolving that such would not be the case this year, they exerted every bit of energy they had to make the other cities in the United States sit up and take notice of what they could do when they really tried. As a result not a boy or girl has been killed in St. Louis by an automobile since July.

I am sure you will agree with me that this is sufficient reason to make us proud of these boys and girls. It is this kind of spirit among all of our members that has made our club the biggest and best safety club in the world. Many of our members in other cities are doing just as good safety work, only along other lines.

From time to time I am going to pick different cities and tell you just what the boys and girls are doing to prevent accidents. Don't fail to tune in every evening at ten minutes to six because your city may be next.

How Accidents Are Caused in the Schools

SAFETY SAM: Now, I know you are all interested in what Handy had to say and I really think you will be surprised if you will do what Handy has told you and listen in and see when your city will be recognized because of some of the nice work you boys and girls may be doing.

And now I am going to present Ready Eddy and let him talk to you for a few minutes. Alright Ready.

READY EDDY: Good evening, children! It is somewhat of an innovation to speak to you boys and girls from the Banquet of the Sixteenth Annual Safety Congress. There is certainly an atmosphere of safety throughout this entire banquet room. I just wish everyone of you boys and girls could have an opportunity to be here with us this week. It is certainly wonderful.

I was very much surprised the other day when I received a report of accidents that occurred in the public schools of one of our large cities during one year. No doubt this report is typical of the schools throughout the entire country. Little did I realize that so many accidents happen while you children are at school. Just think, over 500 accidents happened in the grade schools of one city. Many of them were of a minor nature, but still fifty-five were of a more serious nature, such as dislocations, broken bones, fractures and injuries to the eye. Of the total number, almost one-half of the accidents were caused by falls, from tripping, slipping, losing balance, either by being thrown or pushed down. Next in line were injuries caused by flying or falling objects, such as baseball bats, baseballs, rocks and sticks.

Rough play came in for its share of accidents. By that I mean wrestling, boxing, and kicking one another. I want the boys to listen to this. More than twice as many boys as girls met with accidents. That does not speak very well for the boys, but we realize that the boys play a little harder than girls and their games are usually more strenuous, so it is up to you boys to be twice as careful as girls.

The greatest number of accidents of this total occurred during the month of October, and a large percentage of them happened during the noon hour. The school-day part of our life covers a very few years, but it is the happiest period of our life, in which a great growth in body and mind must take place. If you boys and girls are to learn the lessons and make yourselves ready to use the knowledge in the years that follow, you must keep well and strong and build up a vigorous body while you are growing up. So let us not have any accidents. We should all

rn that there is only one way to do things and that is the right way, and the
ht way is the safe way.

Throughout the country there are many junior safety councils organized in the
ools and they are wonderful organizations. One of the junior safety council
dges is as follows: "I will work for the safety of others as I would want
m to work for my safety. I will try to be careful all the time, everywhere.
will not take unnecessary chances of getting hurt and will warn others against
ng so. I will do my part to reduce the number of accidents this year. All of
s I will do for the sake of humanity and for the honor of my school."

Even though there may not be a junior safety council in your school I am going
ask you to learn and observe that pledge.

SAFETY SAM: I think that junior safety council pledge Ready Eddy gave you
s very good although I don't really believe it is as good as the pledge of our own
b. Now before we sing our safety song I am going to ask each of you to take
r pledge in hand and read each one of them with me. Here we go!

1. I will not take chances—it does not pay. 2. I will not steal rides on auto-
biles, trucks or street cars. 3. I will play on the sidewalks or in a playground,
not in the streets. 4. I will cross the street at crossings only and will not
o into the street between automobiles parked at the curb. 5. I will care-
ly look both ways before crossing a street. 6. I will not play with firearms.
I will not play with matches. 8. I will not touch a dangling wire; it may be
ive wire. 9. I will not take medicine out of a bottle without a label; it may
poison. 10. I will stay in shallow water until I have learned how to swim.

I will stay away from stoves and will not play with gas. 12. I will not play
window sills or porch railings.

Now our time is just about up and we are going to sing our safety song, and
ope each of you will sing just as loud as you can. I am going to ask the audi-
e here this evening in this great banquet hall to sing the second verse and chorus
a me and with you, so when I raise my hand to the audience I hope you will
consult your banquet program where the words of the song will be found, and
; with me the second verse and chorus. Now let's see how loud we can sing.

Oh, the children that live in Safety Town
Are healthy, happy and wise,
And all because they heed advice
About the dangers to their lives.

Oh, we are going to play no more, no more
About the streets and highways,
And all because we are members of
The Careful Children's Club.

Oh, we never run across the street,
We walk and take our time;
We always cross at the street corners
Or where there are white lines.

Oh, we are going to play no more, no more
Upon streets and highways,
And all because we are members of
The Careful Children's Club.

Good night kiddies, and remember our slogan, "One Thought for Safety Is
Worth a Thousand Regrets."

Ladies and Gentlemen, just one more little word. When we asked to put on this program for you this evening we decided it ought to be done two ways, that one of us should be here in order that you might see the microphone work being done and the others could be concealed from view so that you could put yourselves in the place of the child sitting at home listening, so I am now going to take pleasure in introducing Handy Andy and Ready Eddie who will step out and wave.

TOASTMASTER MCDANIEL: Ladies and gentlemen, can you realize what a wonderful work this has been to reach 400,000 children with this message of safety every night over the radio? They know they reach 400,000 because they have sent in their names and addresses; probably twice that many are reached every evening as shown by this practical demonstration by Safety Sam assisted by Handy Andy and Ready Eddie. It has been wonderful.

Now we come down to the last speaker on the program. I think of the father and husband who had died. It was in a rural community where no secrets are kept from anyone and the nice old lady in the neighborhood said to the little daughter, "Mary, what were you father's last words?"

Mary said, "Pa had no last words; ma was with him."

The Ladies Take a Great Interest in Safety

It is a wonderful thing, the interest the ladies take in this work of the organization. I think of the negro who heard the word monotony and didn't know what it meant and he couldn't find out what it meant so he could use it. He thought it would be a wonderful word to use, so he sought out the negro preacher and asked him what the word monotony meant. The preacher said, "I will have to illustrate it to you. It is like this. If a man had three wives at one time, that would be polygamy. If a man had two wives, that would be bigamy. If a man had one wife at one time, that would be monotony."

Now, this next speaker is an old friend of the National Safety Council. Almost since the day of its inception he has served it well. For five years he was a member of the Executive Committee. I am referring now to the man whose picture appears upon the program; underneath the word "Program," as if he were the whole program, Mr. Forster's picture appears. He hails from Philadelphia, the city of brotherly love. First in rugs and linoleum, first in peace and last in the National League. Mr. Forster is so many things and has so many accomplishments I must read some of them. He was educated as a mechanical engineer and is by selection a preacher of accident prevention. He is connected with Brown, Crosby & Company of Philadelphia, prominent insurance brokers, and professionally interested in interrelated subjects of fire prevention, accident prevention and industrial relation. As managing editor of the Crosby Fisk Forster Hand Book of Fire Protection, Mr. Forster has presented the subject of fire prevention and accident prevention in a manner that is proving valuable to the insurance fraternity, the safety movement and industrial plants generally.

Now, I forgot to announce Dr. Mason's subject, but I want to announce Mr. Forster's subject because he is the nightcap of this meeting. He is going to send us away full of pep. I heard the boy from Providence say he got a kick out of something, and I heard the distinguished President of the University of Chicago say he got a kick out of something. I guess it is all right to say that I got a kick out of something. I have two distinguished presidents to go by. The distinguished President of the United States is one president who has had more stories told about him than anyone else. It was related of President Coolidge that he went to church one Sunday morning and Mrs. Coolidge did not accompany him. When he returned to the White House Mrs. Coolidge said, "What was the text?"

The President said in his short, brief way, "Sin."

Mrs. Coolidge then asked, "What did he say about it?"

The President in his careful way said, "He seemed to be against it."

Now, you know I sat up here tonight between Mr. Forster and Dr. Mason and rarely have I enjoyed a dinner as I did between those two distinguished gentlemen. I did manage to eat while listening to them, one on either side, but it is a great thing to know Mr. Forster. I know that he is going to give us a wonderful address.

Safety—A Source of Inspiration and a Test of Courage

H. Walter Forster, Brown, Crosby & Company, Philadelphia, Pa.

From the frequency with which it has been my privilege to appear before you at National Safety Congresses, I think I could more appropriately address you as, "My most endurable audience." This is the largest dinner in the history of the safety movement, but, in spite of your cordial greeting, I do not think for one fleeting moment that this great turnout of safety men and women has been appreciably affected by my being scheduled to speak. No, not for a moment! You know me too well. You came to be among your friends, to eat some of this good Hotel Stevens food, to be entertained, and to listen with as good grace as possible to the toastmaster and to the speakers, without whom no dinner seems to be complete.

I think I speak for the assembled multitude when I say that the toastmaster has been not half bad. He has a winning personality, he is mentally alert, he keeps things moving, and his stories were decidedly fresher than generally is the case. Even his introduction of me was not nearly as bad as one that lingers painfully in my memory. The peroration of that introduction was, "And our next speaker has the proud distinction of being claimed by two cities: Chicago claims he belongs to Philadelphia, and Philadelphia that he belongs to Chicago."

The entertainment has been of a high order. I would hesitate to put to a vote the question of whether the next number should be another safety sketch or the remarks I am scheduled to make.

From the rapt interest with which you have followed the addresses of the school boy from the East and the university president from the Central West and from your tumultuous applause, I can also diagnose the speeches up to the present time as great successes.

It is exalted company in which I find myself tonight. If it were not for my enthusiasm at the opportunity to speak to this record-breaking audience, I probably would feel like the Philadelphian who, after careful preparation and with great trepidation, launched his maiden dinner speech with the words, "William Penn is dead, Benjamin Franklin is dead, Washington is dead, Lincoln is dead, Roosevelt is dead, and I don't feel any too well myself." No, I am feeling very fit, and I accepted the invitation to be here tonight gladly and by wire; and, in order to show our Managing Director that I had not forgotten whence came his forebears, I sent it collect. Now, I am trusting in your natural courtesy, your hope that my talk will not be as bad as you fear, and that the gavel of our vigorous toastmaster will enable me to deliver the remarks I have painstakingly. I hope not painfully, prepared.

By the way, are the amplifiers working well; can you folks in the rear of the room and in the balcony hear me clearly? I want to avoid the experience of the after dinner speaker whose voice did not carry any too well, and who was interrupted by a cry of "Louder," followed by "We can't hear you back here." A man half way back turned around and said, "Be quiet, you lucky cuss."

We come to these Congresses to bear witness to the importance of accident prevention, and to strengthen our faith for the fight we must make during the

year to come, for safety, in spite of its unquestioned importance and possibilities, is not achieved by passive measures. We come to renew and to broaden our friendships, to contribute our experiences and ideas, to learn the answers to our specific problems, to absorb good ideas that we can apply, and so completely to gird ourselves with faith and courage that nothing can deflect us from the goal toward which we strive. Even today, when safety has been so widely endorsed and so generally practiced the safety man often finds himself carrying so large a proportion of the safety burden that he very properly could assume the attitude of the Texas ranger. A riot broke out and spread rapidly in a small town west of San Antonio. Some of the responsible citizens telephoned to the headquarters of the Texas Rangers for help. They were assured help would go west on Train No. 9. When the train pulled in, these anxious, responsible citizens were at the depot to meet it. Only a single long, lean, tanned Ranger swung off the front platform of the smoker. He greeted the anxious committee with "Where's the trouble, gents?" The spokesman answered, "Are you all they sent?" "Why?" said the ranger, "Is there more than one riot?"

Safety Men Succeed in Spite of Trials and Troubles

There is no doubt that renewed courage is one great advantage of attendance at these Congresses, and this renewed courage comes to a considerable extent from finding that the difficulties, disappointments, discouragements that you have suffered are not unique; that virtually every successful safety man has experienced them in the past and does today, that the wonderful records of individual plants, of groups of plants, and now even of industries as a whole, are achieved in spite of 57 different varieties of trials and troubles. And, further, that in spite of the support of management and men, the responsibility for getting results and of keeping and increasing these results devolves largely upon the man who has safety in charge. We know he gets results only by working through the organization, but we also know that ideas, stimulus and courage radiate largely from him if he is putting his heart and soul into the job, and knows exactly what he desires to achieve. Not like the two men who went hunting together and had to share one gun. One stammered; the other had St. Vitus dance. The stammerer took the gun first. As they walked along, his companion spied a rabbit. Pointing with trembling arm, he cried, "Shoot!" The stammerer shot and missed. It was now the turn of him who was afflicted with St. Vitus dance. He took the gun. The two walked further along the woodland road. Suddenly the stammerer saw a squirrel up a tree. He cried out, "Sh-sh-sh-sh-shoot!" His companion pointed the gun upward, but described wobbling circles with the muzzle. Finally he fired; the squirrel dropped to the ground. "I hit him!" cried the nimrod. "Wh-wh-why, shouldn't y-y-you," stammered his friend. "Y-y-you aimed all over the t-t-tree."

No strong man fears difficulties. He does not go out looking for them, but when they come, he takes them on courageously and intelligently. I have often repeated a phrase that I heard years ago apropos of the troubles that go with the higher-up jobs, namely, "if it were not for the troubles, the office boy could have my job." A more artistic way of putting it was found by the poet who wrote, "The game fish swims up stream."

True courage can only come from believing that what we support is fine and truly worth while. No man could fight year after year for a cause of which this was not true. If a stranger from Mars, let us say, ignorant of the merits of accident prevention, could know that this group of men and women for fifteen years, in ever increasing numbers, had poured their strength, faith, and hopes into the safety movement, he would need no further endorsement of the excel-

of our cause. And he might not be so very surprised to learn that at the organizing meeting in New York in 1913, there were 300 persons present, and that the money then pledged totaled \$1,400 per year; that at this Congress the expenditure is over 5,000, and that the annual income of the National Safety Council and of the local organizations that function with its cooperation is well over \$1,000,000. And he could readily believe that as a result of all the outpouring of manpower and money marvelous results have been achieved; that tens of thousands live today who otherwise would have come to an untimely end; that hundreds of thousands have escaped serious injury; that literally millions of minor accidents have been prevented.

Someday a great poet will catch the full significance of what safety has done for humanity and will write a poem as beautiful, as inspiring, as universally appealing as Lt. Col. McCrae's "In Flanders Fields." But instead of singing—

"We are the dead: short days ago
We lived, felt dawn, saw sunset glow,
Loved and were loved, and now we lie
In Flanders' Fields."—

he will sing of the lives that have been preserved by a fight as worthy as the one in which they died, of the joy in their hearts instead of the happiness that was theirs and of the services they can render instead of the sacrifices they made.

Such a poem will be written in words quite different from those complained of by the woman in front of whose house some linemen were working. She wrote to headquarters to protest against some excessively profane language she had overheard. The superintendent of construction wrote to the foreman, one Michael Mulcahy, for an immediate written report on what had transpired. He answered that he saw no reasons for any complaint, because the facts were as follows: Patrick Sweeney was on top of the pole, working with a pot of hot solder. Accidentally, a lot of it dropped down his, Mike's, back, and he had called up, "Pat, me darlin', ye must be more careful."

The Bond That Unites Men in Friendship

Thank God, there is a lighter side to safety; it is not all a matter of inspiration, and courage, and fervor. It also has a most valuable by-product in the creation of many warm friendships, not only among safety men, which these congresses so excellently further, but also in the plants. A safety man frequently knows the organization better than any other man in the plant. He reports to headquarters; he works through it clear down to the humblest laborer whose understanding of English is largely limited to the kind of language of which Mike Mulcahy was so unjustly accused. He knows these men; and, while he has his troubles with a lot of them in the course of a year, there is not one of them, providing the safety man is able, industrious and fair, who does not respect him. A large proportion will admire him, and many will be sincerely fond of him. The respect and friendship of men are a delight, and excellent barometers of the real worth of a man. When you live with a job year after year and you are esteemed as a man and a preacher of a worth-while cause, you have achieved a position that is enviable; remember that when you feel discouraged.

Closely coupled with friendship in the safety movement is generosity. Not only generosity in time and energy and brain power on the specific job, but helping any other safetyman who can benefit by what has been achieved. I

never heard of a real safetyman who was selfish; he gives with both hands and asks no direct return. Not like the Scotchman who gave one of his close friends a homing pigeon as a wedding present. This Scotchman must have lived next door to the one who introduced the style of holding weddings in back yards, so that the chickens could pick up the rice; and he must have been a relative of the one who beat a Jewish friend one up at golf by counting against the Jew the sunstroke he had suffered on the eleventh hole.

We laugh at jokes at the expense of Scotch thrift, but the National Safety Council owes the Scotch a great debt of gratitude. Our first president in those two trying years was a Campbell; three Robertsons served us well in those early hard years; other Scots have sat in the councils of the mighty, and "Willy" Cameron is Scotch. Every virtue of the race—physical fitness, fine mentality, indomitable courage, boundless energy, have been lavished by him in our cause. And we never would have \$175,000 in bonds and other cash assets if our managing director were not 100 per cent Scotch when any one wants a National Safety Council dollar for anything but most efficient service. We have had almost a dozen effective presidents, scores of valuable directors and executive committee members, hundreds of other real workers in the safety vineyard, but head and shoulders above us all in furthering safety in America stands our capable, indefatigable, modest, beloved Will Cameron. Mr. Toastmaster, may I suggest that you ask the managing director to rise and at least bow to 3,000 of his friends.

Often when I have thought of the safety movement, the word "crusade" has come to me. The Crusaders, fired by the zeal of their leaders, put away mundane things, girded themselves for a long march and a hard fight, organized themselves for effective cooperation, and went forth to win or die. And is not that exactly what the safety movement requires of us today?

We have needed and we always will need leaders fired by zeal for our cause. There must be the bugle call to arms, the prayer for strength, the heartening of those whose conviction is not complete.

We also must put away mundane things to a very considerable degree. Fortunately, there is a wordly side to safety; the fact that safety could be shown to be good business has enabled us to advance the cause far more rapidly than would otherwise have been possible. But successful safety work never has been and never will be based primarily on a cold blooded and calculating attitude. The splendor of the cause and the possibilities of the movement have been and must continue to be our prime motivating forces.

Gird for a Long March and a Hard Fight

We, too, must gird ourselves for a long march and a hard fight. We must prepare ourselves for our work and keep prepared. Zeal alone does not get results. We need an astonishingly wide preparation if we are to meet successfully the management, human, engineering, and legal problems by which we will be confronted, and, once prepared, we need the courage of which I have spoken to hearten us for the fight for the results that we can see ahead.

We also must organize ourselves for effective cooperation by departments, by individual plants, by groups of plants, even by industries, and we have in our National Safety Council that source of stimulus and of organized planning which the Crusader had in the Holy See in Rome.

We, too, need faith to win or die; not in the sense of leaving our bones to whiten on alien sands, but in that we make a fight as brave, as inspired, as thoughtless of selfish ends, as did the mail clad knights who went forth to fight the Saracen. Chesterton has wonderfully summarized the spirit of the Crusaders

in his great ballad "Lepanto." He has Mohammed, who in Paradise hears the war-drums of the Crusaders threatening his land, say of the selflessness of the Crusader, "It is he whose loss is laughter if he counts the wager worth."

And, finally, to complete the analogy: what device has symbolized his cause to the religious crusader of by-gone centuries and to the safety crusader of the twentieth? The banner with the cross! The red and white in the one case to symbolize the blood of Christ and the purity of the cause; the green and white in the other to symbolize the sacredness of life and the spirit of him who champions the cause.

While the religious crusades of almost a thousand years ago and the safety crusade of today have certain common characteristics, let us consider for a moment the ends sought in these two great movements. Godfrey, Barbarossa, Richard the Lion Hearted, and other great leaders and their myriads of followers, sought to wrest from the infidel Turk the church of the Holy Sepulchre in Jerusalem. To achieve this end, six major crusades were undertaken, two of them temporarily successful. How great was the loss of life and the expenditure of treasure no one knows, but they were so great that they crippled and almost beggared kingdoms.

And how worth while really was the end that they finally achieved? What real good was gained with the capture of Jerusalem, lost again in a relatively few years? It gave Christendom a great central interest and no doubt furthered the principles and the spread of Christianity, but a dispassionate analyst would gravely question if the end justified the cost.

Human Benefit Is the Victory Sought

The safety movement, on the other hand, seeks not a victory empty of direct human benefit and achieved only with great loss of life and waste of treasure, but safeguarding life without physical danger to him who furthers that safety, protecting property that men have gained by the sweat of their brows, making two blades of grass grow where one grew before, and following every sound teaching in whatever religion it may be found that bears on the sacredness of life and the responsibilities which all possess, whether they sit in the high places or beg alms by the wayside.

Perhaps the contrast in the worth-whileness of the ancient and modern crusades can best be emphasized when we consider the children's crusades of then and now. The former sacrificed childish lives in great numbers upon the altar of a mistaken ideal. Imagine the feelings of the Master who had said, "Suffer little children to come unto me, for of such is the kingdom of Heaven," when he saw this horrible sacrifice, and supposedly in His name.

The safety movement, on the other hand, has organized myriads of children in every corner of this great land for an end gloriously different; to save instead of to sacrifice life; to protect instead of to maim; to apply Christian principles instead of to follow a false ideal; to inculcate a sense of the sacredness of human life and of the responsibility each has for the other. Surely in this phase of accident prevention, probably more than in any other, we can feel the happiness, the uplift that comes from doing the Master's work.

We here tonight are a mature group of men and women. Perhaps it would have been more gallant and politic for me to omit the word "women" from a sentence featuring maturity. I hope my failure to play safe will not result in any painful after effects to me. I do not want to have to break any world's speed records across the waste lands of Grant Park tonight, the sort of speed made by the husband of the woman who told him one evening that the cook was leaving because he had talked to her on the phone that day in a manner

more abusive than she had ever heard in her life, and who answered, "My God, was that the cook; I thought all the time it was you."

But the point I wish to make is that with maturity comes an understanding of what is really worth while in this complex, difficult, adventurous, interesting existence we lead. Most of us clearly see the ways of the false gods, and we are not appreciably attracted by things that are not basically worth while. We know that true happiness comes from work which is useful and from making progress in that work; that the strong man is willing to carry load and glad of his ability to do so; that successfully meeting stress and strain is proof of real capacity; that the respect of many and the love of a few is a crowning glory of a lifetime of work.

If you analyze work in the field of accident prevention in the light of this specification of how to serve mankind, build character, and achieve happiness, you will find (in fact, you already know), that there are few fields of labor in which are found such satisfaction, such happiness, such inspiration. To the devoted worker in the safety vineyard will come at times some of the uplift that caused Elijah twenty-six centuries ago to sing, "They shall mount up with wings as eagles; they shall run and not be weary; they shall walk and not faint."

TOASTMASTER McDANIEL: Walter, we thank you.

MR. FORSTER: Larry, I thank you.

TOASTMASTER McDANIEL: This mutual admiration society will soon be adjourned now, but before I turn the meeting back to the president, I want to tell you what a wonderful privilege it is to be here and to meet those interested in this great work. You know the greatest thing in the world is to meet your fellow man and know him and love him and associate with him and be with him and learn from him and teach him; and after reciting this little poem, I turn the meeting back to the president.

It is the human touch in the world that counts,
The touch of your hand and mine.
It means far more to the fainting heart
Than shelter and bread and wine.

For shelter is gone when the night is o'er,
And bread lasts only a day;
But the clasp of the hand and the sound of the voice
Go on and on alway.

PAST PRESIDENT KING: We have had a wonderful evening. We stand adjourned.

ADJOURNMENT.

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Safety In the Small Plant

Thursday, September 29, 1927

JOHN ROACH, Chairman
Deputy Commissioner, Department of Labor, State of
New Jersey, Trenton, N. J.

The session devoted to safety in the small plant was called to order at two-fifteen o'clock by the chairman, John Roach, Deputy Commissioner, Department of Labor, State of New Jersey, Trenton, New Jersey.

CHAIRMAN ROACH: I think the meeting we have this afternoon is one of the most important that will have been held at this Congress of the National Safety Council. I remember at the Detroit meeting with what splendid interest and unusual enthusiasm the delegates assembled in a large room and spent three very intensive hours in the discussion of operating problems that affect the small plant.

I know, when we use the term "a small plant," that we are dealing in very general language and using a term that is not entirely pleasing to the statistical mind which likes to label and tag things in a codified and orderly manner, and various examples have been presented at several conferences on the small plant as to just how large a plant should be to come within that classification.

I don't know that this point has ever been definitely settled by any authorized statistical authority, but I have been informed that probably 75 per cent of the productive energy of the people of our country is employed in plants that number nowhere under 300 persons. That's a very general statement and cannot be supported by statistical data, but the impression is very strong that this large percentage of all America's industries is employed in the smaller group of plants, where it is more difficult, infinitely more difficult, to promote intelligent safety education than is in the very much larger group.

I sometimes wonder what would happen to the safety movement that has made such a splendid history for America's industrial progress if the large employing groups, the public utilities, the rail and water transportation, and the large industrial corporations should separate, disband and leave the organized safety movement to go on without their splendid assistance and cooperation.

I am afraid we would have hard sledding and a difficult time to promote the educational program that has focused the entire attention of the world on America's chief in its moral obligation to operate the industries of our country safely.

I concede that the state has an important obligation in this matter of providing industry with intelligent operating rules, and that this obligation on the part of the state can never be discharged by merely enforcing the mandates of the law, and forgetting that example, precept and patience are sometimes a trinity that will accomplish much good when the policeman's club has been found ineffective.

If the state provides sound engineering rules of conduct and procedure that are available through the American Engineering Standards Committee, and the employer

in the small plant participates in the organized safety movement in his locality, and then the employees in this great group of small plants are encouraged to conduct themselves during the course of their employment in accordance with sound engineering practice. I am sure the fearful toll of accidents, death and suffering that has been recorded during all the years, will lessen appreciably from time to time.

We have many important papers to be read this afternoon. I will, therefore, call at once on Mr. W. H. Weitknecht, superintendent, Lehigh Portland Cement Company, Mitchell, Indiana.

Why Should the Small Plant Be Interested in Safety?

W. H. Weitknecht, Superintendent, Lehigh Portland Cement Company, Mitchell, Ind.

I am very glad, Mr. Chairman, that your remarks are such a fitting introduction to what I hope to say. What I shall say comes from the result of experience and the deductions I shall try to make are based on that experience and on observation.

I do not know how many executives of small plants are before me. I hope that many of you are either in charge of small plants, are the safety directors of small plants, or represent safety committees in small plants. And by small plants, I mean that plant which has not the opportunity, does not command the means of employing a full time safety man, but must depend upon the work that is done within the organization by the management cooperating with the safety committees of the plant.

In the first place, what constitutes real safety? You have heard much about the two principal factors or elements in accident prevention—the mechanical element, consisting of safe places, tools, equipment and safety appliances, and that indefinite, inconstant human element that has to do with the mental attitudes and the mental aptitudes of the workmen.

I wonder whether you have come to the same conclusion that I have, that there frequently appears to be too definite a distinction made between these two factors. I want to try to correlate them to show their relation one to the other in attacking that problem from the angle of responsibility.

It is readily conceded, I think, that the matter of the mechanical equipment, of safe mechanical equipment, is largely if not wholly a matter of the ownership and operating management. They owe it to the workmen to furnish that. Does their responsibility largely cease when they have a well equipped plant, safe in all its mechanical equipment and appliances? Is it now to be turned over to the workman, and personal injuries resulting from so-called accidents henceforth to be the result of carelessness or bad practices on the part of workmen?

Is not the management responsible for the supervision of the practices and performance of employees? Quite as much as it is responsible for purchasing the proper equipment and safeguarding it? Is not the foremanship throughout the plant the responsible expression of the ownership and management? Is it not true that many of the personal injuries resulting from industrial accidents arise out of bad practices that are permitted, if not engaged in, by the foreman himself? Is it not true that the employee is frequently not adapted to the employment that is offered him? Is it not true that either inadequate or frequently incompetent instructions are given to the employee? Is it not likewise true that the very foremen, who are the expression of management, are guilty of practices either as a result of carelessness or incompetence that is imitated by their workmen? Am I placing too large a responsibility on the management when I draw attention to these facts?

What are the responsibilities of workmen? There are natural deficiencies and delinquencies among properly instructed workmen which cannot reasonably be fore-

men by a competent supervising management. For those the workmen are largely responsible; but they are comparatively few in a well managed, well supervised plant.

Safe practices and safe places constitute the sum and substance of real safety, or both of which management is largely responsible. In proof of that I wish to cite the work that was done by the various cement plants (mostly member companies of the Portland Cement Association) when first the work of accident prevention was suggested to the industry—the placing of safeguards on mechanical equipment, the determining of safe places throughout every department of the mills and quarries, without any corresponding advantage or progress in the matter of accident prevention.

Accident investigation gave us the clue and in nearly every instance it could be said not only that the workman should reasonably have foreseen the condition that resulted in his injury or near injury, but that the supervising management, the foremanship in that department, should likewise have foreseen it and prevented it.

After we began to place individual responsibility, personal and mechanical, on the foreman of every department, we commenced to reduce personal injury accidents, and we have continued to proceed along those lines by assuming the responsibility for practices and performances ourselves, the result was that soon a cement plant operated throughout a calendar year with but very few hours of lost time per hundred thousand man-hours employed. That was followed the next year by a perfect record, where a cement plant operating with (I think) 150 employees continued throughout the calendar year without a single lost time accident in an industry prominently known and conceded to be rather hazardous. The succeeding year two plants went through the entire year without a single lost time accident, each plant having more than 100 employees. That was followed by two plants, one of which employing over 500 men, operating throughout the entire calendar year of 1926 without a single lost time accident. Proceeding on that theory, that the management must assume the responsibility for much of the practices, and trying to discharge that responsibility by careful supervision, what will you say when I inform you that to date in 1927 there are 23 cement plants in the United States and Canada, each employing from 100 to over 700 men, which have not had a single lost time accident.

A Fine Safety Record Is Anticipated

According to the way they are running now, we hope that at least 20 of those cement plants will complete the calendar year of 1927 without a single lost time accident. That is an accomplishment which is the result of what? The assumption by the management that it cannot pass the responsibility, pass the buck, in other words, down to the rank and file for careless practices, that it must give the working organization careful, safe practice habits, and that those must be developed only under careful supervision.

Does the matter of accident prevention assume a somewhat different aspect to you as managers of small plants, now that I have told you what the results are from following that line of thought? Are you willing to go home and put into practice the best efforts at supervision and management that you can think of, in order to discharge that responsibility for the personal injuries that occur in your plants, including the fatalities? If you can get that point, if you can take that home with you, if you will practice that, you will have made a real start in real accident prevention.

What has been done in a hazardous industry like the cement industry can be done in any other industry if you will attack the problem with the same spirit and with the same understanding.

That's the phase of it that affects the industry itself, the plant itself, in the pre-

vention of accidents. The economic side, the directly economic side I shall just barely touch on because there is much dispute with reference to it.

What do you think these cement plants will do when they find that they can run year after year, as they are going to, with just minor lapses so far as their compensation or liability are concerned? They are going as far as it is possible for them to go in states where they are permitted to carry their own insurance, and the best risks which the insurance companies have will drop out. What will be the natural result? As this scheme of accident prevention gains momentum, the industries that do real accident prevention work will drop out as customers of insurance companies and become self insurers.

What is going to happen in the matter of workmen's compensation and liability rates to those who remain as the customers of the insurance companies? Double, treble, quadruple—I shall not attempt to indicate the manifold increases that you may expect and that are bound to happen. If you do not want to be among that class of industry which pays a prohibitive compensation or accident liability premium, you had better begin on the matter of real accident prevention.

There is a far more important reason why the small plant should be interested in safety, for real safety properly inculcated will express itself in habit. No individual can be a safe man in an industrial plant at his employment, and set the garment of safety aside when he leaves the property of the employer. It becomes a matter of habit with him just as much as it does to get up in the morning at five o'clock and before the alarm rings which he has set the night before. All of you have had that experience, I presume, setting an alarm to get up at a certain hour in the morning, and following that practice for several months, only to find that in a very short time you will awaken before the alarm goes off. You do it as a matter of habit, governed by the subconscious mind. That is a problem for psychologists to answer. You will shift the gear on your automobile after you become familiar with the operation of it, without thinking in detail what you are doing. You apply the brake automatically as occasion arises. Your actions are governed unconsciously. You cannot do two things consciously at the same time, but still you can do a number of things at the same time, while your mind is consciously employed at something else. That is the development of habit.

Permanent Safety Habits May Be Formed

So will habit operate in connection with the development of safety in a plant; it will continue to operate after the man has left the plant. He sees a dangerous condition, he recognizes the danger and he does not rest until either he has remedied it or has called the attention of someone whose business it is to remedy it.

That is another thing you want to tell your employees. If they want to be real safety men, they must follow that line of action, for if they don't, if they consider a hazard not a part of their business because it is outside their plant, they will again be like you when you hear that alarm go off several times in succession and do not get up. It will be but a very short time until you will not hear the alarm. You will have destroyed that unconscious government; so with the development of habit and its subsequent destruction. That's what I consider the sum and substance of real accident prevention work.

How does that apply in the community? Are we facing any community problems, especially in the smaller community, in the smaller cities? I heard something this morning that the Safety Commissioner of New York City said eleven years ago in discussing traffic problems of the larger cities. He made the statement that some particular point in traffic regulation did not apply to smaller cities since cities of 250,000 population had no traffic problem. Think of it, eleven years ago cities of 250,000 population did not have a traffic problem—and you know that was largely true.

Is there any need for the development of safe practice habits in industry? Is there any need that safety habits shall be so developed that they will express themselves in the community at large? My belief is that the matter of public safety can be accomplished in no way more quickly and effectively than if we can enlist the active support in accident prevention work of every small industry throughout the United States and Canada.

If it is true, as the chairman has said, that the majority of workmen in industry are employed in plants of 300 men or less, what more important work can the management of such small industries do than to start active, effective accident prevention work in their plants? It will have a far greater effect, will be more far reaching, than the best accident prevention work that is done in large industries.

Take in connection with this fact, the figures from the workmen's compensation bureau, that some industries have proportionately more accidents. Insurance companies now consider them much greater risks than the larger industries employing many hundreds or many thousands of men. Is that due to the fact that there are larger hazards in the smaller industry? No. The reverse is really true. There are greater hazards in the larger industries, but the reason we have less personal injury accidents in the larger industries is because effective accident prevention work is being done.

Safety Influence Will Extend Beyond the Plant

In my opinion the obligation rests upon the management of small industries to help the safety movement by inculcating safe habits among their employees. The big thing that you, as managers of the small industries, can do is to start preventive measures, and if an ounce of prevention was ever worth a pound of cure, it certainly is in preventing personal injury accidents, and no place will be as productive of good results, no soil so fertile, than right in your own small plant. It will relate itself to the schools; the children in the home will be taught by the father. That instruction will come as a result of the instruction he receives in his plant. Many a boy and girl going to school will be saved as the indirect result of your accident prevention work in your industry. Many a boy and girl, yes, many a man and woman, will obey the traffic regulations because they have been taught that it is the wise and the right thing to do. They are in a mental attitude to obey. They don't want to run past the red light. They have been taught the reasonable thing to do and they have acquired that habit, for we are all creatures of habit, and as we perform in our daily life in one way or another, so we perform in moments when we think less about ourselves or about anybody else. We are governed by the law of habit, which is a development of the governing function of the subconscious mind.

How many of you have been mentally preoccupied when you came to a traffic light and have run past it without noticing that the red was turned against you? Mental preoccupation. That's one of the things you must guard against. You weren't controlled by any unconscious governing body within you. Your mind was active on something else and you ran past it. You hadn't formed the proper safe practice habit with reference to stopping at those signals.

If you can in a measure agree with me that the work of accident prevention in the small plant can thus be related to public safety in your community, who is there to deny the great possibility for good? Who is there who will not say that the effort is not worth while?

CHAIRMAN ROACH: I am sure we are greatly indebted to Mr. Weitknecht for the very interesting discussion he has given us.

The next paper will be read by Mr. John Shaw, assistant to general manager, Hercules Powder Company, Wilmington, Delaware.

Safety a Personal Responsibility in a Small Plant

John A. Shaw, Assistant to General Manager, Hercules Powder Company, Wilmington, Del.

By "Personal Responsibility," I understand that the manager does safety work in a small plant, instead of delegating the work to a safety engineer, as in a large plant.

First of all, what is a small plant? I should say it is one in which the manager or his immediate assistant has, at all times, intimate contact with every worker. Such a plant may run from 25 to 200 men. I do not believe the manager can enjoy or maintain close contact with the workers in a plant running over 200 men. A great deal depends upon the manager himself, and in these days of multi-unit corporations where much office work is required, some managers find it hard to maintain close contact with 200 men. Some managers like to think they have this contact and pride themselves on knowing all about the workers, but such managers are fooling only themselves.

The good manager will not be so fooled, and when he realizes that the size of his plant or his other duties prevent him from keeping personal contact with each of his men, he will make sure that all his foremen know his ideas on safety, and he will hold them responsible for carrying out the company's safety policy.

Whether a plant is large or small, the personal responsibility of the management is the same but the methods of conducting safety work differs. In the large plant the safety work is delegated by the manager to a safety engineer who may conduct a department and even have a corps of assistants or a safety committee, depending on the size of the pay roll. In this case, the manager is personally responsible for the safety engineer and his work. He must aid, counsel and direct his safety engineer who, in turn, is personally responsible for the safety movement and the spirit of safety throughout the plant.

In the small plant where it is uneconomical to employ a safety engineer, the plant manager must take the direct personal responsibility for safety. On his daily rounds he has an eye out for unsafe practices and improper equipment. He discusses hazards and ways of eliminating them, directly with his foremen and even the workers. Safety is the one activity which permits this without danger of disorganizing the foremen and the workers. Every foreman who has the right safety spirit understands that the boss is not interfering with orders, but is trying to protect the workers and plant from accidents and interrupted employment. The wise manager in a small plant seizes the opportunity which safety offers to get into close touch with his men. Often, the "safety approach" results in the development of better ideas for greater production, better quality and improved methods and machinery, as it develops friendship and confidence between the manager and the workers. Thus safety is a common ground on which both sides may meet. By direct responsibility for safety the manager of a small plant has a very much better opportunity to put his safety ideas across, than in a large plant.

Whether the responsibility is direct or otherwise the manager must be absolutely convinced that safety is sound and economic as well as humanitarian. He must interweave safety throughout his factory methods so that the best way is also the safest way to do a thing. There is no need of setting up a separate line of procedure or thought for safety. It must be considered and weighed with its degree of importance in every job analysis. A true conception of its importance depends upon the knowledge, experience and consideration of the manager, and his sense of personal responsibility.

Of course there are great differences in individuals, and some managers personally put over very much better safety programs than others, but then again some are better managers than others. Frequently one may observe the successful manager at work. He is known for his ability to obtain good production, low costs and high quality of product. Go further and you will find that his employees like him. Investigate his safety records and you will find low frequency and severity resulting from personal injuries.

Safety is no longer a side line activity in industrial management. The large plant manager recognizes this and organizes accordingly. The small plant manager may not recognize this because one occasional accident may be forgotten. However, his one accident may give him a higher frequency than 10 accidents in the large plant. Thus in the small plant a true sense of proportion may not be appreciated, while in the large plant the manager sees 10 accidents on his report, and is more readily impressed. When the manager of the small plant grasps the meaning of this he holds himself directly responsible for the safety movement in his plant. If he is sympathetic and enjoys associating with his workers, he has no difficulty in making the desired contact. On the other hand, he may not have the proper knack for this, but he may accomplish very good results by appointing a small competent safety committee whose members represent the various departments in the plant. When working through a safety committee he is still personally responsible for the safety policy and the inspiration of his committeemen.

Management Influence Is Far-Reaching

So far no mention has been made of the personal responsibility of every individual working in the plant. The personal responsibility of the individual grows with the development of the safety spirit and the safety spirit must come from the management. Therefore, if the manager holds himself responsible for safety in his plant it will not be long before we find this personal responsibility extending well down the line. The personal responsibility of every worker is the same in the big plant as in the small plant.

In our experience where we have plants running from 20 to 400 men, we are obtaining best results where the managers look upon safety as a personal responsibility. The small plant manager works through direct contact and the large plant manager accomplishes his results through a safety engineer and a safety committee. One of our small plants engaged in the manufacture of high explosives employs on an average of 65 men. That plant has had one lost time accident in the past 1,000 days and no accident at all so far this year. It is also interesting to note that this plant has practically no labor turnover in spite of seasonal attractions for labor in the neighborhood and large mining operations near by. We consider the close friendly contact which the small plant manager is able to hold with his men gives us an ideal condition for fostering safety.

CHAIRMAN ROACH: I wonder, would anybody like to discuss these last two very interesting papers? They have opened up avenues of thought that perhaps might lead to some worthwhile discussion, because it does seem as though we have to do something to stir up the small plant manager.

The next paper will be a paper that was to be read by Mr. L. M. Challis, employment manager, Copeland Products, Inc., Detroit, but Mr. Challis is not present and his paper will be read by Mr. J. C. Graham. I might add that Mr. Graham is an industrial safety engineer from Detroit.

Safety Committees—A Necessity or a Nuisance

L. M. Challis, Employment Manager, Copeland Products, Inc., Detroit, Mich.

In reading over my topic a second time, it may readily be thought that the subject is more or less open to controversy. Personally, I have suspected that a division of opinion on the part of those present has been expected and that the topic was therefore assigned to a little fellow, on the assumption that if the discussion grew too heated, a little fellow would be able to run much faster than a big fellow.

Nevertheless, I am prepared to affirm my belief that safety committees are a real necessity in modern industry. In our own plant, the Copeland Products, at Detroit, the safety committee is a vital factor in accident prevention.

The personnel of our safety committee is made up of the factory manager, the superintendent, the master mechanic, the inspection superintendent, each departmental foreman in the factory (nine in number), the company surgeon and myself as employment manager—the factory manager serving as chairman and myself as secretary. The committee meets at regular intervals, twice a month, and has special meetings at such other times as conditions may warrant. Our plant is of medium size and as previously mentioned, each departmental foreman is a member of our safety committee. We feel his presence on the safety committee bears a wholesome significance to his job. Some one at the safety congress in Louisville two years ago very wisely remarked that "the Foreman is the backbone of industry." And so he probably is. He is the point of direct contact between management and men, in transmitting to the employees whatever policies the management desires. As has been stated often, he is to industry what the sergeant is to the army.

In the greater majority of shops and factories, production is the dominant factor, and the man primarily responsible to the management for production is the foreman. Hence, it is quite natural that he should be an important factor in accident prevention. His presence on the safety committee, therefore, is equally as important to the management as his presence at a production meeting.

Today, the safety of employees is undeniably tied into production, just as much as is low manufacturing costs or the accurate planning and scheduling of materials. A successful foreman, therefore, will take advantage of his membership on the safety committee, as he represents, in our opinion, the crux of the whole safety procedures and practices. Safety thus becomes an integral part of his job in putting over the plant safety program, as given to him through the safety committee. The foreman, as an individual, bears a very important relation to the success of any safety committee, as he represents, in our opinion, the crux of the whole activity, and it is for this reason that a brief analysis of his position has been treated.

Modern methods of wage payment, such as group bonus, gang work and piece work, enhance greatly the importance of production and likewise create a natural need for a definite safety program, administered through well organized effort. The safety committee, in our opinion, is the logical solution to this situation.

Plant safety problems involve three essential features: education, engineering, and safeguarding.

However, we are of the belief that these elements will fall short of their objective, unless they are sponsored by an active, enthusiastic safety committee.

Assuming that the management is convinced of the value and need of accident prevention work, safety committees should have for their purpose the following functions:

1. To be a channel through which a frank discussion of safety policies and practices may be had.
2. To make periodical inspections of the factory and then to submit definite recommendations. (Incidentally, it might be a wise plan to have a member of the

safety committee, preferably a foreman, make an individual inspection, occasionally, of a department other than his own; to detect the possible existence of hazards. Sometimes, even a conscientious, responsible foreman overlooks conditions in his own department that may constitute a hazard, because of his intimacy with them.)

3. To review thoroughly the elements which contributed to an accident and make the necessary recommendations to eliminate a recurrence. Constant education and instruction, together with proper disciplinary measures are the only weapons available. (Cause classification forms, submitted by the foreman in whose department the accident occurred are valuable in this phase of committee work.)

4. To invite and receive suggestions from employees regarding unsafe operations and practices they may observe.

5. To improve the spirit of cooperation and willingness between employees and management.

6. To make the safety plans, as developed in their committee meetings, virtually a part of the operating policies on their own particular job.

The attitude of department heads toward accident prevention work will be reflected by employees, just as accurately as their attitude toward production is reflected. If the manager of the plant treats safety problems lightly, his "key" men will treat them lightly. If, on the other hand, he regards safety as an important feature of the plant's operating policy, his foreman will reflect his attitude and will see that employees under their supervision are educated to observe fundamental precautions necessary to plant safety . . . Hence the need for the existence of the safety committee, beginning its work at the top and working downward to the employees.

The Safety Committee Helps the New Employee

The new employee has long been regarded in industry as a bad accident risk. However, in a plant in which there is a well organized safety committee, a new employee does not present as great a safety problem as his presence would in a plant without a safety committee. The employment manager uses to advantage the lessons learned in safety committee meetings, after making a safety analysis of the particular operation for which a new employee is needed, together with the caliber of employee best suited. The prospective employee's attention is directed to a safety sign occupying a prominent place in the employment office, stressing the need of men being careful to avoid injury to themselves and others, if they desire employment. The new employee is given a letter addressed to him personally, from the factory manager (who is chairman of the safety committee), inviting his interest in accident prevention and admonishing him to work safely—this letter being given to him at a time when he is most impressionable. This safety element is also a product of our safety committee. He is then taken from the employment office to his foreman (likewise a member of the safety committee) who introduces the new employee to his job; he points out carefully the hazards that may exist on the operation if not done properly, and satisfies himself that the new employee understands the instructions. If the foreman may happen to be absent from the department at the time, these matters are handled by the assistant foreman. The foreman later checks up on the new employee's absorption of the safety work, as well as on his progress with the other phases of the job.

When production is rapidly increased or new construction is to be hurried along, these conditions carry with them a hasty distribution of new employees into the organization, and if these new employees have been previously working on jobs where safety has not been implanted in them, their very presence constitutes a menace to the well-being of the plant safety program. This type of man has the impression that he has been given employment to tide over a busy season, and for divers reasons he is not prone to exert himself, either in holding up his end of

the job, or in shouting from the four corners of the plant his firm belief in the principles of safety. The interest of this type is not always in his present job. So these men, commonly called "floaters" (and for some strange reason do we have them in Detroit, as in other places), bring out the need of very good judgment and tact on the part of the foreman.

Here, we feel, is a real need for the foreman's touch with such an organization as a safety committee. On the one hand, he realizes that when the first let-down in business comes along, this particular type will be the first to be laid off. On the other hand, he realizes that if any of them get hurt in the meantime, it means broken safety records and payment of considerable compensation money. Unfortunately, as compensation adjusters have found out, some of these gentlemen would not object to a subsistence on compensation payments. Is the influence emanating from the safety committee a necessity or a nuisance, here? We believe it is an urgent necessity.

The chairman of our safety committee (factory manager) holds department heads responsible for accidents and their cost, the same as they are held responsible for scrap in a production meeting. If a foreman is interested in his job, he is interested in cutting down the expenses connected with his department. His connection with the safety committee gives him excellent reasons, at close range, for adopting this attitude. Departmental competition is strongly urged and its effects, we find, are very beneficial to the safety movement.

And so we all must continue to visualize what we are doing that we may sustain the interest in the work. Some of the points in our experience have been given and we feel pleased with the progress being made by our safety committee. We fully appreciate, however, that the job is never finished, and we must "carry on," always going forward and never for a minute losing faith in what we know to be a work well worth all the energy and effort that we can put into it.

Endorsement of the Safety Committee Idea

MR. GRAHAM: Mr. Challis has, in connection with his paper, submitted a letter from William Robert Wilson, who is president and chairman of the Board of the Copeland Products Company and likewise president and chairman of the Board of the Murray Body Corporation, and is also the president of the Detroit Industrial Safety Council on whose staff I am employed. Mr. Wilson's letter follows:

"My Dear Mr. Challis:

"In line with your paper for the annual congress of the National Safety Council in Chicago, I would like to record endorsement, as president of the Detroit Industrial Safety Council, of the Safety Committee idea.

"The Safety Committee idea, as used in the factory at Copeland Products, Inc., here will appeal to all executives who have found that the cooperation of intelligent men is superior to individualism in industry, and that with intelligent cooperative men ideas have an adherent leadership superior to the methods of the big stick. As safety has to be built into the minds of men before it can bring results, there seems no logical argument against the cooperative methods for the development of the safety conviction.

Sincerely yours,

Wm. Robert Wilson."

CHAIRMAN ROACH: Gentlemen, I am sure some very important and very worthwhile points were brought out in the paper read by Mr. Graham. If there is no discussion, we will have a paper read by Mr. E. J. Kreh of the Pittsburgh Railways Company. This paper was written by Mr. H. O. Allison of the Beaver Valley Traction Company, New Brighton, Pennsylvania, who cannot be present.

Interesting the Man on the Job in Safety

**H. O. Allison, Commercial Manager, Beaver Valley Traction Company,
Beaver Valley Motor Coach Company, New Brighton, Pa.**

To interest the "Man of the Job" in safety you must first learn what will interest him.

You must know your man; you must know what, and why, you want to interest him. Knowing these two things, you proceed with the full realization that you are dealing with other human beings imbued with all the elements of the human, leveled only by age, intelligence, experience and environment.

Set yourself apart from the official aspects of your position. Carefully consider what interests you. Then determine if that which interests you will interest the man or the group of workers you wish to interest. Do not make the error of deciding "it should interest them" instead of determining if they will be interested. When I want to interest a man I transfer some of the responsibility to him. This can be done in the plant. Why not call in a group and let them decide on innovations and have each one assume his share of the responsibility?

Man is interested most in those things for which he becomes responsible, and his interest lags as monotony and familiarity creep in, therefore, you have two things to guard against—monotony and familiarity.

In interesting the man on the job it is essential that you know what causes accidents and then apply the known prevention by the removal of the cause.

So let me proceed with some causes and we find:

Lack of proper care.

Inattentiveness.

Lack of instruction.

Lack of proper instruction.

Lack of determining man's qualifications.

Man misrepresents his qualifications.

Defective material.

Ignorance of the danger.

Lack of interest.

Familiarity with the job.

Lack of warning devices.

Momentary lapse of attention.

Excitement.

Poor judgment: (a), as to speed; (b), as to distance; (c), as to equipment; (d), as to danger.

Fatigue.

Dissipation.

Curiosity.

Taking a chance: (a), necessary, chances; (b), for economy—of time, of labor, of material.

Unnecessary chances.

These general causes may be classified and the remedy shown as follows:

Cause—Lack of Instruction.

Remedy—

1. Instruction by

(a), foreman; (b), older hand; (c), safety committee.

2. Bulletins:

(a), change frequently; (b), calling attention to results rather than causes.

3. Marking real danger points.

4. Instruction is not completed until man can do the job by himself or under proper supervision.

Cause—Defective Equipment.**Remedy—**

1. Proper inspection.
2. Investigation to determine the cause.

Cause—Necessary changes.**Remedy—**

1. Instruction as to how to meet emergency to eliminate danger as far as possible.
2. Equipment to meet emergencies.

Cause—Changes for Economy: (a), time; (b), material; (c), labor; (d), equipment.**Remedy—**

1. Equipment to meet emergencies.

Cause—Ignorance: (a), unforeseen; (b), man ignorant of the usual practices of the job.**Remedy—**

1. Anticipate as far as possible the danger.
2. Investigate as to real causes.
3. Educational: (a), publicity pertaining to accident; (b), instruction by foreman.
4. Slogan—in case of doubt—Stop.

Cause—Poor Judgment on the Job.**Remedy—**

1. Put older men on the job.
2. Change of job.

Causes—Temporary.**Excitement—****Dissipation.****Curiosity—****Lack of Interest.****Remedies.**

1. Instruction to meet irregularities.
1. Curiosity will cure itself.
2. Instruction.

Working Conditions—

1. Attention to windows and ventilators already installed.
2. Recommendations for improvements.
3. Rearranging lights.
4. Instruction.
5. Provide special equipment to protect against exposure.

Monotony of work—

1. Change of job if possible.
- a. Degree of developed intelligence.

Short working force.**Improperly nourished—**

1. Suggestions to company physician.

Personal trouble—

1. Advise if opportunity presents itself.

Momentary Lapse of Attention—

1. Change of work.
2. Warning devices.

- a. Emotions.
 - b. Outside distractions.
- Fatigue.
 Taking a chance.
 Outside Troubles—(a), domestic; (b), financial.
 Scared of His Job—
1. Advise him, to give him assurance.
 2. Encouragement.

Causes—Permanent	Remedy
Nervous Disposition	1. Change of job
Lack of Interest	
Taking a Chance	1. Change his job
Familiarity with the Job	1. Change his job
Laziness	Discharge
Indifference	Discharge

The following causes of fatigue analyzed would be classified under the head of apparent carelessness, and most under the head of real carelessness:

Causes	Remedies
Too long work period without rest intervals	1. Taken care of in regular run of the work. 2. Avoid overtime if possible.
Poor equipment and tools.	1. Inspection of tools. 2. Maintenance of tools and equipment. 3. Considering complaints.
Physical disability	1. Lay off to recover. 2. Distribution of heavy work to meet the disability. 3. Change of jobs.
No incentive	1. Recommendation.
Dissipation	1. Personal advice. 2. Change of job.

Diverse Things Will Interest Diverse Minds

Some one has said: "To know safety is an act or condition of the workman's mind, not of the tellers. The worker's senses, rather than his common sense, must be appealed to. A safe and familiar line of thought must be used to the point of departure for new ideas; even prejudices must be taken into account. The type of mind that "rocks the boat" for amusement, and "did not know it was loaded," is not easily kept to any one line of thought; the attention wearies easily and can be engaged by concrete moving objects rather than with distant and abstract ones. Pictures, action, drama, thoughts of family, sex instinct, sports, classes of information—those are the fundamental sources of interest.

Not all men can be moved by the same cause.

John T. Ryan, vice-president and general manager of the Mine Safety Appliance Company, Pittsburgh, carries great weight with the men of his plant when he brings before them the fact that his company is manufacturing products which have to do with lives, and those of other men who risk their lives in the use of the product. To carry this home to them every one of the men employed either in the manufacture or the assembly of their devices

must occasionally wear the equipment themselves. Each employee is subject to call at any time to put on the equipment which he or a fellow workman has assembled and use it in a poisonous atmosphere.

This applies particularly to mine explosions, for, in the event of any mine disaster, Mr. Ryan takes these men to the scene of the disaster and they are in charge of the equipment on the outside and some of them have to wear it inside the mine.

This is a vivid demonstration of the necessity of careful workmanship. It is an appeal to the worker to have his product the best possible in order that the life of a fellow worker may be protected. When you consider that a good portion of accidents are caused from the neglect of another than the one injured you will grasp the force of Mr. Ryan's argument to his employees.

The Globe Wire Company of Sharpsburgh, Pa., is a small plant, employing from 40 to 50 men. The principal reason for the safety thought on this plant is that the superintendent himself is a safety enthusiast. This is as it should be and in turn enthuses the other men.

Personal contact does count and where employees are few it becomes possible.

Horrible examples alone will not create safety. Very few men can be scared into keeping their fingers out of the buzz saw.

Safety Work in Pennsylvania

In Pennsylvania there is more safety to the square foot than in any other state in the Union. My authority for that statement is none other than John A. Oartel, President of the Western Pennsylvania Safety Council—an organization which has done more to make Pennsylvania safe than any other in Pennsylvania. Safety starts at Pittsburgh, is fed by the Beaver Valley, my home section, and the National Safety Council.

My first experience in safety was in the start of the prevention of accidents, both public and employee, on an electric railway back in 1909, and I have been at it more or less regularly since that time. Just then our genial colleague and official of this organization, W. H. Boyce, was the pater par excellence. We worked together and formulated some 125 hazards together with the preventive measures. That railway was the first to have a safety engineer, the first to advertise in the newspapers for the purpose of preventing public accidents, and the work has continued regularly and consistently all these years and will continue for ages to come. As to results, the claims cost for public accidents dropped from 8 per cent of the gross receipts to 1.49 per cent and today the smallest part of a fraction of a cent per car mile is sufficient to pay all such costs. Employee accidents are nil. In competition with all other concerns in a No Accident Month last June, we stood 100 per cent perfect. The major accident this year has been my own fall at a company Field Meet at Schenley Oval, Pittsburgh, and the fracture of a few ribs—painful but lesson like. This speech was written during the days of recovery but while the stitch in the side was still making itself felt—I know that it “hurts to get hurt.”

We conducted a county-wide No Accident Month, June, 1925, and the results were:

Deaths in June, 1925, 13; in June, 1924, 42. The decrease was 69 per cent; lives saved, 29.

Drowned in June, 1925, 0; in June, 1924, 6. Lives saved, 6.

Street railway accidents (all classes included) decreased 44.8 per cent.

Public accidents (street railway) in which other vehicles were concerned, decreased 44.2 per cent.

To do that we had to interest the man on the job and the man in the street.

We did by talks in the factories, daily articles in the newspapers, a safety parade, the first and only one we have ever had, and a prevailing of the thought "No Accident."

In one of our campaigns we divided our force into ten teams, each with a pilot, and loaded them into aeroplanes and started them to the North Pole. Commander Byrd was making the real trip at the same time. A day without an accident let the plane advance, an accident set it back one day. Both employee and public accidents counted. Three planes reached the pole. Two were within two days, three within three days, and two were five days away. The record was shown daily on a large painting of the territory being traveled by the Byrd plane. Interest was created.

Again we organized the property into military formations for the prevention of accidents.

Those so unfortunate as to have an accident were court martialed to the guard house. We had a guard house and miniature figures were labeled with the name of the employee and placed therein as recommended by the court.

The "Man on the Job" is a man just like you. Stilted phrases, or a better than thou attitude will not get safety across. You may live and act it, but so do preachers, priests and rabbis, and still there are backsliders.

So, interest yourself in what interests them and you cover 90 per cent of the problem. As you do that and when you do that, you will get safety across and have but the 10 per cent to contend with—and that's a cinch, for engineers have solved it.

CHAIRMAN ROACH: That was a very interesting and tremendously important paper, despite the discovery that there was so much accident prevention service in Pennsylvania. Some of us will agree to that, and so it is pleasing to have our friend speak well of his own home town.

We will next have a paper read by Mr. P. W. Armstrong, assistant manager, Mississippi Valley Structural Steel Company, Melrose Park, Illinois.

Care of Injured in Small Plant

P. W. Armstrong, Assistant Manager, Mississippi Valley Structural Steel Company, Melrose Park, Ill.

One of the hardest things in the care of injured and safety work in the small plant is to determine how much you can afford to spend to accomplish the most good and obtain a fair return on the money spent. When you are limited to the amount a plant with a yearly average of 100 employees can afford to spend, a good deal of thought is necessary to get the most out of every dollar.

Plants with a payroll for a thousand or more employees can afford their doctors, nurses, dentists and plant hospitals. We all know these are to be desired and accomplish a great deal, but since they are out of the question for the small plant something else must be substituted, or some part of it used.

I've often thought that in some neighborhoods a number of small plants might combine and have these things in common, and I believe this has been done. However, unless the plants are somewhat similar it is hard to proportion the cost of maintaining it, due to the unequal benefits received by the different plants.

I'm going to attempt to describe a plan worked out over a number of years in a small plant providing for care and treatment of plant injuries and accidents. It has been in operation for a number of years and proves what can be done with a little thought and by taking advantage of services offered by our

National Safety Council. It is giving excellent results with practically no extra cost. A good deal of credit should be given to the company doctor who assisted in working out the plan.

This plant averages about 135 men, made up of laborers, semi-skilled and skilled workmen. No non-speaking English or women are employed. It is operated in a state which has no compensation insurance act until last January, and because of the activities of damage suit lawyers minor accidents and injuries had to be handled very carefully.

Several years ago the St. Louis chapter of the National Safety Council started giving once a year a nine-lesson course in first aid work. This was given by men trained in mine rescue station work. Each man was given personal instruction and practice in dressing, bandaging and emergency first aid work. At the conclusion of the course each man was given an examination and if he passed was awarded a diploma. The holders of the diplomas are required each year to take an examination to keep their diplomas. The only difficulty came from these nine-week doctors who complained of the small number of patients, which limited them in showing off their knowledge and skill to their fellow workmen.

This plant had a Safety Committee headed by a permanent safety man. He held an inspector's position and was ideal, since his duties took him to all parts of the plant. They also had in the shop office a first aid room. This room was in charge of the payroll clerk. He also was ideal in that he was familiar with the name, work and employment records of each man.

To this school they sent their safety man and their payroll clerk to prepare themselves to take care of the minor injuries, to prevent infection and for emergency treatment of cases requiring a doctor.

Taking Care of the Minor Injuries

Due to the natural hazards in this plant a large number of their injuries consisted of scratches, slight cuts and bruises, and with infection from rust always a possibility. The foreman and the safety man on their trips about the plant saw to it that all injuries, no matter how slight, were given first aid treatment.

As soon as a man came in his injury, if minor, was treated and dressed, and a record made of it in a daybook, under that date, giving the injury, who dressed it, and the treatment given. If the injury was serious only emergency dressing was applied until the doctor arrived. After the injury was dressed a report was made out and also a record made of it in a day book under that date, giving the injury, by whom dressed, and the treatment given. They never make out injury reports until everything has been done to make the man as comfortable as possible. By means of this day book a record of all injuries, dressings, redressings and discharges for each day was kept with the record of who attended the injured and the treatment given.

The doctor stopped at the plant each day provided he had any injuries that required dressings. At that time he looked over the records of the day book entered since his last visit. If the injuries appeared to be only minor and no infection reported, he checked the treatment only. If he decided after reading the report in the day book and talking to the man who dressed the injury that he should inspect the injury, the man was asked to come to the office. Each man was called in separately and his injury inspected and dressed.

They try to have only two men out of the plant at one time, one in the dressing room and one waiting. If it has been a serious case, after the injury has healed the doctor may instruct the first aid man to change the dressings as required, but in all cases the doctor examines the injury before final discharge. None of the injuries requiring treatment only from the first aid man are reported on

accident forms. About six first aid treatments are given daily, while only about three injuries a week require the doctor's care, all of which means a substantial saving in doctor bills.

They also believe in a liberal use of X-ray photographs and in all cases of bad mashes have pictures taken to insure a correct treatment. The plant doctor has this equipment in his office. They also believe in keeping in touch with the man whose injury keeps him away more than a week, and make it the duty of the shop superintendent or assistant manager to call on these men at least once a week. Much suffering and many misunderstandings can be prevented by such visits.

All employees are at liberty to come in and see the doctor by obtaining permission from the foreman, should they be dissatisfied with the dressing or treatment of the first aid man. Quite frequently the visit is not an injury case but a bad headache, toothache, sore throat or cold. The doctor gives these men treatment sufficient to last the balance of the day with the advice if they are not better by night that they should see their family doctor. The doctor does not charge for this service and the company furnishes the medicine free. They find this well worth while since in most cases it keeps the man at work and may head off several days' illness and loss of time.

Some Typical Records of Injuries

Let me read the records of injuries for three days in succession as shown by the day book as an illustration of the treatments and the detail manner in which it works.

November 5th:

Harry Heron—Thumb, left hand, redressed. Mercurochrome and bandaged by G. A. C. Injured Nov. 4th.

Esty Bennett—Thumb and knuckle of index finger, right hand, skinned. Accident not reported until became infected. Mercurochrome and borsceptic ointment applied and bandaged by G. A. C.

J. F. Masmic—Cut on back of left hand. Mercuro compresses and bandaged by G. A. C.

Joe Dargie—Cut index finger of right hand. Mercuro compresses and bandaged by G. A. C.

November 6th:

Esty Bennett—Thumb and knuckle, index finger, right hand, redressed. Mercurochrome and bandaged by G. A. C.

Joe Dargie—Redressed finger. Mercurochrome and bandaged by G. A. C. Injured Nov. 5.

Harry Heron—Redressed thumb, left hand. Mercurochrome and bandaged by G. A. C. Injured Nov. 4th.

Ray Hunt—Redressed index finger, right hand. Borsceptic ointment and bandaged by G. A. C. Doctor's bandage came off. Injured Nov. 4th.

J. D. Kyle—Foreign matter in right eye. Washed with boric acid solution. Doctor called.

November 8th:

Ray Hunt—Redressed index finger, right hand. Borsceptic ointment and bandaged by G. A. C. Injured Nov. 4th.

Harry Heron—Redressed thumb, left hand, clean bandage by G. A. C. Injury Nov. 4th.

Ernest Owens—index finger right hand mashed. Borseptic Ointment and bandaged by G. A. C.

A. M. Wallis—Bruised wrist, left arm. Borseptic ointment and bandaged by G. A. C.

John Snow—Burn and blister on second finger, left hand. Unguentine and bandaged by G. A. C.

That, I believe, gives you a good idea of what the first aid man does in caring for minor injuries and the saving in doctor bills. At the same time it gives a greater protection to each man, as it isn't possible or practical to call a doctor for each of these minor injuries. The whole scheme certainly helps do away with infection, as every injury is inspected and dressed daily.

To my mind, that is one of the main differences in the way most small plants run their injuries. If a fellow out in the shop hurts his finger, mashes it or something, if he is pretty well sold on safety, he goes to the place in the shop where there is some iodine and a fellow puts a rag on his finger and he comes back. Maybe that's the right treatment and maybe it isn't. It is a haphazard way in which no record is kept; nothing is heard about this man and no method is followed to look him up to see what happens to his finger after the first treatment; while the records in this book give a complete history and a check.

Treatment for the Worker's Injuries

With the aid of the doctor the following drugs were assembled and always kept on hand and the following treatments were standardized to cover injuries common to their plant and is the result of experiment and experience.

For all cuts they used listerine to wash the flesh around the cut. If the flesh is covered with grease or oil, gasoline is used to remove the grease or oil. Deep cuts are washed with chlormine and tablets dissolved in warm water and then bandaged. Slight cuts are painted with 2 per cent solution of mercurochrome or a mercurio compress applied.

For mashes and bruises where the skin is not broken, borsceptic ointment; where skin is broken, chlormine and tablets dissolved in water and poured over wound.

For burns, unguentine with gauze dressing, where skin is red and blistered. If skin has been broken picric acid solution with gauze dressing.

For foreign objects in eye use boracic acid solution with eye cup. If not relieved call doctor.

For fainting—Aromatic spirits of ammonia.

For heat prostration—Spirits of ammonia and epsom salts.

For bleeding from deep cuts, two feet of gauze and a stick for twister.

One and two-inch bandages and adhesive tape, gauze, cotton and woolen applications are kept on hand.

Their first aid room is about 10x8 and is equipped with the following articles: portable stretcher, folding emergency chair, blankets, table wash pans, towels, waste can, scissors and pair crutches.

As I said before, I know of no better or less expensive manner of taking care of injuries. The injuries have been systematized and the treatments standardized as far as possible. Systematic precautions have been taken to prevent infection. Systematic medical treatment is provided. Thought has been given to plan and carry it out. Personal touch with the injuries is maintained. All of this is done with an expense, exclusive of doctor bills, for less than \$100 per year for medical supplies. The only other expense is the time spent by the payroll clerk and inspector away from their regular duties.

I believe the principles outlined can be successfully applied to any small plant and obtain excellent results.

CHAIRMAN ROACH: What is the size of the plant?

MR. ARMSTRONG: One hundred and thirty-five men.

CHAIRMAN ROACH: That was a very interesting paper and a very worthwhile paper presented by Mr. Armstrong. I wonder if anybody present would like to ask questions or carry on a discussion?

JOHN S. SHAW (Hercules Powder Co., Wilmington, Del.): I don't wish to discount the speaker because I think his paper was excellent, but I have just three little suggestions.

The joint hospital affair, that is, the cooperative affair with another plant, sharing a doctor, sharing a hospital between two plants; we do that in two of our states, in New Jersey and Michigan, and it works out all right. It is a cooperative affair and we have a way of proportioning our share of the debt.

At another small plant where the hospital in the nearby town takes care of our injured folk, we pay their regular bills, their regular rates and at the end of the year donate to that hospital a like amount. If our annual hospital bill has been, say, \$350, at the end of the year we also donate another \$350.

This is an incentive to the local hospital to take good care of our men. That's where you have a small plant and can't keep your own hospital.

As to the first aid squadron who are itching for somebody to be injured so that they will apply their skill, I would suggest a few drills. Get somebody to act as the subject. Just have a few drills.

Personally, three years as Scoutmaster taught me a good deal that I apply even today, and the scouts get their drills that way. Some of these scouts are now men and you will find every once in a while in your plant men who have been thoroughly drilled in first aid measures and they will carry on, they will organize these drills for you. They like to have those drills.

Infections Call for Expert Attention

The third note is cases of infection. I would not trust them to the layman. If a man comes in three days after he has received a laceration, while it may be all right to put a compress or antiseptic or sterile dressing on that wound, that man should be taken immediately to the doctor. Don't monkey with infections because they are very often disastrous. I presume, though that the last speaker's plant does this.

CHAIRMAN ROACH: Would anybody else like to discuss the paper?

S. LANGNER (U. S. Fidelity & Guaranty Co., Chicago, Ill.): My work takes me in close contact with a large number of small plants and I often find that there is an objection to dictating to the employee who should give him medical attention.

I think it is important that the employee be impressed with rehabilitation starting with the initial medical treatment, and it is important that he get expert and specialized treatment for his injury. There is no doubt that a specialist in industrial accidents is far superior to the general practitioner in handling compensation cases.

Another point I think could be brought out is the importance of posting the men with the name of the doctor who is to take care of the injuries which occur in that plant.

There are plants I go through that have fine safety organizations and much work is done in accident prevention, but there is not enough stress put on this point of immediate medical attention and proper medical attention. I think that ought to be brought out in connection with caring for the injured employee.

MARK D. MOORE (Worden-Allen Co., Milwaukee, Wis.): I would like to ask the gentleman with the day book what their policy is in regard to particles in the eye, whether it is their policy to send the man to a specialist?

MR. ARMSTRONG: The only treatment we give an eye is an eye glass solution of boric acid. If that doesn't bring relief, the doctor is called. No one is allowed to gouge around. If it can't be washed out with an eye glass, the doctor takes care of it.

CHAIRMAN ROACH: I take it that your first aid department is not going to indulge in surgical practices. That isn't the purpose of first aid. It seems to me all those things should be taken care of by an expert skilled in that particular line of work.

If an eye suffers an injury, certainly treatment should be given by a skilled surgeon. I think we all agree to that. The main point under consideration, however, as brought out by Mr. Langner, is to impress on management; supervisors and workmen the necessity for skilled surgical treatment in case of injury; and that applies to minor injuries as well as those of major importance, because we have evidence enough now in the records to show that a very slight wound may become a matter of major importance through neglect, or if the physical condition of the worker is of a certain character.

I think many fatalities have resulted from neglecting to take care of minor cuts as soon as they occurred.

Effectiveness of the Safety Organization

MR. LANGNER: I would like to add that in most of our plants, those plants handling meat, lumber or scrap iron, we try to incorporate a rule that any injury which draws blood should be attended by a physician before that man returns to work the next day.

JOHN S. SHAW (Hercules Powder Co., Wilmington, Del.): I would like to ask this gentleman here why they pick on the payroll man for the simple reason that he is acquainted with the individuals who are employed in that particular plant. Why is it that this particular man was chosen? Was it because he had some previous experience in safety work?

MR. ARMSTRONG: There wasn't any particular reason. He was a man that was available and was interested in that work. He had done some work. He was available in the office. You know, some fellows like to do it and other fellows do not. He was interested and therefore we let him do it.

A. W. BRADFIELD (Industrial Works, Bay City, Mich.): Several years ago we inaugurated at our plant a first aid room in charge of a registered nurse. I might say that that nurse does remove particles from the men's eyes and it has been entirely satisfactory. We haven't had a lost eye in four years. Previous to that we had ten lost eyes in one year.

W. H. WEITKNECHT (Lehigh Portland Cement Co., Mitchell, Ind.): What was the occasion for the loss of eyes?

MR. BRADFIELD: That was preceding our work with the safety organization.

CHAIRMAN ROACH: That shows the effectiveness of a safety organization.

MR. BRADFIELD: I might add in the year 1916 we had more accidents in one day than we have had in the entire period for 1927, and I might also tell you that one of the most important features, I believe, that was ever inaugurated at the Industrial Works plant was that at the close of 1926 we received a form from the National Safety Council asking that we furnish our experience in accident prevention work. Later on we got a report showing our position in our division. I immediately conveyed that report to the foremen and the executive organization, told them of our position and asked them to try to do all possible to hold their line straight, and it was possible we might land in a leading position. We were not very far down. There was an immediate response and everybody seemed to be working. The mental attitude created was phenomenal.

I might say that last week we had our first lost time accident since the middle of last May and it was very minor.

We have the proper mental attitude that is pretty hard to beat and the result is

that we have gone from last May up until last week without any lost time accidents for the entire plant.

PETER DE MALT (Robert Gaylord, Inc., St. Louis): What do you do when a man refuses to return to work on the following day? We had a case of merely a pinched finger, no fracture of any kind, and he elected not to come back, so we were obliged to charge it as a lost time accident.

The reason I asked is this. A plant of 150 men was charged with 152 injuries. That was rather unusual. Some people charge their lost time accidents in different ways. That is why I asked that.

DR. LUCIAN W. CHANEY (U. S. Department of Labor, Washington, D. C.): There is a definition which is quite standard for lost time accidents; anything which causes disability beyond the day in which the accident occurs, is a lost time accident. At any rate it is the most widely used definition of lost time accidents that is applied anywhere.

CHARLES SWEGER (Mattheissen & Hegeler Zinc Co., La Salle, Ill.): If a doctor discharges a man and says he should go to work the next day and the man doesn't come, would you count that a lost time accident?

CHAIRMAN ROACH: Let Dr. Chaney answer that.

DR. LUCIAN W. CHANEY (U. S. Department of Labor, Washington, D. C.): It seems to me that depends entirely on the surgeon. If he decides that the man ought to come back to work and the fellow does not do so, it ought not to be considered as a lost time case. In my own practice the surgeon specifies that the man should come back. What the man thinks about it doesn't cut any figure in the statistics.

Discussion of the Lost Time Accident

MARK D. MOORE (Worden-Allen Co., Milwaukee, Wis.): In connection with this, in deciding just what is or what is not a lost time accident, we run quite a number of no accident contests in our plant and naturally under those conditions the foremen are trying to keep their accidents down and that's exactly what we want to get at. But there are instances where it depends largely on the individual. One fellow will crush the entire tip of his finger and probably through personal circumstances or home conditions or his own personal pride will stay on the job; and some other fellow who gets a minor scratch will stay home two weeks.

Where you have a doctor whose opinion can be relied upon, he will say he is perfectly able to work, and the foreman will want the charge taken off the board; and we usually do it because it isn't fair in the preventive contest for a foreman to have to stand for an accident where the surgeon claims it ought not to be a lost time accident.

Of course, there are times when a fellow stays on the job when he has a perfect right to stay home.

MR. LANGNER: We had occasion in one of our plants where a man left the job and came back a week or ten days later and said he had strained his back and had not reported it until that time.

The foreman maintained he was not responsible for that accident and shouldn't be charged with it, so in order to take care of future circumstances, we decided to discuss those things at a foreman's meeting and then let the safety committee decide whether a department should be charged with an accident like that.

MR. WEITKNECHT: Those disputed cases of lost time can probably be solved best by the visiting committee, probably from the department of employment. We have had occasions like that in which the men thought they should not resume work after the physician said they were perfectly able to return.

We didn't want to exercise force because of the report of the surgeon and yet those were cases that had to be solved, and we devised this scheme. We appoint a visiting committee, preferably from the department in which those men are em-

ployed, who go to see the man at his home; go to see whether or not he is able to come to work; and those fellows have a good deal of influence. Each man respects the feeling of his fellow-worker. We found that the most effective thing.

MISS MARIE L. MENCHAN (Ohio Brass Co., Mansfield, Ohio): This problem is very interesting, because we have not only iron but brass foundries and therefore we have a lot of sprained backs in our plant. On lost time cases the doctor must pass on the man coming back, but our men are paid for lost time whether they lose a day or a week, when it is an injury. We pay them two-thirds of their wages, the same as the state compensation pays them, in the second week.

We have 1,500 people in our plant. We usually have nurses and an extra girl in the dispensary, and so on eye cases the nurses are permitted to remove the foreign bodies, if possible. If it is a burned eye they give first aid treatment and then immediately consult a specialist. We permit the men to use their own eye specialists and their own family doctors. We never instruct a man in connection with his family doctor.

Mr. Olsen is our family manager. He is a very human type and he has laid out the entire plan of our dispensary and our personnel, and we find we maintain a wonderful mental attitude with all our people.

I imagine we have an average of 95 people coming to the dispensary daily. We not only take care of injuries but we attempt to keep our people well. We feel a well man can do better work than a sick man. We have three beds and we have a doctor part time each day.

Treating the Employee on the Level

If a man is injured, say, for instance, getting his back injured (we have tried to get our men when they feel they have sprained their backs in carrying metal to report to the foreman), he comes to the dispensary. We have a car to take him home and then the nurse calls on him the next day to see that he is having his family doctor.

We feel by expecting our men to do the right thing, but putting them on a high standard, they would be sort of ashamed to put anything over on the company.

The other thing I would like to discuss a little further is in regard to what was brought up in putting a man's name in the guardhouse. The more I see of people the more I think we should treat our people on a high standard; and don't think the average factory man doesn't believe in that sort of thing. I saw it worked out in one of our steel plants. I saw some very serious cases follow because a man was in the habit of protecting the record for his department, and I also found that foremen would try to see that things were taken care of on the side, so as to keep the record from being spoiled. I think that might be all right for running a race, but when we get into health and accident prevention I think we have to be extremely careful.

MR. LANGNER: I think the fact of putting a man in the guardhouse and so forth is all right. I think the objections can be overcome when the men are impressed with the seriousness of the result of an injury that is neglected. No doubt it is important they should be impressed with the necessity for immediate attention.

I think the objectionable features of races and so forth can be overcome if the men are properly instructed on the seriousness of neglecting accidents.

PETER DE MALT (Robert Gaylord, Inc., St. Louis): I would like to ask this gentleman about back sprains. Is it possible for a man to strain his back with a lift of material to his arms, providing that man is in good physical condition? Is it possible to strain muscles in his back through a lift of material by the muscles of his arm?

DR. LUCIAN W. CHANEY: There is nothing more puzzling to the medical profession concerning compensation than those cases of back strain. They are exceedingly difficult to determine.

It is possible for a man to strain his back simply pulling at his arm. I have done it myself. There isn't any doubt about the result, but there are a good many cases which are certainly close to the border line, and just how to get at them is a puzzle which any physician who has to deal with cases of that kind dislikes. He would rather have almost anything else to deal with because it is so difficult to decide whether the man is really injured or not.

It is possible for him to be injured. I haven't the slightest doubt about that. There are a good many cases in which he isn't injured at all, perhaps he only thinks he is; but personally, I wouldn't like to be charged with the responsibility of deciding.

DR. W. T. CARSTARPHEIN (Speer Manufacturing Co): I want to say one word. I have been very much interested in all these discussions because they all come so close to us, and as we found out in our meetings, there are so many angles to all of these questions that we have to use a great deal of common sense in comparing them one with another because our experiences are so varied.

I hadn't intended to say anything, but when you brought up this back question I couldn't refrain from saying a word. It may be of some help.

Three Types of Back Sprain

I don't know how many physicians there are in this audience. They may take issue with me, but I find that there are three types of so-called back injuries or back sprains. One is the true type that has to be treated. The probabilities of complications are present, but we only find them occasionally.

There is another group, and I am about to say a large percentage of that is not true back injury, yet the man is injured. He is entitled to consideration. I have done a little researching and I employ a good many doctors in our various plants, and we have come to this method of procedure.

When a man comes in and tells you he has turned a muscle and is not able to do any more work, the first thing we do with that man is to make a thorough examination of his mouth; and you will find in a great many instances that he has septic tonsils, chronic tonsils or else decayed teeth, and he has a pain which has been instituted by the sudden and direct muscular movement he has made on the machine.

It is pretty hard to drive that into the man's head. Sometimes he can't understand how the defects in the mouth end in the back, but it holds true all the same that this is the defect, and you can pass that on to your industrial physician for what it is worth.

The other group is purely imaginary. I had a big fellow some time ago in one of our plants. He was out a month, I think. Injury belts had been bought for him. He had gone through the compensation courts. The award had been paid for so much disability.

I happened to be downtown one day and I saw him come out of the Five and Ten Cent Store and mount a bicycle in the athletic way the boys do; he jumped up and started off. Prior to that time I had always seen him on crutches. I sent for him and he came to my office, and I said, "I saw you mounting your wheel last night at eight o'clock in front of the Five and Ten on Main street. It is all up." He laughed and said, "It is."

There is one other thing I would like to say which is a constructive thing. I have listened with very much interest relative to the first aid and its paraphernalia and its bearing on the small plant. I think a great deal of good could be accomplished if we could standardize, somehow (although I don't know how we can do it), our practice in first aid rooms. I offer this merely as a suggestion.

I had a plant some time ago, a steel plant. The treasurer came to me and said, "Here we are, losing \$25,000 a year on infection losses," and he wanted to know what could be done.

Well, the practice in the first aid department was not standardized, and the standardization, as I mapped it out for that particular plant, soon reduced the number of infections and the results were quickly noted in greatly lowered costs. Where the cost peak for such infections had been \$20,000 in the past eight years, the cost has only been \$500 per year. That is the actual statistical result in that particular matter of infection. I think if we could standardize our practice in the first aid room, culling from here and there the best things, we could save millions of dollars.

ADJOURNMENT

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Industrial Safety Supervisors in Small Communities

Friday, September 30, 1927

**CHARLES B. SCOTT, Chairman
General Manager, Bureau of Safety, Chicago, Ill.**

The special session for Industrial Safety Supervisors in Small Communities was called to order at ten o'clock by the chairman, Charles B. Scott, general manager, Bureau of Safety, Chicago, Ill.

CHAIRMAN SCOTT: The work of any Industrial Safety Supervisor is definitely tied in with community interest and community activities in safety. The community needs the safety supervisor and his influence and he must have the interest and cooperation of his community. In industry our greatest problem is to build up a thoughtful, careful personnel within the plant and who must be selected from the citizenship of the community. Civic and home influences are the most powerful forces in the development of men and the channels through which men may be developed. Selfish aloofness by the industrial safety supervisor from these factors in our industrial interests is not good citizenship and is certainly not good business. That broad minded appreciation of our safety problem which encompasses the education of the child, the home influence and civic responsibilities and opportunities must characterize the successful safety supervisor whatever the type of his industrial operations and in every community, large or small. Thus, this meeting becomes an important one for we are to be told how these mutual interests may be advanced.

The speakers who have given their time and efforts to the subjects to be presented desire and deserve that you should follow each with snappy and pertinent discussions and for this reason we will not allow our program to lag. If there is not a prompt response to the invitations for discussion I shall take the liberty of calling upon many of you for your views. Our congresses give us a wonderful opportunity for expressing our own views as well as learning the views and opinions of others.

I shall now proceed with the program and we will hear from Mr. Frank Pollock of the Oliver Iron Mining Co., Eveleth, Minn.

The Safety Engineer As a Community Factor

Frank Pollock, Oliver Iron Mining Company, Eveleth, Minn.

Eveleth, my home town, is located on the famous Mesaba Iron Range in Northern Minnesota, sixty miles north by paved highway from Duluth which is situated at the end of the western finger of Lake Superior. Eveleth is a

city of 9,000, modern in all respects, with paved streets, sewer, water, fine public buildings; including the schools, which would do justice to a town many times its size.

Mining iron ore is the only industry. The Oliver Iron Mining Company for which I have the honor to be district safety engineer, employs close to 2,000 men, our company being the only large employer of labor. The city is next in line with 250 employees and the schools following third with 165 on the payroll. As the population of this town has a diversity of nationalities it may be interesting to know that only 32 per cent of our men are Americans, 31 per cent Jugo Slovenians, 16 per cent Finns, 8 per cent Italians, 3 per cent Scandinavians and 10 per cent others. It is evident that since the majority of the male population is employed by the mining company, there must be a very close bond between the miners and the homes in our city and everything that goes on around the works is of interest to the workers' families.

After four years of endeavor to "Safety-ize" a mining town we are convinced that any work done with this end in view is favorably reflected in the attitude of the employees toward the Safety idea in their work.

Aroused by the Deaths of Children

Five years ago when appointed to my present position the safety work was confined entirely to our own organization, with one exception: that of showing safety movies which were witnessed by our miners and the children of the community in one of our public halls. These pictures are still being shown once every two weeks to audiences of 500 or more children, two reels of safety and three of comedy making up the program.

A few public accidents occurred at this time which included the drowning of a boy who had trespassed upon mining property by swimming in a pond formed by a depression made in the earth when the ore was removed from below. The second kiddie was killed by an auto while he was observing the municipal Christmas Tree, which was placed in a hazardous position in the center of Main Street. Then two children were injured by playing with blasting caps which they had obtained from a road job close by. These accidents caused quite a discussion by our district safety committee which felt that something outside of their organization should be done to spread the safety idea throughout our community. A few of the committee, being members of the local Chamber of Commerce, turned to that organization for advice. They decided to form a safety committee as part of their regular program of work, making the writer chairman; the other members being the superintendent of schools, chief of fire department, chief of police, county mine inspector and two other men holding responsible positions in the community.

Local safety conditions were given consideration at the committee meetings and the most serious were brought up before the chamber for discussion. We feel, in handling this matter through a civic organization, with the prestige of a live Chamber of Commerce, that any safety suggestions broadcast over its signature is considered more seriously by the community than if otherwise handled.

In describing the work done in Eveleth through the efforts of the Chambers of Commerce safety committee, only the high spots can be touched. This can be done by citing the safety activities in our city under the following heads:

1. CIVIC—which includes schools and any municipal work.
2. ORGANIZATIONS—including clubs and associations; and lastly,
3. INDUSTRIAL—which takes in the Oliver Iron Mining Company, Minnesota Power and Light, Northwestern Bell Telephone Company, newspapers, garages, railroads, etc.

Realizing that 20,000 or more children are accidentally killed each year throughout the United States and that this total could be cut down materially through safety education, the local school board, when asked, approved of the safety program being carried on throughout the schools. The superintendent and supervisors of the different departments formed its first safety committee and appointed the head of the manual training department as its safety director. Membership was taken in the National Safety Council and a representative of their educational department was sent here to organize Junior Safety Councils. This was done three years ago and I will try to outline a few of the activities which are being carried on in our schools today.

Details of Eveleth School Training

Children, when they enter the kindergarten, are taught during the first month, how to cross a street correctly. In the primary grades safety slogans and poems are learned, while the pupils in the intermediate grades work mathematical problems which deal with accidents. Safety plays are presented. In the junior and senior high schools the Safety Council carries on the work. Safety bulletin boards have been installed in every room and National Safety Council posters are exhibited. In some of the rooms one student each day is made responsible for newspaper clippings covering some accident occurring the day before. This is first read to the class and then posted on the board. The art department students draw safety posters, the best of which are reduced to report card size, printed in the school printing department and issued each month with report cards. All students, before they graduate from the junior high school must be able to swim. Swimming instructions are given once a week to all pupils from the fifth grade up. They also receive training in life saving, prone pressure method of resuscitation, etc., during this course. In the home nursing department the girls receive training in first aid and home safety. During the summer months six playground instructors are employed. These playgrounds tend to keep children off the streets. Supervised play tends to lower accidents among children.

A thorough inspection was made of the manual training departments by this committee which resulted in all machines being properly guarded. During Fire Prevention Week, the schools are inspected by the local firemen who give talks to pupils on how to prevent fires in their homes, etc.

In the auto mechanics classes, students of 16 years or older receive special training in auto driving. You will say that boys and girls of that age are not supposed to drive a car! That is true, but, how often do we see them driving cars. Isn't it better to teach these boys and girls at an age when they are eager to learn and drill into them the safety principles which make for safety? Isn't it better to have them taught in this way than that they should be later compelled to learn the mechanical operation and the road rules out on the road? We believe this is a step in the right direction.

All accidents, both trivial and lost time, are reported by the student's teacher to the superintendent within 24 hours after its occurrence. These cards are kept on file by the safety director who classifies them as to *home* or *school* accidents and to their nature. It may be interesting to note that in 1925-26 term there were 32 lost time accidents while in 1926-27 only 5. These resulted in 224 lost school days.

We have observed that boys graduated from our local schools who have entered the company employ in the last year or so, are much easier to educate in safety lines of mining than those who come from elsewhere. It has also been noted that we are having few accidents with these young men.

Through the efforts of this committee an ordinance was drawn up and passed by the City Council forbidding all fireworks except those handled by municipal authorities on the Fourth. This law has been in force for two years and it is a noteworthy fact that there were no accidents from fireworks during that time.

With the assistance of the City Attorney a traffic ordinance which covers our arterial highways, bus regulations and liability insurance for taxi cabs was drawn up and passed.

The city joined the National Safety Council and has inaugurated a safety movement among its employees which number about 250. Men requiring goggles in their work are supplied with them by the city. Red flags and lanterns are used at sewer and water works excavations when such work is in progress.

At our public bathing beach, two life savers are in constant attendance during the summer months. Areas have been fenced off in shallow water for the younger children, who cannot swim.

The fire department puts on a Fire Prevention Week each year, making inspection of all the public buildings and the schools. The police department is active in trying to cut down the traffic accidents in the city.

Organization

Our safety movies have been used by the two local luncheon clubs on a number of occasions. Some of our company and Chamber of Commerce safety committee members belong to each of these organizations which helps to give a safety aspect to things that they carry on for the community good.

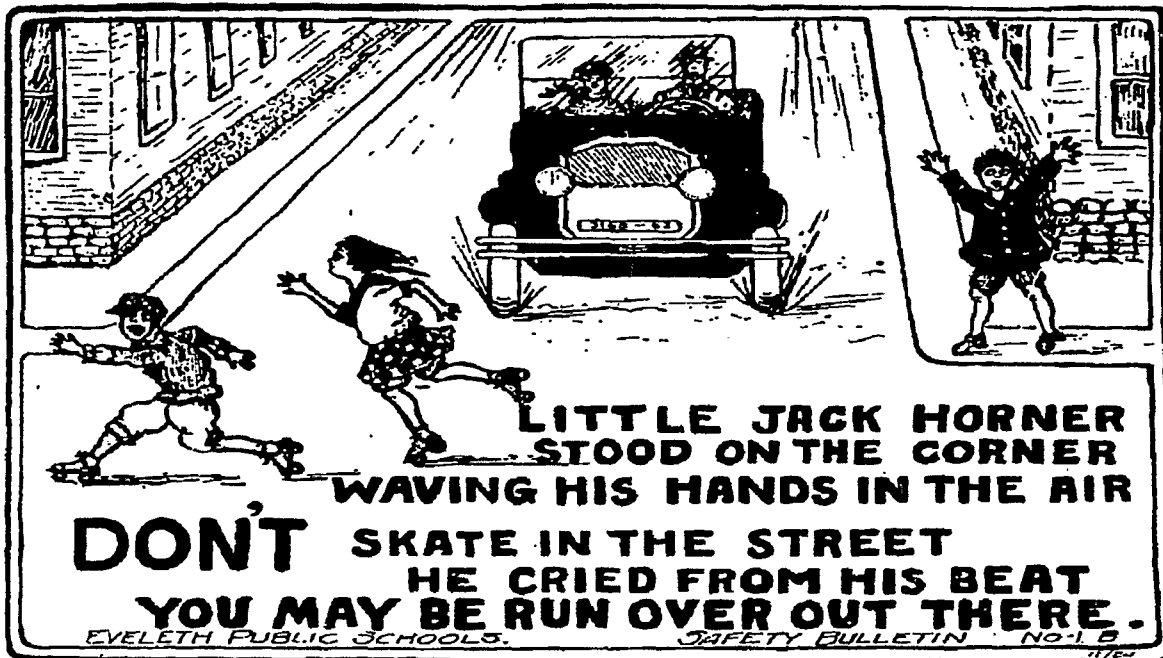
At our Parents and Teachers Association meeting, school and home safety has been broadcast through the medium of speakers and motion pictures. We feel that the wives of our miners through this organization can be made to realize what an accident to their bread winners means to them and their families, and a lot of good work is done through this association when followed up.

The Boy and Girl Scout organizations in Eveleth are well organized, there being a full time paid executive at the head of each. Scouts are given merit badges for first aid, life saving and public safety. The company first aid man has charge of giving part of the first aid course to all our scouts. The American Red Cross expert visits our camps and gives advanced training in life saving, while the chairman of our company safety committee also is chairman of the merit badge examination committee. The writer has been chairman of the scout camp committee for a number of years. Work in subjects such as life saving, canoeing by American Red Cross instructor and woodcraft are carried on. As the motto of this organization is "BE PREPARED" we believe that more of the boys and girls of our country should be given a chance to attend summer camps thus preparing themselves for any emergency that may present itself in their daily life.

Industrial

As a majority of the men in our city work for the Oliver Iron Mining Company, naturally anything that affects these men affects the community. It might be interesting to know that the early methods of promoting safety among our employees proved unsuccessful because of lack of interest in the movement by both the management and men. Safety meetings were held on the men's own time and broken safety devices were left to go unrepaired.

Five years ago our company began its intensive safety campaign. Safety meetings are now held on company time and machines with faulty safety devices are shut down until repairs are made. Educational methods have been introduced throughout the works in order to train our men how to work safely. Safety bulletins covering mine and home accidents are issued each month with the pay check. Our new employees receive their first instructions in safety from the employment supervisor, which is followed up by the foreman on the job. Every employee receives a pair of goggles and is instructed in their use. We have five motion picture theatres in the district where all our men have a chance, at least once a month, to see a safety movie. At our monthly workmen safety meetings, accidents in the home, on the highway, as well as those at the works are discussed. Our company nurse visits the homes of our employees and stresses safety in the home, and also teaches



Example of the School Safety Poster

the essentials of first aid to mothers. The progress in mine safety might best be illustrated by records of the Eveleth District of the Oliver Iron Mining Company which shows 477 lost time accidents in 1920 as against 28 during 1926. This means that 449 homes in our city remained happy last year, which goes a long way to make a better community and more prosperity.

The Minnesota Power & Light Company, realizing that the commodity they handle possesses swift death dealing possibilities to both employees and consumers, joined the National Safety Council and perfected its own safety organization a little over two years ago. After doing so, they employed the mining company's first aid instructor who taught their men the essentials of first aid and the prone pressure system of resuscitation. We have noted their men pulling tacks out of posts which have held advertising cards which they

considered a hazard to men climbing same. They have also put on a service man who spends the greater part of his time visiting the homes of people, showing them how to use special electrical equipment and repairing the cords on these machines when necessary. Men are sent through the city schools periodically, calling the children's attention to the danger of playing with live wires, etc. The city police department cooperates with the organization by reporting any hazardous condition of the power lines they may observe.

By using safe methods in their work and spreading the general idea of safety throughout the community, this company feels that they will occupy a higher place in the minds of the general public.

Our two weekly newspapers have been of great assistance in broadcasting the safety idea throughout our community. Such subjects as fire prevention,

ACCIDENT REPORT Eveleth Public Schools

Name School

Grade Date 19.....

Kind of accident—(Auto, Railroad, Firearms, Poisons, Cuts, Burns, Falls.)

Was Injury—Minor Serious Fatal

Where Did Accident Occur—Home, Street, School?

Cause of Injury

Nature of Injury

Remarks:

(Over)

Recommendations to Prevent Recurrence

Was first aid applied? By Whom?

Was injured person sent to School Nurse? Name

Was injured person sent to a Doctor? Name

Remarks

Signed

home safety, state and city traffic regulations, have always been given special consideration by these editors. They have always been boosters of safety, and through their editorial columns are active in bringing unsafe practices before the public.

An inspection was made of the buildings housing public garages and filling stations and a number of improvements in ventilation which would intend to reduce the carbon monoxide hazard were recommended. Notices were posted at all filling stations requesting car drivers to shut off motors when being supplied with gasoline, thus reducing the fire hazard. Posters which have been sent out by insurance companies and National Safety Council on the much discussed carbon monoxide hazard are always passed on to the garages. We feel that much can be done in warning the traveling public by posting these bulletins and through live wire gas station or garage attendants.

The two railroads which haul ore out of our city and the telephone company are members of the National Safety Council and maintain active safety organizations.

It is needless to say, with all these safety activities going on in a small community, that some favorable results should be attained. In this country of lakes children go to swim where there is no supervision. We note there have been no fatalities among them in the last two years, which proves that swimming is an essential in any educational system. Our traffic ordinance has been in operation now for two years. During that time there has not been a fatality in our city limits caused by an automobile. We know of any number of cases of men in our employ telling us of safety ideas which the children have brought home from the schools. All of which proves to us that the time and cooperation spent in securing the above warrants the expense that our company has gone to in Eveleth in order to make our community free from accidents.

Details of the Prize Garden Contest

CHAIRMAN SCOTT: Mr. Pollock, you have given us a very interesting and profitable discussion on this subject.

Before we begin the discussion, are there any questions which anyone desires to ask Mr. Pollock? What is population of Eveleth?

MR. POLLOCK: About nine thousand.

F. C. MILLER (Power, Fuel & Iron Co.): I should like to ask about your prizes for gardens, and can the same party compete year after year, or are they eliminated after they win the first prize?

MR. POLLOCK: They can keep right along. We don't take the employees, but we take the park superintendents of two or three of our large cities and they visit my house, or my neighbor's house and decide at the end of their trip who should get the prizes. We classify as to locations and as to company-owned houses, or what we call "squatters." You can't buy land up in our country, you have to "squat," and that costs you one dollar per month.

Two squatters got the first prize this year of ten dollars apiece. They were in two different locations. We give ten, eight, five and three dollars—that is, four prizes, in each location for company-owned houses or squatters.

MR. MILLER: Our company gives four prizes in each of our four or five attempts, but we have found it necessary to eliminate a prize winner for this reason. It is so outstanding that that individual could just continue to take the first prize each year for evermore. So, as an incentive to new competition, we keep eliminating for a period of five years. That gives the other party a chance for the prize.

MR. POLLOCK: We don't. If a person has ambition enough to compete for first prize year in and year out, we give it to him.

CHAIRMAN SCOTT: We will allow five minutes for further discussion.

I. GORDON (Bureau of Safety, Chicago, Ill.): I want to ask Mr. Pollock in regard to the films. I believe you said you show safety films and comedy films. Who pays for these films, your company?

MR. POLLOCK: The company pays for these films. We get our safety films from the National Safety Council. The mining companies do not charge us for any films and the films we get from the National Safety Council are very reasonable, probably cost us about twelve dollars a week for them and we figure it is worth while.

CHAIRMAN SCOTT: Mr. Arkills, will you please discuss this paper for a few minutes?

M. E. ARKILLS (The Waterfront Employers of Seattle, Seattle, Wash.): I have had very little experience in small towns on safety, but if I were to be a judge of this paper, I would say that the safety man is pretty near the whole thing

in this little town. At any rate, there is no doubt but what the safety idea, put over as he has put it over, has done a great deal for the health and happiness of that community, and he has occupied a tremendously important place. The work he has done there should be an inspiration to every man, even in a large town, to put over some of the same activities that he has put over. I doubt if very many of us are utilizing the means that are right at our front door to carry on some of the activities he is doing.

I have talked before but one school and I think that probably spoiled my chance of talking before another; nevertheless, I am sure a great deal of good could be done through the schools, even in the larger cities, if it were properly approached.

CHAIRMAN SCOTT: Now, we have with us Miss Lee of Birmingham, Ala., who has a number of connections with the National Light Association, and is very active in the work of that institution. I ask Miss Lee to discuss this presentation.

MISS ELIZABETH S. LEE (Alabama Power Co., Birmingham, Ala.): I try to put in almost twelve months of the year working for my company, on my every day job, and between times I get in work on the Women's Committee of Public Relations and work on the Educational Section and on the Accident Prevention Section, so I don't have much time left except to sleep a little.

I was very much interested in Mr. Pollock's talk this morning and there was one part I was thinking of especially, that is the contacts with the Parent-Teacher Association, which probably gets in contact with most of the home makers of the community. I don't know just how far they extend in the majority of cities, but it seems to me that would be a wonderful contact for furtherance of this work to get in touch with groups such as women of the utility companies, the electric light, power and the gas companies, and in the manufacturing companies. That would give the women in the home more expert knowledge than I think they obtain from a few people going out from schools or safety councils or others in talking to these groups and in mingling with these groups of women and getting them interested. That is, because you would have numbers of women who are experts in their own line talking to these groups of people. It seems to me it would be a wonderful contact there if that could be brought about, and especially where women are using electricity in the home. I believe women would probably pay more attention to other women because they have their same point of view in teaching them any hazards in connection with electricity or gas, or whatever it is. Not with the idea of scaring them, but we want to present it to them in a constructive, positive manner, because we are going to use these things in modern life and they should know how to use them properly instead of improperly.

CHAIRMAN SCOTT: The next subject is "Cooperation With Representatives of Other Local Companies" and is to be presented by Mr. H. Henry of the Mansfield Sheet & Tin Plate Co., Mansfield, Ohio. I take pleasure in introducing Mr. Henry.

Cooperation with Representatives of Other Local Companies

H. H. Henry, Mansfield Sheet & Tin Plate Company, Mansfield, Ohio

Safety, both industrial and general community safety, as well as many other activities of interest to employers and employees alike, in Mansfield, Ohio, have received excellent stimulus through the cooperation of the Manufacturers Club, in the past nine years, under the able leadership of Wellington T. Leonard, now Member of the Industrial Commission of Ohio.

Industrial safety received his enthusiastic attention and cooperation as early as 1921. I might say here that our Manufacturers' Club is not a manufacturers' club in the strict meaning of the word. While financed by the manufacturers

It is a club where the employees of our community have felt free to consult and seek aid along any and all lines; and I believe it has built up an enviable reputation for the success of its work among the employees as well as in those matters of interest to the employers of our community.

Among the activities of the club, in the past ten years, have been the establishing of an employment office, industrial publicity bureau, industrial surveys, relief campaigns, civilian rehabilitation committee, vocational training in our schools, etc., and Mansfield has now in its schools a vocational training equipment and personnel much better than in many larger cities in our state. Mr. Leonard, because of his extensive experience in newspaper work and exceptional knowledge of human nature, because intensively interested in the safety movement, primarily, I believe because of its human appeal and the opportunity it afforded him to give support to a movement that would eliminate to a large extent pain, suffering and financial loss in the families of injured workmen.

Mr. Leonard's enthusiasm was contagious and he never failed to have a large representation from practically all industries, large and small in the community whenever a meeting was called to consider any phase of the safety movement.

Stimulating Interest in Greater Safety

Realizing that there was little knowledge of the Ohio Workmen's Compensation Law, and little attention paid to the then existing safety codes, Mr. Leonard in 1920 invited T. P. Kearns, chief of the Division of Workshops and Factory Inspection, of the Ohio Industrial Commission, to address a joint meeting of the employment managers and superintendents. Mr. Kearns explained the act and the compulsory feature relative to the obligation of the employer to safeguard his workmen in accordance with the various codes. He also agreed at this time to send a number of inspectors into our community and make a more intensive survey. Codes were distributed to all the plants.

Interest having been stimulated the question of rates, reserves and merit rating system under the Compensation Act next received attention; and Emil E. Watson, actuary of the Industrial Commission, was invited to address a meeting of managers, superintendents, and employment managers. A second meeting was held a few months later and further information along the actuarial line discussed by P. F. Casey, now chairman of our Industrial Commission.

About a year later the state inspectors and safety engineers, because of the enthusiastic reception accorded them thought that Mansfield should have an "Industrial Safety Education week." The Manufacturers' Club sponsored this week. Talks were given in all the plants, the newspapers gave the work a large amount of publicity and many of the retail stores carried safety displays of guards and posters.

The Mansfield Sheet & Tin Plate Company, being the largest employer of labor in our community, employing approximately 1,800 men, has equipment consisting of four open hearths, bar mill, seven tin and 12 sheet mills, and having inherently the most hazardous conditions, became interested in safety in 1921, and I was appointed safety director at that time, after several years' experience in the Youngstown district. A constructive program of engineering revision, education and enforcement was entered upon. A large force of guardmakers was immediately put to work guarding the numerous hazards, under the leadership of a very able guardmaker foreman. Our plant has been described as a museum of safeguards by several inspectors and safety engineers. Being the pioneers in safety work in our community, representatives of other plants were invited to inspect our safety, hospital and compensation departments. Our management also very heartily endorsed our efforts to spread the safety idea and movement to other industries and the schools. Effort was also

made by our company to gain new members for the National Safety Council and encourage them to send representatives to the annual Congresses.

The efforts of the Manufacturers' Club in sponsoring the safety movement in Mansfield and the success attained became known outside our community and our local club was instrumental in spreading the cause of safety and stimulating interest among the members of the Central Ohio Manufacturers' Club, and many safety talks and discussions were given before this association as well as plant inspections and talks at individual plants affiliated with this organization. In 1923 when effort was made to strengthen the Workmen's Compensation Law of Ohio and the amendments were receiving much discussion among employers and employees, representatives of our club and industries were looked to for information and leadership and many talks were given not only in the industries in our section of the state but in granges, schools and service clubs and trade associations.

The State, having accepted the offer of the National Congress to establish Civilian Rehabilitation, Richland County, in which Mansfield is located, lost no time in appointing a committee to carry on this work of rehabilitating the civilian cripples injured in industry. This committee was selected from recommendations made by the Manufacturers' Club and the writer was made its chairman.

Getting the Foremen Interested

In 1924 a City Foremen's Club was organized, largely through the efforts of our Manufacturers' Club and the cause of safety was further enhanced through the opportunity this organization gave of bringing the safety idea to the foremen of our industries. Many prominent men throughout the country have addressed our foremen's club, including Past President Auel of the National Safety Council.

The Mansfield Sheet & Tin Plate Company sent a delegation of 25 foremen and superintendents to the National Safety Congress at Cleveland in October, 1925. After their return it was realized that the third thing necessary to attain a good accident record must be enforcement. Engineering revision and education had received much time and thought, still accidents especially non-mechanical, were very high. Due to the combined efforts of management and men lost time accidents immediately dropped. The average lost time accidents per month in 1925 had been 28; in 1926 they were cut to 6½, a decrease of 69 per cent over 1925 and 79 per cent over 1924; and frequency dropped from 118 to 19.6. A number of records were established, among which were a decrease of 97 per cent in days lost due to permanent partial disabilities, and premiums were decreased 20 per cent over 1925 rates.

This very favorable experience by our company undoubtedly served to increase the interest of other companies in our community and safety departments were established among five other large companies; and nine new members were added to the National Safety Council in Mansfield and surrounding territory.

The interest and activity in the cause of safety on the part of the Manufacturers' Club culminated in May, 1927, in our club sponsoring, with the cooperation of the Department of Safety and Hygiene of the Industrial Commission of Ohio and our Chamber of Commerce of Mansfield, a Community Safety Education Week in Mansfield. Excellent cooperation was had from all organizations, City and County officials, Chamber of Commerce, Schools, Women's Club, Boy Scouts, public utility companies, mercantile organizations, etc. Many safety men of national prominence were brought to Mansfield and a very extensive program carried out in safety education. An accident survey, both indus-

ial and public had been made over the previous year by the department of business research of Ohio Wesleyan University and much publicity given to the results obtained which showed that in a city of approximately 40,000 population 29 deaths had occurred, of which 11 were in industry. In addition there were 4,355 industrial accidents, involving 96,803 days lost; 580 of the industrial accidents resulted in over seven days being lost. There were 14 traffic deaths.

Safety meetings were held in all the industrial plants, schools and churches, before all service clubs, women's organizations, parent-teachers' clubs, etc. Other meetings were held of mercantile, construction, city and county employees, railroads, public utility companies, playgrounds, commercial vehicles; and the safety message was broadcast two evenings from our local broadcasting station. Streets were painted with safety slogans and safety zones marked off. Placards were liberally placed on telegraph poles, in windows of stores and in the homes as well, so that one could not go far without having the gospel of safety brought to their attention.

I believe our cooperation with representatives of other local companies, through our local Manufacturers' Club, has resulted in a substantial decrease in accidents in our community and the saving of life and limb, as well as increasing the economic wealth and happiness of the members of our community. We have at least awakened our community, through safety education, to realize its responsibility in accident prevention and to appreciate the advantages that can be attained through a concerted and well organized effort to make the community safety conscious. Safety is not only an industrial problem but a public and community problem as well. The principles involved in the eliminating of public accidents are precisely the same as those involved in the elimination of industrial and home accidents; we must first locate the accident causes and then devise ways and means of eliminating or minimizing these causes. If the effort to build up the habit of reasonable carefulness as opposed to life-destroying habits of carelessness is to be successful, it cannot rest with one week's intensive effort, but must be carried on systematically throughout the year. The long recognized obligation of the employer to provide the safest possible conditions of work must be spread to every individual of the community in order that human life may be safeguarded at all times. Until the time comes when we realize that no one is safe unless every man, woman and child habitually practices carefulness—not until that time will our task be done.

Community and Plant Have the Same Interests

CHAIRMAN SCOTT: Mr. Henry, we thank you. Mr. Fred S. Armstrong of the Central Illinois Public Service Company, Springfield, Ill., will tell us what he thinks about the cooperation of safety directors in small communities with those of other companies.

MR. ARMSTRONG: Mr. Chairman, I am not capable of talking to you about accidents in industrial plants because I have never had any experience in that work. The company with which I am associated is a server of utility products, gas and electricity, etc., in which we are scattered over some 340 communities in the southern part of Illinois.

We believe that whatever is for the good of any single community that we serve is for our good and we are thorough believers in safety. So strongly do we believe in that, that during the past three years we have talked safety to over 160,000 school children in our properties.

We have taught them resuscitation and artificial respiration and as a direct result of that work in the schools there have been three who have been resuscitated from death by the abilities of their companions through the knowledge that they gained from our instructions. If nothing else has been done in the safety work in those

communities except those three lives being saved, the work has been paid for. Those lives were as precious to the families of which they were members as are the lives of the members of our own families; and whenever we lose track of the fact that human life is the most precious thing there is in this world, our safety work will be a failure.

MR. HENRY: What I wanted to add was the influence we have had regarding the safety council of Mansfield which resulted in five plants putting in safety and compensation departments. Three of our larger plants have this examination and we have a representation at this congress of about 15 from our community where, I believe, three years ago, there were only two or three. I think from that possibly you can get the idea of how we have spread the influence of the council and the membership through our community.

CHAIRMAN SCOTT: I wish we had more time for discussion. The next subject, I am sure, will be of interest to all of us. This will be given by Mr. Irvin J. Ott, Worden-Allen Co., Milwaukee, Wis. Mr. Ott.

Combining Safety with Recreation

Irvin Ott, Worden-Allen Company, Milwaukee, Wis.

Assuming it is true that a man's mind continues to turn over impressions even as he sleeps, a very significant fact is brought to our attention. In every 24 hours there is a period of 16 hours when your employee is not under your direct influence and control, but is, I contend, during that period, in a state of mental and physical relaxation that makes him much more highly susceptible to properly introduced influence than when at work.

It behooves us, then, to cast about for ways and means of utilizing this valuable period, so as to best accomplish our accident prevention aims.

A wise man recently said about the fair sex, "You think it is cute to have her slip her hand into your pocket—until after you marry her." Still, how else is she to get hold of our safety propaganda for home broadcasting, if we continue to hand same out to Tony at the shop, who absent-mindedly chucks it in his pocket, to be forgotten?

There are two mighty big reasons why. First, we should create safety propaganda for relaxation periods; and, second, Tony's wife should see it. In the first place, harking back to my original contention, which I think important enough to repeat, we want to reach our employee after he has gotten home from work, because it is logical to assume that during relaxation he can best be influenced. Influenced by whom or what? That's where Tony's wife comes in. The proverbial feminine tongue is still, I believe, the best means of speech repetition, so why not assure ourselves that Mrs. Tony is going to help us out?

To this end permit me to tell you about the plan our firm and several others I know of, practice. At regular periods, a notice is gotten out, bearing on safety, which contains either complimentary remarks about a satisfactory no-accident record; or if the reverse is true, a general synopsis of a poor accident record, and further notations that the recipient and his family have our sincere wishes for their welfare. These are mailed to the home, and of course the wife and family have an opportunity to discuss same; the wife discussing it, no doubt, far, far into the night, as Briggs, the cartoonist, would have it; and of course, bearing out my original contention that it is possible with proper methods to push this recreation safety so as to have it function 16 hours out of 24.

This all helps but it isn't everything that can be done. We all know the value of safety posters. Did you ever stop to realize what it would mean to

place one in your employee's home? The National Safety Council has made such a thing possible in the creation of their annual Safety Calendar. For several years, we have used this and as a means of promoting safety discussion in the home, in my opinion, its value is inestimable. Our welfare department, when visiting the employees' homes, finds the calendars hanging in prominent positions in the house; and what more can we ask than to have such an ambassador functioning for us right in the homes?

In passing, another thought occurs to me. This home accident prevention work, without a doubt, will tend to lessen domestic accidents, also, creating for us a much more contented and efficient employee, than the man whom family misfortunes often turn into an accident hazard or, at least, an absentee.

There is still a period of recreation that does not concern the home. During the noon hour and other rest periods and also during the early evening in some localities, a portion of the employees are prone to indulge in athletics of one kind or another.

It has been found necessary in our locality to give this matter our attention. Our employees, during football season, endeavored to play the game in their everyday overalls. After watching the gory results, we insisted on their playing a compromise game which consisted of tagging the man who had the ball, instead of tackling him. The system worked out fine and since then, we have had no bad results.

We have consistently discouraged the use of hard baseballs for recreation purposes at our plant, supplying the regulation playground ball, and it has worked out favorably, to the extent our plant is now in a soft ball league, formed with other companies who had the same safety ideas.

In this connection, the hazard from too small a space to play forms a problem for the safety man. The necessity of having to field the hit balls on railroad or street car tracks, or even on the street or road forms a stumbling and traffic hazard worth consideration. A wire mesh fence with conveniently paced gates, generally solves this problem, as it deters the thoughtless runner, who, after a ball is knocked over the fence, merely goes through a convenient gate, retrieves the ball and play is resumed.

You might question the necessity for all this, as having little more than a humanitarian motive back of it, so to show its financial value I quote from our own Wisconsin Industrial Commission's report dated July 10, 1927, which has this paragraph of warning:

Compensation Liability During Noon Hour or Other Intermission

"It has been repeatedly held by courts and by this commission that any employee is within the protection of the Workmen's Compensation Act if injured during the noon hour or other intermission because of a hazard created by the industry. The employee need not be at the time of the accident performing actual services for his employer. Being rightfully on the premises in the capacity of a servant at the noon hour or other intermission and conducting himself in a manner reasonably to be contemplated by the employer, he is entitled to protection against a hazard of the plant or premises the same as if actually performing services. He is at such time, in contemplation of law, to be taken as in the performance of service growing out of and incidental to his employment."

This I believe speaks for itself.

So far, I have confined my remarks to the very selfish problem of recreation safety as applied to our employees. We are all supposed to be safety men from small communities, where it, no doubt, becomes our lot to interest ourselves in the matter of civic recreation safety also.

This brings to my mind the appalling number of juvenile accidents yearly and the extreme necessity for interesting ourselves in this connection.

In the United States it is a matter of record some 4,000 children are killed and some 250,000 seriously injured each year. In the city of Chicago, in 1925, 171 children under 16 were killed and 520 seriously injured through traffic accidents, bearing out the dire necessity for more safe play spaces and properly supervised ones.

We men from the small communities might endeavor to close our eyes to this and say that the small community does not have the traffic hazard to contend with. I would like to point out that in quantity of vehicles, the small community may not suffer as to accidents, but the rate of vehicle speed is generally greater than in our larger towns, hence the necessity for keeping children off the street.

The Playground and Recreation Association of America has provided a great deal of information on the subject of child recreation safety, and I would strongly recommend any one interested in this branch of our work to get in touch with it.

Promoting Safety Through Recreation

Recently the association published what they considered were the effective ways a local safety executive could best promote safety through recreation.

It asked for your cooperation with local recreation authorities, or in the absence of such, with local Chambers of Commerce, churches, etc., in securing more playgrounds, play streets (streets blocked off from traffic during play hours), more bathing beaches or pools and more picnic grounds.

They asked that you urge the fencing of all playgrounds.

To help work out plans for properly supervised coasting and skating places, was another plea.

To bring to the attention of playground directors new traffic games or other plays that teach safety, was also urged.

The concentration of our attention on this matter of child safety has in my opinion two big benefits. First, whatever the children are led to do along the lines of promoting safety will exert an influence in the home, for youngsters are sure to talk about such things, so that not only the child, but the whole family indirectly come under our influence.

Then, secondly, we are instilling safety into our future employees, making our job a much easier one, when the time comes for us, as the employer, to personally direct their welfare.

And after all, that is our big task and primary object, the education of employees and future employees, to develop their thinking along lines of safety, eliminating thereby our chief cause of accidents today—thoughtlessness.

Let us bear in mind that safety, in view of the facts just mentioned, can be considered a 24 hour per day responsibility with us, for all ages and sexes; and accordingly I would respectfully commend your future thoughts and deeds in this connection to a consideration of it as such.

CHAIRMAN SCOTT: Mr. Ott, we thank you very much, ~~Milwaukee~~ always brings a lot of information. Mr. Gordon, will you discuss that subject from your point of view?

I. GORDON (Bureau of Safety, Chicago): First, I think this a good hint to safety supervisors, that the employee is on duty at noon hour, at a time when we would naturally suppose, if he got hurt playing ball the company would not be responsible for the accident. I think that is something we might think about and consider.

I was impressed with Mr. Ott's remarks in carrying the safety work into the homes through the school children. It has been my pleasure and privilege to talk

to a large number of school children and I know there are many hazards in the school that, perhaps, the teacher doesn't consider a hazard, and I think it the safety man's duty to point those out at the time he talks to school children. This will emphasize the hazards that confront the children while at play and when their minds are busy with play and not hazards.

School teachers should give some thought to the things that the children are doing while at play. Who has not seen eight or ten boys in a group make a pile of jagged stones and then about 50 or 100 feet away another group of boys pile up another pile of stones, and engage in throwing these stones at one another for fun. The boys do not realize the possibility of a very serious accident. At the time a boy may be picking up a stone, he is not looking, of course, and there may be a stone coming toward him just as he faces the other group of boys, and it may result in the loss of any eye, or other serious injury.

The teachers should see that the play apparatus is inspected frequently for defects, and whenever there are dangerous defects forbid their use until repairs have been made.

Now as to climbing. I doubt very much if the teachers realize the danger of boys "following the leader," as we used to play in school by daring each other and doing some very dangerous stunts. For instance, the boy who climbs ten or fifteen feet high on a wall, a shed, or a roof, and the boy on the ground looks up at him and says, "I dare you to jump off." You have challenged the bravery of that little fellow, and without thinking he looks down and says, "I don't take a dare from nobody." Not very good English, but that is the way they put it, and after he jumps, expecting, of course, that the other boy will run up and commend him for his bravery, his only reward may be a broken leg.

I try to get the children to realize that the boy who dared won't praise. The chances are he will go up to the injured one and say, "I thought you had more sense than to jump off of a high place like that." Now, if we can get boys to realize that it is just as brave to say, "No," to a thing that is wrong, as it is to say "Yes" to a thing that is right, I think you have taught them a safety lesson.

The little fellow who has been dared should realize the danger of doing the thing that he has been dared to do and should say to the fellow who dared him, "What do you think I am, a dumb-bell? If I should jump off of this high place I might have a bad injury. I would suffer and not you." Oh, there is a wonderful avenue for teaching the children the safety lesson in their play or at their play.

CHAIRMAN SCOTT: The next and final topic on the program is tied in very closely with the subjects which have just preceded it. This paper will be given by Mr. C. Ziolkowski, of the U. S. Gypsum Company, Chicago.

Selling Safety to the Worker Through Community Activities

C. Ziolkowski, United States Gypsum Company, Chicago, Ill.

The remarks made by the first speaker here about the fact that some of our speakers are from Chicago, Youngstown, Mansfield, etc., and that they might have little connection with work in small communities, may have been somewhat misleading. I am sure most of them have had experience in small communities. In my talk, which I will make as brief as I can, I will deal a little more in abstract than in definite detail with community activities. What I have in mind is communities where plants are located with an employment roll of probably two or three hundred, usually companies engaged in the process of mining or pouring, where you have to locate your town around your natural deposit, wherever it is found, and build the town. A town

of that type usually has 600 or 700 inhabitants and the safety man there is not only a safety man but a personnel man and a community man, all put together.

I am sorry, as the chairman remarked here at the beginning, that the number of men who attended this meeting is small, because I believe that the safety supervisor in a community of as small a nature as I am mentioning, has a job that is peculiarly his own. He may not represent numerically as many employees as some of our supervisors or big railroads or other industries; but you will find a great many more plants scattered about the country in communities of say from five hundred to one thousand, or possibly two thousand. Therefore, I think if they met together they could find a lot of problems that are common to them to be discussed.

Your safety supervisor in the real small communities that I mentioned is primarily employed, of course, to prevent and keep down accidents in the plant and at the outset, the work takes up practically all of his time so that the community work is not given very much, if any, attention and probably in some instances, he doesn't even consider the community angle of it at all because he may feel that "I am hired to take care of the safety of the plant and beyond that, if I have time, all right, I will do it."

I believe, however, a safety supervisor who is really, in the true meaning of the word, a safety supervisor, is interested even beyond the plant. They should be, at least. He should be imbued with the spirit that moves our accident-prevention work sufficiently to get out of his sphere of the plant gates in his work and influence that he can exert. It will mean, of course, sometimes, in most instances, extra work, sometimes after working hours, but that goes along with what I explained about the feeling that he should have towards safety. A few extra hours of work shouldn't make such a tremendous difference.

I also believe work in a community of that size (I speak of from 2,000 to 3,000), is greater than in the larger community. He has more personal contact, and, as far as direct contact is concerned, he can do more in the hours spent in the work than possibly your men can in the larger cities and it should be an incentive for him to do it.

Carrying Safety Influence Outside the Plant

Now, I shall go briefly over the reasons why I think he should go into community work to help along his plant safety work. I am speaking from the angle that the work is not being done. I mean, he is not taking interest in community work and I am trying to show why he ought to, both from a humanitarian interest and probably a slightly selfish interest.

The papers prepared before me have all shown things that have been done and they were marvelous. I think, especially about the Minnesota Mining Company, which was excellent, and it gives us an idea how far you can develop community activity. Of course, all of us are not fortunate enough to be with companies of that size and that have the financial means to do all that Mr. Pollock stated he was able to do up in Minnesota.

Fundamentally, I think one of the main reasons for a safety supervisor (or the company he represents) interesting himself in community safety is one that has been mentioned before, and that is to carry the safety influence beyond the company property.

The employees quite often consider the interest the company takes in safety as somewhat of a selfish proposition. They say, "Well, they save a lot of money by getting us to work safe," sometimes forgetting the benefits they derive from being safe and saving their families from hardship. I believe you can confute that argument quite strongly because you can point very distinctly to who will be benefited by taking active interest in community safety. Through this the employee will understand, and rightfully so, that the spirit which moves the safety work at the plant is

ader than the plant alone. It goes into the community and into the lives of the ves, brothers, sisters and children, not only during working hours but after working urs, also.

The influence the family has on the employee is going to produce results, I think, t are greater than you could possibly produce at the plant. You use discipline at : plant, as well as education and some other ways. But when the family talks to : father or brother about being careful when he is at work, he knows that they only ve an idealistic, unselfish idea. He is much more likely to listen to them than to : one at the plant, because he knows at the plant he is not among people who are ated to him and it is an industrial and commercial proposition. I think the family luence is far greater.

Another thing it does, is to interest the family in accident prevention as far as the mediate family is concerned, the children, mothers and sisters, in their homes and the streets, and it spreads that gospel of safety in the community. It also gives : plant an opportunity to outline to the families the real motives behind the indus- al safety movement. It tends to quiet any false rumors about what is happening in : plant and gives a right picture of the conditions as they really are and gives the l reasons for safety work at the plant.

A Vital Interest Lies in the Community

Also, I think one of the biggest reasons for taking interest in community safety that it shows the company's interest in general, not only in safety as it stretches pond the plant gates, but it goes beyond them into the communiy and they really : vitally interested in how the community, as a whole, fares.

Of course, there is no question about this in a community where the company owns : land surrounding the plant and rents the houses to the employees; but the ques- n might come up where you have several industries and there is not the spirit of t one corporation. In communities where you have more than one industry, it will d to bring a closer cooperation between these industries in safety work; whereas : tendency so often is that each one works on his own hook and there isn't very ch contact or exchange of experiences in the safety work. When you create this ion of ideas and let down the barriers of reserve or coolness, whatever it may be, : have taken a very definite step in helping not only your own records at the plant, : the safety record of other plants also.

Now, I think one of the biggest reasons (I left it for the last), why you should e an interest is the effect that it will have upon inducing other companies to take : safety work and in that way lighten the burden of your individual plant when v men are employed. I am a strong believer in the idea that eventually every nt in the United States, and in the world, will have safety work developed to such legree that when you get a new man you will not have to go through all the ele- ntaries of showing him first aid, or what he should do in the case of an accident. y you had a fellow come from the Jones Company and you asked him what he uld do if he cut his finger, and he said: "We put some chewing tobacco on the : and go right on with our work." That makes it difficult. You are starting at the tom.

But if you could get all your industries, especially in the small communities (where : people live for years and seldom change), vitally interested in safety work and hing it, you will come to a day when, regardless of who comes to your employ- nt office, you are certain that he knows the fundamentals of safety and understands at it is all about. All you have to do is impart to him any additional rules which : required because of the different operation, which are mere details, and you have ttened the burdens considerably.

Now, in starting a program of this kind in a community that hasn't had it, the n of finances, of course, is always a very touching one. I have found in the small

community work that you would like to do a lot of things until you get to the point of what it costs, and then the thing dies down. That is where I believe the ingenuity of the safety supervisor comes in. He can devise means. I have a hobby of my own, my personal way. I usually like to arrange entertainment with local talent. You know how in small localities you have opportunities such as you don't have in large towns. Anything with local talent goes over big; and the funds you need aren't always so great that you can't raise them through such means as athletics, or other things—sometimes in which you can get your community interested to attend and raise money that way to start it. Small communities, the term itself means a lot. You will have to adjust the plan to your community, as to organization.

Now, I would say, wherever a community can, it should organize a local council. You can do the work through your Rotary Clubs, Manufacturers' Associations, etc., but if you specialize on safety and organize a local council, I would say your job is going to be better done than if you place it with some organization which will consider safety as only part of its program. However, I know that some communities will be so small that you won't be able to do that. In such cases, you will have to use whatever clubs or organizations you have and get them interested to such an extent that they will take part and push the safety program.

One of the things they did was to arrange a safety week or month. Arrange to have all the plants in a safety campaign at the same time; and not only advertise them and give them publicity in the plant grounds, but give it publicity outside and by placing your plant signs on wagons and store windows, so the whole community becomes conscious that there is a special effort being made in the community; and I am sure it will result in a very effective way on the accidents in the community, too.

A Big Safety Opportunity in the Schools

Your school, of course, is a very vital medium as mentioned here. There are quite a few things which are a repetition. If you are furnishing the posters that the National Safety Council make up especially for schools, or any literature that you have on public safety, make it so that the schools can get them. An essay contest. I am sort of a bug on that, because it has been worked successfully in several of our plants. We have a safety community campaign, and at the time the campaign is on, we get in touch with the principal of the school and tell him about our plans and get his cooperation to such an extent that he announces an essay contest. Perhaps the subject will be "Why Should My Father or Brother Be Safe in Working in a Plant?" Then prizes are awarded to the best essays which are written; some in the first few grades and then up through the higher grades. It was really surprising what a response we got and quite often we knew the paper was dictated by the father or brother because the wording was similar to that of the plant; but it got them to sit down to the table at home, whether the father dictated the paper or not.

Another excellent way we have of getting safety through the home to the child is the use of our picnic. I felt rather guilty about that. A picnic is supposed to be a free for all pleasure, but we didn't let them go by without having some safety stunt after the races were over which would bring safety to their minds even while they attended the picnic. In our campaigns we have a safety show or rally, where movies are shown, and, of course, I presume most of you do this. You are missing a good bit if you don't attend and invite the family to attend this rally so they know what is happening in the plant.

Then, of course, there is your first aid contest. You organize your first aid teams, have a contest and make it public so that the families can attend and benefit, if possible, by the training that the contestants receive.

Then, there is your visiting nurse, if you are large enough to be able to keep a visiting nurse at the plant. I think she is a vital factor. You can utilize her services considerably in the plants and in the homes when she visits them.

Then, you have larger communities where you want traffic laws. I think whatever you organize, the Rotary Association should take a very active interest in demanding that these laws be adhered to for the safety of the inhabitants of that town, providing crossing signs for the community and around the schools. Then, if you have a plant publication of any kind, a very vital meeting is a community factor. I find in many instances, though, even though the plant publication is issued, it doesn't reach the home. Of course, there are several ways you can overcome that, even by mailing it to them at their homes. Or, sometimes, the fault is at the plant, so that the people at home who look into it are not interested. If you put all the material in it about the plant and nothing about home gossip, you are not going to get their interest.

I think it is a good idea, once in a while, to take a Sunday, or Saturday afternoon, and invite the workmen to bring their wives or their relatives with them to visit the plant. It gives the family an actual picture of what is happening at the plant. They hear so much at second hand that sometimes the attitude that the home relatives have regarding what is being done at the plant is not fair to the company.

Of course, if you have a newspaper in the larger communities, naturally you are going to use that for publicity and most of our contests are arranged in the plant itself. Or, if you represent a company that have several units and it is an inter-unit contest, I think in the small communities it is a wise stunt to arrange an inter-plant contest in that particular community. It may be two or three towns, or it may be in one town; but regardless what business you are in, get together, because that will bring out the civic and community spirit in the accident-prevention work.

That, for individual items, is about the list as I have prepared it, and, I say it is very difficult to say definitely for another man's town what he should do to get started on community safety, because it all depends on your local conditions. I have tried to speak in an abstract way so that you can pick what applies to your particular place, and you probably will think of a thousand other things that I haven't here. But one thing is certain, and that is, you are missing a big and helpful thing if you are not taking some active part in the community safety work. You can't shut yourself away in your plant, because the home influence is so great; if you don't get its cooperation you are not getting the full effect of your work at the plant.

It is very much like the farmer and his wife who went to the town to buy a box of dynamite. They sat in the buggy and there was a box of dynamite directly underneath the seat. The wife said, "I am not going to sit right over that box of dynamite, put it right back into the rear of the buggy." And so they rode home. You can't get away from it. If you try, like the ostrich, to put your head in the sand, and stay in the plant without doing anything in a community way, you can't do it; because it is going to affect you just the same, whether you think so or not.

So get out and get into it. It may mean a little more effort, and, as I said, a little more work, but I am sure when the final results are tabulated, a good percentage of your accident reduction can be attributed to the time you have spent in work in the interest of the community safety.

A Helpful Experience in Canada

CHAIRMAN SCOTT: Mr. Ziolkowski, that was a very fine talk. We appreciate it. Will Mr. Willis MacLachlan of Toronto, Ontario, please discuss this subject just presented?

WILLIS MACLACHLAN (Toronto, Canada): I didn't expect to discuss this paper. I am very much interested in it and enjoyed it very much, but there is possibly one type of small community that I know something of, and that is the small community of 200 or 300 people, up to say five thousand, in which the public utility have one man in a town, or it may have half a dozen. It may come up to twenty or thirty and that would be your limit of the number of employees.

Now, what can they do or what can you do in community safety to interest your employee more in accident-prevention in the plant? One scheme we used is the idea that you will learn something better yourself by teaching somebody else to do it; and we wanted to have the men particularly well trained in resuscitation from electrical shock because of the very apparent hazard of the industry.

I wrote to the local centers of the Boy Scouts, I wrote to the Scout Leaders, also, and told them the name of the line foreman or the man in that town who could teach the boys resuscitation. I also wrote to the man in the utility. Now, I don't think very many of the men in the utility went to the Boy Scouts, but I do know the youngsters came around to the plant and asked to have the man go.

I will give you one instance, in the town of Galt, Ontario, perhaps of about 3,000 or 4,000 inhabitants with about 20 or 30 employees in the public utility. They came around to the line foreman and asked him to come down to the meeting of the Boy Scouts and give them a talk on resuscitation. He tried to stall them off, but it wasn't possible. So he went down and he took a lineman along with him, and he taught them what he could on resuscitation. Then they began to ask him a lot of questions he couldn't answer. He said he would come back after he got the answers, and he did go back and tell them. That was the latter part of the winter. Along in August, a youngster was out swimming in the river. Two of the Boy Scouts happened to be along with the crowd and the boy in the middle of the river went down. These youngsters went out, got him out of the water, got him over to the bank. He was not breathing. They started in with resuscitation and brought him back. They received the hero medal for their work.

I wonder who values that medal most, the boy or the line foreman? I have talked to the line foreman and I know. I just suggest these things to you as examples from my own work of the training of resuscitation. There are various things that you want your men to learn. Why not get them to teach somebody else in your community, even though you don't have a community entirely composed of your own employees. Even in a small community where you may have only a few men, why not get them actively interested in the problem?

Round Table Discussion on the Subject

CHAIRMAN SCOTT: We will devote the remaining ten minutes allowed for this session to an informal round table discussion of any questions you may desire touching upon the general subject.

EUGENE T. LEES (Playground and Recreation Association of America, Chicago, Ill): In our own gang they call me the "Convention Hound of the Playground and Recreation Association." I get around to so many conventions.

I was very much interested in the several papers which I heard that touched this question of recreation. They were very illuminating and they showed that the light is gleaming around the country in reference to the possibilities that play of the right kind and recreation of the right kind, can have in this field of safety.

I just want to touch upon two or three points. Mr. Ott, in his able paper, mentioned that there were possibly 4,000 children killed annually from accidents. Unfortunately, we have to declare the number is very much higher. Last year we are told it was upwards of 7,000 in the United States.

Any of you who have seen my little exhibit downstairs, saw in the center of it on the background the sign "Save the Children" and then the figure "26,000 children killed in traffic accidents in the last eight years." Those are the official figures of the National Safety Council and the Metropolitan Company.

Now, you ought to have picked up, if you didn't, one of the little pamphlets, that were referred to by Mr. Ott, which were prepared jointly by the Council and our association. I had hundreds of those and the supply is gone, but you can get it by writing to our association in New York or to the National Safety Council in Chicago.

It is the last word on the subject of utilizing public safe playgrounds, as a safety measure.

Now, I will say this. We have to conceive of the possibilities of rightly directed play for the child as a life builder, as a builder of bodies, as a builder of nerve reserves, that will carry far as a safety protection for the child. In this age of strenuous living, in this age of dangers on every hand, we certainly need more and more of that thing—the building of bodies and nerve reserves in the children of America so that they can go through with their objectives in life.

Secondly, I am thinking of the special needs of workers today as never before. Probably in factory industries, the dominant thing is the universal use of automatic machines. But the man on the job doesn't get any exercise worth speaking of; he doesn't get any great satisfaction from doing the thing that he is doing, pushing a little lever automatically several thousand times a day. Now he has to get something off the job if he is going to continue as an efficient worker; if he, indeed, wants to go on with any kind of work, he has got to be revived and balanced up in his off hours, in that leisure that is being more and more provided today in the industrial field. He has got to be built up in order to be a safe worker on the job on each of the next days through the working year.

Safety Recreation for the Man Off the Job

One could discuss that for hours, of course. I am just touching the high lights.

The third point is this: The history of interest of employers in industry in the field of recreation will show that in the earlier days in America, the employer with any interest at all in that line, thought of putting up recreation facilities in the plant, possibly around the plant for his workers. The tendency in our experience, and from our observation from year to year, is that that is changing greatly. He is not lessening his interest in the possibilities of recreation as a protective measure from every point of view during the noon hour, and, therefore, providing facilities on the ground of the plant, but he is also (and this is the new tendency), taking that keen interest that was recommended to him, you will recollect, in the community's provision of recreation.

The man off the job has a whole lot of time. What is he going to do with it? The pleasure time problem, we are told by great authorities, is one of our great problems today. It depends partly on his own attitude, but it depends more largely on what the community is offering him in the way of a luring temptation in the way of recreation and there is a great field for employers in their various communities.

IRVIN OTT (Worden-Allen Co., Milwaukee, Wis.): I just want to say a word in defense of my address. I think the records will show, that while I quoted the number of children that had been killed and seriously injured in traffic accidents in the city of Chicago, when I quoted the national records, which I obtained from the National Safety Council, I mentioned that those were the children who were killed and seriously injured during play, not necessarily the total injured through traffic. I believe the records will show that.

GEORGE P. NEVITT (Paine Lumber Co., Oshkosh, Wis.): I just want to mention one point in defense of my being here. I am an industrial worker in the Paine Lumber Company and I think there is one point these men are missing in reference to industries. The National Safety Council tells us that 25 per cent of their accidents could be prevented by guarding and other devices in the plant. That means that 75 per cent of them are accidents that cannot be prevented except by creating an atmosphere and impressing the man with safety.

Now, that can be done just as effectively, if not more effectively, at home than it can be around the plant. Twenty-five per cent of our absences from the plant, approximately (I am not accurate on that figure), are through accidents at home. Now, that gives us a large field to work in and I feel that the outside safety propa-

ganda is really the most important and I feel is the only salvation for industrial safety.

That accounts for my being here because I put more importance on this field than I do on the purely industrial safety.

CHAIRMAN SCOTT: May we have a word from Mr. George Opp of Detroit? He is the dynamo of safety for the electrical industry.

GEORGE OPP: When I saw this item on the program this morning, immediately I questioned, "Why small communities?" or "big communities," because the same things apply in the larger communities that apply to the smaller.

In substantiation of that, let me say that through the directorship of C. E. Brauer, Commissioner of Recreation of Detroit, during the past summer, due to the intensive work carried on by that city, there has been but one fatal accident to a child in the vicinity of a playground, either on its way to or from that playground. If you stop to realize what that means you get the picture when you get the comparison that during the four months of school, earlier in the year, that figure was 16. You get the picture of what can be done through recreation facilities and planned recreation during the children's play period of the summertime.

CHAIRMAN SCOTT: I want to thank you for your interested attention and these speakers for giving such real contributions. I now declare the meeting adjourned.

ADJOURNMENT.

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Group Plant Safety Supervisors Session

Tuesday, September 27, 1927

LEWIS A. DeBLOIS, Chairman

National Bureau of Casualty & Surety Underwriters, New York City

The meeting convened at two-fifteen o'clock, Mr. Lewis A. DeBlois, National Bureau of Casualty & Surety Underwriters, New York City, chairman, presiding.

CHAIRMAN DeBLOIS: I am not going to take any of your time discussing the subject myself. We have four papers on the program, each one dealing with a different phase of the problem. Our speakers are all experienced men, experts in their line.

Our first paper bears the title, "How to Organize for Safety." It is to be given by Mr. Harvey Ellerd of Armour & Company. Mr. Ellerd has been with Armour & Company since 1903. He is now assistant vice president and assistant director of personnel. Before that he was assistant manager at Kansas City, and prior to that was in charge of industrial relations here in Chicago.

It gives me great pleasure to introduce Mr. Ellerd.

How to Organize for Safety

Harvey G. Ellerd, Department of Personnel, Armour & Company, Chicago, Ill.

There is one very nice thing about this subject and that is that further original thought on it is scarcely possible. Volumes have been written about it and every enthusiast for safety has at some time or other prepared a paper or delivered a speech about it. This naturally has saved me a lot of brain fag, as I see no necessity for attempting to puzzle out new ideas on a subject that has been so exhaustively exposed.

Another very nice thing about this paper is that your committee has definitely limited its length. I say that it is a nice thing from the standpoint of the audience, but I have found it most difficult to try to condense into 30 minutes material that would take many hours to peruse.

As I went through the great quantity of material that was handed to me on this subject it seemed to me that there were just as many varieties and styles of safety organization as there are of women's dress. However, as far as covering the subject is concerned, modern safety organization plans go much further than the present trend in women's clothing. Beginning with very small and rather feeble attempts at organization for the promotion of safety work, we now find elaborate, complete, detailed methods of organizing that apparently are getting very splendid results.

It goes without saying, that the very purpose of organizing for safety is to stimulate in the worker the practice of thoughtfulness while at his work, thoughtfulness for his own and his fellow worker's safety.

You safety experts know, and you have had it proven to you by statistics at every one of these safety conferences, that mere mechanical safeguarding does not prevent all the accidents; in fact, I have read recently from some authoritative source the statement that the possibilities of accident prevention work through mechanical safeguarding are actually limited to about 25 or 30 per cent of the total number of accidents. The rest are caused by thoughtlessness on somebody's part, either the injured man or his associates, and the question immediately arises how can we stimulate his thinking to the point where safety is an ever present idea.

I have long felt that the term "Safety First" was not well chosen because I do not believe that in the mind of the man at work safety is the first thought or consideration. I have to confess that it is not with me when I am trying to accomplish anything. I believe that it is merely one of the considerations that we should have in mind in the doing of any job. If I want to get a certain piece of work done, my primary thought is to do it in the quickest and best way consistent with the accomplishment that I am trying to achieve; and then my inclination is to add the qualification that of course I want to do it with safety to myself and others. But I do not believe any of us start out on any business or work on the premise that safety is our first consideration. Therefore, I think it has been a mistake with many of us in the past to try to get the workman to consider safety as the first and most important consideration of his job. In doing this, we have actually cheapened the idea of safety. Our whole objective should be to get him to do his work and constantly keep safety in mind simply as one of the primary requisites of his job. The best method of doing this and of inculcating in him the safety habit as a regular part of his procedure seems to be through organization.

The Best Idea in Safety Organization

Many years ago, some smart safety man said: "Let's put the workmen on a committee that will make inspections of the place of work, and by the very act of doing this they will be thinking about safety; and when they are seen by their fellow workers they will be reminded that the Safety Committee is trying to find out ways of preventing accidents." This is probably the best idea that ever has been put forward for the promotion of safety, and while it is fresh and new and carried along by the enthusiasm of somebody in the management who is thoroughly sold on it, it goes forward with a great impetus. Unfortunately, however, the plant gets unusually busy and the workers are needed on their own regular jobs every minute of the time, and the management says that temporarily we will have to suspend our safety organization and safety committee work, and pretty soon the suspension becomes a regular order of business. I think if we are frank with each other, we will all admit that we have seen this sort of performance time and again.

Then along comes a serious accident or some evangelist on safety hits the plant again, then activities are resumed. I suppose this cycle will always be at work in industrial establishments, but it does seem too bad that so valuable a thing as safety organization, especially as represented through safety committees, cannot be established on a permanent basis.

One of the most substantial and most material evidences of the financial value of safety organization work is that insurance companies who handle Workmen's Compensation and Liability insurance allow substantial credits for a safety organization that is conducted along standard lines, and by standards they mean regular inspections, regular meetings, regular reports of such meet-

ings, and the definite evidence of activity on the part of safety organization. The discount allowed by these insurance companies from their manual rates proves conclusively that from a mathematical computation of experience, those plants which are organized along standard lines for safety will have a better experience and a lower loss ratio than those which are not so organized.

The safety committee in itself was one of the earliest and most successful attempts at organization. Through its efforts the message of safety is brought to employees through meetings. This is a very effective means in educating a worker for his and his fellow worker's safety.

We have had reports come into our office of serious accidents, and in discussing them we have asked our foremen and superintendents what can be done to prevent an accident of that sort; and it is surprising how many times the answer that you get is, "It is simply a matter of education." Then having this very simple answer, it should be a very easy matter to go out and educate. We have so often heard it said, that when you once know what the trouble is, it is comparatively easy to correct it; but don't let anyone tell you that it is easy to educate—it is the most vexing, most exasperating proposition in the world, to try to get people to use their heads to avoid hurting themselves. It should be a human instinct to avoid injury, but sometimes we are inclined to believe that people will go out of their way to put themselves in danger. Of course, this is exaggerated, but at any rate, they are guilty of moments of thoughtlessness and an injury is apt to result.

The Bulletin Board-Is Indispensable

The meeting with employees carries the spoken word to their ears. This is its place and its effect but we have to go further, and the next step is the appeal to the worker for thoughtfulness through what he sees.

The bulletin board, with its attention-arresting, sometimes terrifying, pictures and cartoons is exceedingly effective, and I do not believe that any of us would be without them. The constant reiteration of these self evident truths, illustrated with horrible examples or with pictures that appeal to the self interest of the individual are bound to be productive of some results. To what extent they are effective will never be known, but they are a factor in the general problem of organizing for safety.

Another means of working this out is the plant newspaper, and I want to say that we have the greatest confidence in the message that we are continually putting over to our people through our plant newspapers. The great advantage of the paper, which, in our own particular case at Armour and Company, is issued every second week, is that it goes into the home and the message of safety is carried back to the worker from the members of his family. I feel that it is made more impressive in that way.

Another effective means of making the worker think for safety is the safety campaign or the no-accident campaign. These are run in countless ways. In our company, we have now established a practice of running a two weeks "No-Accident" campaign during the early spring and a similar campaign during the late fall. You may be interested in some of the details of this arrangement and in some of its results.

As many of you are aware, the plants of Armour and Company operate under a plan of Employee Representation. Employees elect, from among their own numbers by secret ballot, men to represent them. The management appoints representatives. These men meet and deal with all problems of mutual interest. They settle such subjects as hours of labor, rates of pay, working conditions, health and sanitation, waste elimination and accident prevention, and all other matters that have to do with the relationship between the rank and file of the workers and the management.

One of the major activities of the Armour Plan of Employee Representation is safety and accident prevention. In each plant, there is a committee appointed to handle this work. It is composed of equal numbers of elected representatives and appointed representatives. In Chicago, our largest plant, the committee is at present made up as follows:

An hourly paid mechanic, who is an elected representative who has shown a special interest in safeguards and in the general subject of safety.

A highly skilled butcher, who is a veteran in the service of the company, and who is an enthusiast for safety.

These two men were selected for this committee by the entire group of elected representatives. They have every qualification for doing effective safety work. The two management members on the committee are the safety inspector of the plant and one of the department superintendents. I merely cite the personnel of this committee as a sample of our type of committeemen. This safety committee, and likewise the safety committees in other plants, make regular plant inspections; examine all accident reports, attempt to ascertain the real cause of the accident and to prevent its recurrence. These committees meet once a week for these purposes. Their reports are sent to the general superintendent of the plant, who puts into execution their recommendations. If he finds them impractical he gives the committee his reasons, whereupon an effort is made to meet the situation in some more practical way. A report of all the activities of the safety committee is made at the regular monthly meeting of the Conference Board, which comprises all the representatives.

No-Accident Campaigns Two Weeks Long

The semi-annual "No-Accident" campaigns are conducted under the auspices of the safety committee and with the cooperation of the entire group of elected and appointed representatives. Our "No-Accident" campaigns are now conducted for a period of two weeks. Each plant is in competition for first place in the campaign. We take into consideration only the frequency of accidents in relation to the number of people employed. There might be some question raised that severity should also be included, but after experimenting in various ways, we have come to the conclusion that any accident requiring the attention of our doctor is potentially a lost time accident and therefore should be charged against the plant in which it occurs.

From time to time, we have used various means of arousing the interest of the employees in the "No-Accident" campaign. The one which was recently concluded may be of interest to you. On the Saturday before the campaign started, a button was distributed to each employee. This button had on it the message "Let's work safely," also a picture of an Armour Star Ham. It also carried a serial number. As these buttons were passed out to the employees each name was recorded on a slip with the number. On the day that the campaign opened the safety committee in a secret session drew out of a box 25 numbers, each of which would win an Armour Star Ham under a certain condition. This condition was that the holder of that number must be wearing his button conspicuously displayed on his working clothes every day during the "No-Accident" campaign. This fact is ascertained by some member of the safety committee going around the department to see whether or not he has on his button. Of course, the person whose number has been drawn does not know it until after the campaign is over, and in this way, all have an incentive to wear their buttons at least during the campaign.

This is simply a bally-hoo stunt to have an item of continued interest at all times during the campaign. When a member of the safety committee is going through a department, each employee wonders whether he is the lucky one and he makes a great effort to see that the safety committee member sees the

button. At the end of the time the numbers who have continuously worn their buttons during the campaign are awarded hams, and the names of those who had been drawn out in the beginning but who failed to wear their buttons are published and there is a great deal of fun over this fact.

Of course, this particular thing has nothing to do with safety, but it gets a lot of people talking about the "No-Accident" campaign and about the safety prizes as they are called.

Each noon, during the two weeks, a meeting is held at a different point in the plant. To draw the crowd, entertainment of various sorts is provided. It is all voluntary entertainment put on by employees, and it is of every variety, bagpipes, whistling, cornets. Charleston dancing, real Indians doing their dance, singing, banjo playing, in fact, nearly everything in the entertainment line, and some of it is very good.

This idea is simply carrying out the old medicine show principle of drawing a crowd and selling them something. After the entertainment has gone far enough to have the crowd interested, some member of the safety committee makes a five minute talk on the subject of safety.

Foremen and Department Executives Have a Club

We believe that this sort of campaign, coming as it does twice each year, is one of the most effective ways of awakening and reviving interest in accident prevention, and we are thoroughly sold on the idea. Of course, we have to devise new and novel stunts from time to time to maintain the interest.

It is our belief that the chief responsibility for safety rests with the supervisory organization, and it is our custom to hold our department superintendents and foremen rather strictly accountable for accidents occurring in their departments. In order to impress them collectively with this responsibility, safety is a subject that is discussed at the foremen's meetings, and their responsibilities are outlined to them by the executives in charge.

Our foremen and department superintendents have a club known as the Armour Plant Executives Club. This organization grew and developed from safety meetings with the foremen, and safety is still one of the predominant factors in the club operation. For many years we had the custom of holding an annual safety dinner for foremen. At these dinners various executives addressed the foremen on the subject of safety. The experiences for the year were thoroughly reviewed by the people in charge of claims and the foremen were exhorted to greater efforts for accident prevention during the ensuing year.

After one of these meetings, some eight years ago, it was suggested that the next meeting be turned over to the foremen themselves and that they should select their own chairman and their own speakers. There was a committee appointed to work this out, and the following meeting was one of the most interesting that ever had been held. There were five papers presented by the foremen on the subject of safety, and these indicated clearly that great thought and study had been given to their preparation.

As a result of the success of this meeting the Armour Plant Executives Club was formed, and it is now the outstanding organization in the plant. As I said previously, its fundamental consideration is safety and it promotes this work through its membership, which is comprised of the supervisory organization.

There is just one other point that I want to touch on in organizing for safety, and that is the success that we have had in the use of safety inspectors. In our plants which are large enough, a safety inspector has been selected from the ranks and he gives full time to the handling of safety work. I won't go into the qualifications of such a man any more than to say that he must be a regular fellow, able to command the respect of both the supervisors and the workers. He must have patience, enthusiasm, perseverance, and a great quantity

of that much abused qualification politely termed "intestinal fortitude." He must be a leader and must be able to sell safety to both management and men and break down the barrier of old time employees who are opposed to new ideas and who are prone to think that safety is a fad.

He should be able to speak with force and conviction, and to be the inspiration of the entire safety movement in the plant. Such men are rare, but we have been particularly fortunate in our selections in securing men who have done a very effective job for us. They have in each case been men already employed in our plants, usually in some branch of the maintenance division, and we have developed them as safety inspectors with very satisfactory results. They not only know the plant and know our foremen and workmen, but they are able to correct dangerous conditions themselves by devising safeguards which are effective and at the same time practical. With a little coaching and practice these men have become rather convincing speakers and are able to address employees effectively.

The Goal Beyond Organization

This has been a rather sketchy review of some of the activities that have proven of value in our own case in organizing for safety. I do not imagine for a moment that there is anything new or original about them, in fact, we probably started all of them on the strength of some one else's experience.

We are thoroughly convinced that a safe plant with safe working conditions is only a start toward the solution of the problem of preventing accidents. The only way that the greatest accomplishment can be secured in this work is through safe workmen. We are further convinced that the problem of making the workmen safe is one of organization. It is a matter of eternal vigilance and of constant organizing effort. The impulse may at times be toward too much organization work, with the result that the movement becomes too blatant and in the minds of the workmen is apt to lack sincerity. We are trying to avoid this possibility in our own case.

We are trying hard, through our organizing efforts as I have outlined them, to impress our people with the idea that thoughtfulness is the only price that they have to pay for their own safety, and that one of the vital considerations in the daily performance of their work is the ever present thought; not only "Am I doing this job the quickest and the best way at the lowest cost, with a maximum of quality production; but, am I doing it in a way that will avoid injury to me and those around me?" If we are ever able to get to that point we will feel that we have accomplished wonders, but it is a problem of ever continuing organization and education. It is not one of those things that you can do once and then leave with a satisfied feeling of accomplishment. It will always be a case of eternal vigilance and ever continuing effort.

CHAIRMAN DEBLOIS: Gentlemen, we have five minutes for the discussion of Mr. Ellerd's very excellent paper. I am sure you have questions to ask him.

MR. COLE (U. S. Gypsum Co.): I would like to ask if the Armour Company are self-insured?

MR. ELLERDS: Yes, they are.

MR. COLE: In all operations?

MR. ELLERD: Yes.

MR. COLE: Just how far do you go in the matter of strict enforcement or policing responsibility? I don't want to talk in generalities, but I want to know. It is a problem we have had come up, and I would like to have a few words from you.

MR. ELLERD: I presume you mean disciplinary measures. I think that has to be left as a very common-sense proposition. Discipline must be exercised and men must obey certain rules. When they go beyond a reasonable limit, there is only one thing to do and that is to get rid of them.

I don't know whether I have spoken on your question exactly. It is one on which you could speak at great length. But we have been rather strict in a good many of our rulings. Where we have established a standard safety practice, we have insisted it be followed out.

MR. COLE: That answers part of it. We all talk of selling safety. I might say that our company has come to regard the salesman end of it rather as you spoke of it, as all balleyhoo; but just how much weight do you put on it in comparison with holding accountable the men who are controlling the situation? I am trying to get an idea as to how far you go on your selling and where you draw the line.

MR. ELLERD: You can see that we have two weeks out of the year where we put on a balleyhoo stunt, where we try to arouse their thinking through some novelty and some competition. In the remaining 50 weeks of the year we use the other methods, the bulletin boards and plant paper and disciplinary methods. The balleyhoo does arouse some thinking on the subject of safety. I think it has a place, but not an especially weighty place. You can do only a certain amount with it.

Sometimes I think of safety from that side of it as I do of religion. Every once in a while you have to have a revival, with an evangelist around. Then everybody gets religious and gets back into the fold.

MR. MCCLELLAND (Armour & Co., Chicago): I might state that Mr. Ellerd overlooked an answer to your question, which is that a statement goes out monthly which shows the number of men working, the number of accidents and the percentage compared to the rest of the departments in the plant. Therefore, the department superintendent or head of the plant knows how many accidents have occurred in his department. If it runs too high in actual percentage, he is bound to hear from the superintendent.

R. B. KELLEY (Anaconda Copper Mining Company): What do you do in connection with foremen not trying to prevent accidents?

MR. ELLERD: I don't believe I could lay down a general principle. I don't believe there is any specific line or rule. I think each individual case would be considered on its own basis of fact. I think we would have to determine whether a foreman was really negligent. If he were, I think we would use severe measures.

We try to hold the foreman accountable. We let him know that it is his responsibility to prevent accidents wherever possible.

CHAIRMAN DEBLOIS: We will have to give each speaker his allotted time. If there is any time left when we get through with the papers, we will have a general discussion on the whole subject.

Our next paper is going to be given to you by an "old war horse," Henry Reninger. I don't know exactly what he is in his own company, the Lehigh Portland Cement Company, but he seems to run a large part of the safety work of the entire cement industry. He is vice president in charge of industrial safety for the National Safety Council.

Securing the Cooperation of the Plant Management

Henry A. Reninger, Lehigh Portland Cement Company, Allentown, Pa.

There are many different ways of securing the cooperation of plant management just as there are many ways of getting from New York to Chicago. It is a matter of deciding which is the best way, the safest and quickest. The same thing applies to interesting management. The situation must be studied carefully. Many times I have been asked—How do you interest this concern and that concern in the National Safety Council? What did you do? How did you do it? The only answer I can make is, to find out the type of man I must do business with and then make up my plan accordingly.

In the large organizations there is no use of trying to put safety into the plant until you have the executives of the company sold absolutely to the safety idea, for until the official order comes from headquarters to the plant management authorizing safety you cannot get anywhere, no matter if the manager or superintendent himself believes in safety. He will not go ahead with it wholeheartedly unless he knows he has the backing of the officials. It has always been my endeavor to get executives and officials interested in safety work from the humanitarian side. However, when this fails the only thing that is left to do is to show them actual facts and figures as to what it means in dollars and cents. We cannot forget that in both large and small organizations, management is at the head of the organization. They spend money to produce money for its stockholders and owners—and we cannot blame them entirely if they cannot see the value of safety when presented to them from the standpoint of theory and sentiment. Manufacturing conditions and costs have reached the point where they feel that their entire effort must be put into production. Therefore if the humanitarian side does not appeal we must endeavor to show them that safety will help them in production and in cost.

Every executive, no matter how busy or how hardboiled he may be, is interested in his employees to some extent. Today, with the great industrial organizations we have throughout the country, the executives do not come into personal contact with the employees as they did years ago when the plants were small. Therefore the personal contact between men had been lost, but today I believe that the safety movement has brought back the personal contact between men and management and the organizations that are doing real honest safety work are reaping the whole benefit. In our own organization our executives believed in safety, but like many other executives of the big corporations they did not have time to go into the detail work or visit the 20 plants throughout the United States. However, the vice-president and operating manager (whose personal contact and experience with his men made him see the value of it) backed up the safety movement from the very beginning, and it was his wholehearted cooperation with the department that has made our work so successful.

Plant Executives Became Thoroughly Sold

In the beginning our executives went along and were willing to grant any requests made, but after two or three years, when they began to see the results and figures in accident reduction and had a chance to attend some of the safety meetings of the National Safety Congress, they came out wholeheartedly and in the strongest language on behalf of safety.

At the Buffalo Congress our president came out wholeheartedly for safety when he made the statement at a Sectional meeting, as follows:

"Safety work improves efficiency. Nothing has ever been introduced into cement plants which has touched the hearts and spirits of the employees as has the interest of the management in their physical welfare. The work of the Safety Committee, the prizes for good records, the rivalry between plants for the least number of days lost, brings about an *esprit de corps* which could not otherwise be developed. In my opinion as an executive, safety work has become as necessary and essential to the successful operation of a cement mill as a boiler house or laboratory."

Superintendents and foremen are just as much responsible for the safety of their men as they are for production. When once we can get the executives of industry to make such statements to their organization, how can any plant management or superintendent fail to cooperate in this great work when he is held responsible absolutely for safety and production?

I worked out a report several weeks ago which I showed to the president of our company as to the number of men employed, pointing out to him that in our organization, of which he is the responsible head, he had over 6,700 children under

16 years of age that were dependent upon him in many ways for support and education.

A report such as this made a great impression and brought out very clearly the great responsibility that rests upon the president and other executives of corporations.

I do not think I have ever worked out any report for our executives which seemed to affect them so much as the report showing the number of married men and the number of children in our organization under 16. After going over it very carefully, one of them made the remark, "I never realized before that I, as president of this company, am responsible for the education and the raising of 6,700 children. My family is a great army and I can see where this company must carry on its safety work if that responsibility is resting on my shoulders."

Managers Want to Eliminate Waste

Any efficient manager is easily approached when you can show him that he can eliminate accidents—which means the elimination of waste; that by the reduction of accidents he can reduce his cost of manufacture; by preventing accidents through the efforts of the Safety Committee he can instill a better relationship between himself and his men; that carelessness in the matter of safety by foremen and men indicates the same thing in production, and if it is possible to change the mental attitude of the men from wastefulness and carelessness and instill in them the desire for cleanliness and good housekeeping, then you have reached a point that means increased production.

The attitude of the plant management in the organization of the Safety Committee and their attendance at the meetings will be reflected in the foremen and the men. Placing direct responsibility upon the foreman for his machinery, good housekeeping, cleanliness, and fire prevention, will make him keep his department in such a condition that the men will like to work there.

When departments are once kept in such a condition, then safety has reached a point where all intelligent workmen will realize that the company is interested in their welfare and they will begin to cooperate in any safety program presented. A safe, clean plant makes labor therein more pleasant and means that men will remain on their jobs; steady, satisfied workmen, plus accident reduction, means less labor turnover. If you can show any manager that through safety work he can reduce labor turnover, you have a hold on him. Every manager is interested in a productive organization and improved leadership; and where is there a better opportunity to train your men for leadership than with a good safety organization?

I find a great many of our safety men (safety engineers as they are often called) discouraged, because after spending six months on the job they cannot see any great improvement. Let me say here that the man who becomes discouraged at the end of six months, a year or two years, has not become imbued with the real safety spirit. Safety work cannot be established in any organization on a firm basis in six months or a year or two years, and when I say that I refer to conditions as we see them. In a great many organizations when the slump comes, what happens? In nine out of ten cases when curtailment takes place, the safety department is the first hit. If that is the case safety has not been placed on a firm foundation. This should be the very last department to be touched. In too many cases we find a safety engineer in a position where he is called a necessary evil. I have heard some superintendents express it in that way. It makes the situation for the engineer and the superintendent one which is not at all satisfactory. It is only when the safety engineer and the manager are working absolutely hand in hand and where safety is an operating problem, that we can feel we are getting to a point where neither one will be able to do without the other.

In the large organization the safety department should hold the same place that

is held by other departments and should cooperate with every department, cooperating in every way with the plant management furnishing them with all the information possible on safety problems and make them realize their responsibility. Plant management is continually harassed by details of production which many times the safety department is not familiar with. No matter what authority the safety department may have in the plant, it should never take advantage of iron-bound rules and regulations, but when the various problems come up they should be freely discussed with the management at the plant so that both sides of any question are fully understood and each may cooperate with the other to work out a solution.

We are all creatures of habit, and what we must endeavor to do is to educate our people to the safety habit. Slow work, to be sure, but once we get them in the habit of safety we have reached that point where we can feel we have attained our goal. Clear, concise reports of work accomplished through safety, as to the cost of production, labor turnover and reduction in frequency and severity of accidents, must be kept before the plant managers. Results are what management wants, and when these can be definitely shown, then we have the full support of the plant manager.

Safety work has been the entering wedge that has removed the old spirit of aloofness between employer and employee, which so often leads to disastrous results. With the idea of safety and the safety committee for better industrial relations we have produced a feeling of friendliness that has brought forth a closer understanding between men and management. It has saved the industrial situation from its sinister labor aspects and makes men feel that management, foremen and men are all brothers in industry, each working side by side with the others, and all putting forth their efforts to produce and to secure for themselves those things which rightfully belong to them, viz: a home, and in that home a family and children who, through their efforts, may receive the education and blessings to which they are entitled in this great country of ours.

Safety has removed the barrier the old country was so familiar with, that of slave and master. It has brought them together as fellow-men with the rights and privileges granted them under our constitution.

Awards For the Best Safety Records

CHAIRMAN DEBLOIS: Major Reninger has turned our thanks and five minutes more time for discussion. You see, I am running the meeting on your schedule as I can. The floor is open for discussion.

E. A. STAMP (Swift & Co., Chicago): I would suggest that if Mr. Reninger's paper is going to be published in pamphlet form, a copy be sent to every member in the meeting.

CHAIRMAN DEBLOIS: I will be very glad to refer that to the officers of the Council. Of course it will be published in the transactions. Some papers are separately printed. Are there any questions?

MR. COLES (Wyman-Gorman Company): I would like to ask the speaker what he does in the way of awarding prizes for a good record? I think he made some reference to that.

MR. RENINGER: For seven years we have conducted a No-Accident Campaign in June. Each year we award a small prize to the plant going through the month of June. The first year we awarded cups, and it was necessary to furnish five cups. The following year we awarded a large American flag. We did that at the suggestion of two safety committees.

Other awards consist of a big safety flag of our own design. At the last campaign in June 1927 we awarded an additional safety flag, seven by fourteen, to the mills that went through most of June without a lost time action. We have 20 mills and we furnished 20 flags.

At the end of the year we have a permanent safety trophy that goes to the mill which makes the best record in accident prevention. By that I mean days lost per 100 man-hours. As figured out originally, the idea was that the trophy should go to the mill and they would retain it for a year; any mill that won it twice would retain it permanently. I am glad to say that this contest has been going on for ten years now, and this year I have to buy a new trophy. It was designed by Gorham Company of New York, the silversmiths, and it is quite a beautiful trophy.

In addition to that, in the cement industry, as you may know, the Portland Cement Association awards a trophy to the mill making the best record in accident prevention in the United States or Canada. That is a beautiful, concrete trophy standing about eight feet high and three and one-half feet across, with a design on it which was worked out by an artist. There was a contest held in the United States about six years ago with prizes of \$1,000, \$500 and \$250 for the best design.

In addition to that, two men from the plant winning the prize attend the Portland Cement Association meeting to receive it, with all expenses paid. The meeting may be held in New York, San Francisco, or anywhere in the United States, but two of the men attend it. This does not include the superintendent. They are selected by the safety committee.

The mill making the best record for the year and winning the Lehigh trophy also sends two men to the National Safety Congress. We have one plant that has sent four men to New York to win the Association trophy and eight men to the National Safety Congress in the last ten years.

I am not a great believer in money; I never have been. We found out that a cup or a flag or some trophy of that sort works out a great deal better. What we have done for those mills in outlying districts where they can't very well get to a safety meeting or a local contest meeting, is to send them \$100 for a dinner.

When those checks are sent to every safety committee at the end of the year, I have often wondered what they did with them, because the minutes that I get don't always show a dinner. I found that one plant, two years ago after that disaster in Southern Illinois from wind storm, turned the \$100 over to a Red Cross contribution. I know one mill which for the past four years has turned over its check to the nurse to buy layettes for new-born children of the employees. I find that most of the money sent to the men for dinners has been used in one way or another for the benefit of their own employees.

CHAIRMAN DEBLOIS: The third paper this afternoon is entitled, "Interchange of Plant Experiences." It is to be given by Mr. H. G. Hensel, who has charge of the safety work in the Western Division of the Youngstown Sheet & Tube Company. We have had as speakers, first, a mining industry man and then a cement man; we now have a steel man. Mr. Hensel has had much experience in steel safety work and he has been with two other steel companies—the West and Tube Company of America and the Inland Steel Company. I take great pleasure in introducing him to you.

Interchange of Plant Experiences

H. G. Hensel, Safety Director, The Youngstown Sheet & Tube Company,
Chicago, Illinois

I assume that all here are agreed that the value of having a safety supervisor of a group of plants or mines is to provide a means for quick exchange of safety ideas and accident records between the various operations.

There must first be some designated person at each operation, and preferably a safety inspector, to whom items for exchange can be sent. This person should be trained to send such items to the party at that operation who is most likely to be interested, and this same safety inspector should be on the alert for items

and records which he thinks will be of interest and value to other plants and mines of the company. In my work the various items interchanged between works and mines are as follows:

Monthly Accident Records—

Each safety inspector is advised as to how his monthly accident record compares with the records of other works and mines of our company. This is done on several bases. First, we have the accident record on a dollar and cent basis wherein we compare the accident cost per \$100 payroll, accident cost per ton and accident cost per man. We also make comparison of accident frequency and accident severity.

Reports of Serious Accidents—

A report of a serious accident is quickly passed on by my office to each safety inspector in the district so that he may use this record of an accident in preventing a similar occurrence at his works. He very often passes these reports on to department heads and foremen in a similar department at his works, and I have no doubt but what the exchange of these reports assists us many times in heading off a similar occurrence in another works.

Safety Devices and Safe and Unsafe Practices—

Through the medium of a safety supervisor's office, the various works and mines can be easily advised of any new safety device that has just been investigated and the value of it can be clearly explained to the plants where it is needed. We are engaged in a drive against unsafe practices, and in fighting unsafe practices it is also a fact that we must devise and put into effect safe practices. A record of these safe and unsafe practices is passed along to the various safety inspectors so that they can secure from such lists any items that will apply to their operation.

When There Seems to Be a Let-up in Interest

Safety Supervisors Assisting Safety Inspectors—

Many times our accident records show us that a certain department in a certain works is apparently letting up on their drive to prevent accidents and it is certainly the safety supervisor's duty to step in at such a time and assist the local safety inspector in bringing such a department back into line. It may require a talk with the manager of that operation to determine just what is wrong, and I have never talked with a plant manager about the poor accident record of any certain department without hearing from him almost instantly that the production record of that department has also slipped, which indicates more and more to us that production and safety go hand in hand. It seems to be an almost unbroken rule that when a department head, for any reason, begins to be lax in his attitude toward the safety movement, his production is also suffering.

Keeping Up Interest in Accident Prevention—

It is certainly one of the duties of the safety supervisor to assist the local safety inspector in providing new means and stunts for keeping up interest in the accident prevention movement. We find that we secure great help along this line from the various publications issued by the National Safety Council and by many companies who issue safety bulletins. I have found that within the past two years our safety bulletin, issued for the use of superintendents and foremen to be used at safety meetings of the men, has helped our work considerably. These bulletins give the foremen items of interest to take up at their safety meetings for the men and they also tell them of the kind of an accident record their department and their plant is making as compared with other departments and other plants.

Keeping Up "Pep" in the Organization—

The safety supervisor must keep his organization, which no doubt consists of one or more men at each works or mine, "pepped" up in the accident prevention work, and even though the best of records is not made every month, it is the duty of the safety supervisor to keep his organization working for better records and have them carry the right feeling towards the movement at all times so that they in turn, in their contact with heads of departments, foremen and men, can impart to them to some extent the necessary amount of "pep" and enthusiasm to put the work over and make the results what they should be.

We have tried out one scheme which seems to stimulate interest in the accident prevention work and that is urging workmen to talk at safety meetings. Our meetings of the men are held by the foremen, and at a great many of them a representative of the safety department is present, although not always; but we found that interest in the meetings was lacking somewhat and that the workmen felt that they had no part in them. One of our foremen hit upon the plan of asking a certain workman to talk at the next meeting on any subject of safety that he desired, and this fellow, much to our surprise, prepared a fine talk on the subject. We had never known that he was so well sold on safety, but he certainly covered the subject well, and we found that his fellow workmen were very much interested in what he had to say and his talk brought forth favorable comment from them.

Men Who Talk Safety Are Deeply Interested

That one instance started the ball rolling and we have tried it in many departments and find that men are glad to take part in these meetings and it certainly has a good effect. We feel that when a man gets on his feet and expresses himself as being much interested in safety and calls attention to unsafe practices which his fellow workmen should avoid, that he will naturally go back on the job and practice what he has preached. He will also feel that his fellow workmen are watching him and he will likewise watch them. It will also keep him thinking safety and he will be on the alert to prevent accidents.

We find that workmen, in talking at these meetings, have been more observant of articles printed on the subject of safety than we ever supposed. They frequently quote some newspaper and magazine articles, and this shows that they are deeply interested in the subject and are following it up.

It is necessary in some departments to schedule the meetings of the workmen which the foremen hold. While it is a general rule in our plant that each foreman hold at least two meetings a month of his men, still we find that unless these meetings are scheduled for a certain date or time the foreman is very apt to neglect to hold these meetings, but when he has a schedule before him he usually lives up to it the same as he does his working schedule.

It is at these meetings of workmen held by foremen that you can drive home to the men the cause of the accidents that have occurred in that works, mine or department, and time should be taken to go into the causes of some of these accidents in detail.

It is also well, at such meetings, to let it be known what discipline is used for the violation of safety rules. There are certain cases, from time to time, where the management feels it is necessary to use discipline, not only as to a workman but as to foremen, and we find it does no harm to broadcast that discipline has been used. In every case that we have mentioned in our meetings the men always comment on this and say that the right action was taken by the company in view of the circumstances surrounding the occasion for it.

It seems imperative to me that an arrangement for the interchange of plant accident experiences be in effect in the small organization as well as in the

large, the same as an interchange of operating experiences to make any organization as efficient as it should be. I fully believe that being forewarned is being forearmed, and we certainly should profit by the experiences in one department to prevent the occurrence of a similar accident in another department or another works and not allow these warnings to go unheeded.

As many of you know, safety bulletins are issued by many companies in this country and I know that I find it to be of great advantage to be on the mailing list to receive these various bulletins, as many times they have records of accidents that we can use to advantage in our plant in preventing such occurrence there.

I cannot urge too strongly the interchange of plant experiences between the various plants of any organization, no matter how small or large the plant may be.

100 Group Safety Supervisors Were Present

CHAIRMAN DEBLOIS: Gentlemen, this was another very excellent paper. Before we start the discussion, I want to satisfy my own curiosity. I would like every man here in the room who is a salaried safety man having charge of more than one plant, that is, having more than one plant under his jurisdiction, in other words, any man who is really a group safety man, to raise his hand.

(About a third of the men present raised their hands.)

I estimate at least a third. We have about 300 men present. It means we have 100 group safety supervisors, or very close to it.

E. R. LAWLER: (U. S. Rubber Co., Hartford, Conn.): I would like to ask if these meetings of the employees are held during working hours or after and if you pay the employees for the time spent on the meetings.

MR. HENSEL: The meetings are all held on the company's time. They are held during working hours, and I might add the time most advantageous to that department is selected. We, of course, don't go in and ask a department where there can be no shut-down to let us have all their men at any one time, but we see to it that in those departments where the men cannot all be spared at once, they are in a meeting twice a month. Those meetings are held at various times; in some departments we have to have from four to six meetings to get all their men in.

R. B. KELLY (Anaconda Copper Mining Co.): What has been your experience in the use of posters? How do you use them? Have you any program?

MR. HENSEL: I presume you refer to the National Safety Council posters.

MR. KELLY: Yes.

MR. HENSEL: I might say that my own way of handling that is to allow the safety inspector from each organization to select the posters from the NATIONAL SAFETY NEWS each month and I supervise it by having his order sent to me to see that he is ordering what I think best fits his operation; although I think each man on the job perhaps knows as well as, perhaps better, than I what really answers his purpose.

These posters are placed about the plant, some on bulletin boards outside where they have to be covered with glass, others on open faced boards on the inside of mill buildings.

A. F. GRIGGS (Walworth Co., Kewanee, Ill.): I would like to ask the speaker what he thinks of what they call "humorous bulletins," that is, the cartoons:

MR. HENSEL: I think the so-called humorous bulletins have a place in safety, but I do not like to see the use too general. I don't think safety is anything we can make light of. I think a humorous subject can be handled right, however; and it is by a number of organizations that issue their own posters. I think we have to use great care in getting up such a poster. We often see examples which we

would not care to use. I think you have to leave it up to the judgment of the plant safety supervisor.

L. H. BRUNO (Chicago Brick Exchange, Chicago, Ill.): What means do you take of reporting accidents, in many cases minor accidents, that might develop into serious accidents? What means do you take of having those reported to your office? Sometimes a man might be injured and let it go two or three days until it developed into a serious matter. You would be uncertain whether the accident had happened in the plant or at home when he was splitting kindling wood.

MR. HENSEL: I might answer that in two or three ways. I might say first of all that every accident reported to our first aid room for treatment is also reported to our safety department and to my office.

If you ask whether we exchange between plants a record of accidents which perhaps are not very serious but may have been serious, I may say that if we see a case we would call a very "near-serious accident," we write it up in a special accident letter. If the accident is of a trivial nature, it is not exchanged between various plants.

CHAIRMAN DEBLOIS: I want to take this opportunity to make a comment on the so-called minor accidents.

I wonder if you realize how much there is to be learned from the minor accident. Now what really happened, a good many years ago in this country was, that we more or less arbitrarily drew a line across the center of our accident experience and said, all above the line is reportable and on it we will base our frequency and severity rates; all the experience below the line is a good thing to keep a record of and to draw some general lesson from, but we won't base any rates upon it.

Stressing the Importance of Minor Accidents

I do not wish to question the policy of doing this at the time, but I now think what we did was practically to throw overboard a lot of exceedingly valuable experience. Small plants—relatively small plants, employing under 100 men—do not have enough accident experience in a year to give them a credible frequency rate and, much less, a credible severity rate. By this I mean that the rates are subject to such violent fluctuations, particularly the severity rate, that in a small plant even after years of experience no one can tell whether it really has a good rate or a poor rate. It may have had a run of bad accidents, but it is possible to tell whether they represent the normal conditions or a chance distribution.

One of the best accident statisticians in the country, Dr. Chaney of the U. S. Bureau of Labor Statistics, when he compiles the rates of the entire steel industry, employing thousands of men, is not satisfied to publish in his charts the rates based on the experience of single years; his charts are based on a three-years moving average.

Now, if we knew more about our minor accidents, gentlemen, we would know more about the accident trend of the small plants. Our accident rates would have a higher credibility, if we draw the division line at a lower level. I just want to leave this thought with you. Don't neglect your minor accident records.

L. G. HADLEY (Utah Copper Co.): May I refer Mr. Hansel back to his method of conducting his departmental form of safety meetings? Did I understand him to say the foremen conduct the meeting every two weeks and use the entire force for their audience for those meetings? What is the duration of those meetings?

MR. HENSEL: The meetings do not always contain all the men in the department. There may be certain departments where we cannot spare all the men at one time, but those men who are not brought in the first day are brought in the next day to a second meeting.

As to duration, the meetings run from 15 to 20 minutes and sometimes a little beyond.

E. A. SMITH (Titanium Pigment Co., Carondelet, Mo.): I understood Mr. Hensel to say something about assessing a penalty of some kind for accidents. What is that penalty?

MR. HENSEL: I think I mentioned discipline, if that is the question. Our people do, as the speaker before me said, use discipline and it is put up to the plant management as to where and how it shall be used. You certainly do have to use common sense as to whether a man is to be called in and talked to on a matter, whether he is to be given a day or a week off, or whether he is to be dismissed from the service. We have had cases of all types. I think it depends upon the rule which the man has disobeyed.

CHAIRMAN DEBLOIS: The time is up; our next paper is on, "Inter-Plant No-Accident Competitions." We have as a speaker a gentleman who is well-known to many of you. I always think of him as an automobile man, but I have looked over his past history and find he has been in the paper industry, in lumber and in civil engineering. He used to be the safety man of the Buick Motor Company. He is now safety director of Jones & Laughlin Steel Corporation. **MR. EARL BLANK.**

Inter-Plant No-Accident Competitions

E. F. Blank, Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Feeling that more practical value will come from general discussion of a subject of this nature, I will make my presentation as brief as possible, dealing only with fundamentals and hoping that if anyone present is interested in details, the same will be brought out in the discussion to follow.

I believe that the greatest problem of any safety engineer today is: How to arouse and maintain interest in safety. Most of our accidents result from the thoughtlessness of some one. If we could get our employees to think of safety at all times, there would be very few accidents. Of course, machinery must be guarded, ample working space and sufficient light provided, but I am taking it for granted that this work has been done in your plants, and though it has been done, you are still having accidents. From 60 to 90 per cent of our industrial accidents are due to causes over which only the human element has control—accidents which could not possibly be prevented by mechanical or physical means—therefore, our problem is: How to keep "Safety" in the thoughts of our employees at all times.

Why not make a game of it? The average American is a great sports fan. He likes to watch a ball game, a race, a boxing exhibition, in fact, any kind of a contest where strength, speed, endurance or skill in any line is featured. If one is acquainted with the contestants, the interest is greater; and if one has the opportunity to participate in the contest in any way, the interest is still keener. Why not create interest and a competitive spirit by matching one department against another or one plant against another, with the elimination of accidents as the aim of the contest? In a contest of this kind, it is possible for all employees to participate and if properly conducted, it will create an interest that would result in a reduction in accidents.

The first thing to establish when it has been decided to have a safety contest is a set of rules for the competition. These rules should be as simple and equitable as possible and should meet with the approval of a majority of the persons competing. Care should be taken that every one understands the rules and the basis of competition at the beginning of the contest. It should be decided what will be the period covered by the contest and how the winner is to be determined. The method of determining the winner, of course, is a

very important matter in any contest. The following are some of the most popular plans:

- (1) Longest period without a lost-time accident.
- (2) Best accident severity rate.
- (3) Best accident frequency rate.
- (4) Best adjusted severity rate.
- (5) Best adjusted frequency rate.
- (6) Greatest reduction in accident frequency.
- (7) Greatest reduction in accident severity.
- (8) Combined accident frequency and severity rates.

One of the first things to be decided in any of these plans is: What shall constitute an accident? This should be clearly defined. Most contests are based on lost-time accidents. According to the National Safety Council's standard, this is an accident which causes death, permanent disability or loss of time beyond the shift on which the accident occurred.

In contests based on accident severity it is necessary to know the number of days lost from injury. For temporary disability, the actual number of days lost are counted. In case of death or permanent disability, the standard scale of time losses is generally used, 6,000 days being charged for a death, 300 days for a finger, and so on in accordance with the seriousness of the injury.

We who have been using the national standard method of computing accident rates for a number of years have come to talk rather glibly of frequency and severity. It may be well to explain at this point that accident frequency is the number of lost-time accidents per million hours worked and accident severity is the number of days lost per thousand hours worked. This takes into consideration exposure which is calculated in terms of hours worked. Every hour worked is an hour's exposure to hazard. The time records of most are kept in hours and it is not a difficult matter to get these figures.

Four Safety Contests Simultaneously

The competing units in a safety contest are usually determined somewhat by the division of supervision. It is well to have the units as near the same size as possible. This helps to make the contest more equitable.

We are conducting in our steel plants at the present time four safety contests. One is an inter-works contest between the three chief operating units and the others are inter-departmental competitions in each of these works. Besides these contests in the plants, our two railroad subsidiaries are competing in the same sort of contest. All of the contests are on an adjusted severity basis, or a "severity per hazard" basis, as we call it. Each department is given a hazard rating which is based on the compensation insurance manual rate for the occupation or operation. By dividing the accident severity by this rate or hazard factor all departments are reduced to the same basis for comparison. Each plant is rated compositely by multiplying the number of men in each department by the hazard rate and dividing the sum of the products by the total number of men in the plant. In departments where there are several classes of work, each occupation is rated and a composite rate for the department computed in the same manner.

The contests run from month to month, a trophy being awarded to the winners, who hold same until it is won by another unit. At the end of the year the trophy will be permanently awarded to the department, works or railroad which has the best adjusted severity rate on an annual basis. This gives us a chance to award the trophy to the department with the best record each month and to make a permanent award at the end of the year. The monthly

competition keeps the interest in the contest alive and all have their hopes of permanent possession of the trophy.

We have selected as the trophy for the inter-works contest this year a bronze sculptural group depicting the steel worker's safe return home at the end of the day; for the inter-departmental competitions, bronze plaques, suitably inscribed and showing the monthly winners; and for the railroad contest, a silver loving cup.

The intrinsic value of the prize matters little. It is the thing for which it stands that counts. Every one who has ambition strives to be a winner or a top-notch in something and these contests give departmental groups a chance to exert their prize winning ability, thereby stimulating departmental cooperation and pride and reducing accidents at the same time.

The standings of the departments are computed each month from our accident records and a monthly safety standings report is compiled and sent to all foremen and superintendents and is also posted in all bulletin boards so that employees can see the standings of their departments.

Details of the Bulletin Boards

We also have some large special boards made up which show the number of accidents in each department for the current month, the severity for the last month and the year to date, and the rank of the departments for last month and the year to date. These boards also designate the departments in the plants which have won the contest each month and the plants which have held the inter-works trophy. Our largest bulletin board is 9x16 feet and is mounted in a conspicuous place at the main entrance of the plant. Showing the current accidents during the month tends to keep the interest alive and spur the workers in each department to greater efforts against accidents.

Our first intensive safety campaign was conducted in November, 1926, in cooperation with the Western Pennsylvania Safety Council which was sponsoring a Thanksgiving No-Accident Month. We felt that November was a particularly appropriate month to hold a campaign as figures for a number of years indicated that accidents increased in our plants in November and that the months of November, December, January and February were our worst months for serious accidents. This was probably due somewhat to the seasonal increase in production activities and perhaps somewhat due to the advent of cold weather.

It was decided to conduct a contest between our Aliquippa works, at Woodlawn, Pa., and the works in Pittsburgh, on an adjusted severity basis, the winner to receive a bronze tablet especially designed for the occasion.

Considerable publicity was given to the campaign prior to November and when the contest opened, every employee was on his toes to make a record. On October 19, a safety rally was held in the Moose Temple at Pittsburgh, where about 1,000 superintendents, foremen and key men gathered to hear the challenge from the safety engineer at Aliquippa and its answer, and to learn the details of the campaign. On October 21 a similar rally was held at Woodlawn with about 1,500 supervisors in attendance. News letters were sent to all foremen giving the details of the contest and asking that they call their men together before November 1 and pass on the information.

Special posters announcing the contest were displayed on all bulletin boards during the last week of October and special display posters were exhibited during the month. Eight-foot banners were displayed to show which plant was in the lead. The Pittsburgh banner was a green rectangular flag with the inscription in white, "Pittsburgh Works—November—No Accidents." The Aliquippa flag bore a similar inscription with green letters on a white background.

These banners were arranged on the main flag pole at each plant, with the flag of the leading works on top so that the workers could see the position of their plant in the contest each day. When the flags changed positions, the telephones in the safety department were kept busy with inquiries regarding the reason for the change. Blueprint charts were also printed showing the daily record of days lost through injury so that department heads could follow the progress of the contest from day to day.

The result of the contest was a 78 per cent reduction in accident severity as compared with the previous November, and 74 per cent reduction compared with the previous month. Frequency rates were also reduced by 40 per cent.

I believe that a great deal of the success of this campaign can be attributed to workmen's meetings which were held by the departmental foremen during the month. At the Aliquippa works every foreman had his men together for a while each day to talk to them about safety in order that they might reduce accidents to a minimum. A safety pledge was signed and sent in to the safety department each day by each departmental foreman stating that he had talked to his men about safety. More than 10,000 pledges were sent in, indicating that more than 10,000 meetings were held in this works alone. These meetings are a regular item in our safety program and were merely intensified during this campaign. Some departments hold these meetings normally each week, some bi-weekly, while others hold one a month. A report on each of these meetings is made to the safety department, stating the amount of time consumed, number of men present, and safety matters discussed.

You can readily see from this outline of activities that to get results more is necessary than simply to announce that a safety campaign is going to be conducted and expect accidents to be thereby reduced. The entire organization must be thoroughly sold on the idea; it is somewhat similar to organizing a Community Chest or Liberty Loan drive. Considerable publicity and "hurrah, boys," stuff is necessary to arouse interest and enthusiasm and get the whole plant to enter into the spirit of the thing.

Far-Reaching Effects of the Contests

We feel that our contests have accomplished a great deal in interesting our employees in safety work. Malingering has almost been eliminated and our problem is more in seeing that the men do not get back on the job too soon rather than seeing that they get back soon enough. This, of course, is left entirely up to the doctor, who will not let his professional judgment be influenced by department heads, safety men or any others who might be too ambitious to get men back on the job too soon, thereby aggravating their injury and prolonging their disability.

This brings up the question of returning an injured man to work on a job other than his previous occupation. I might explain our policy in this respect for this is a much discussed question whenever contest rules are considered. We have been asked a number of times: "Do you give injured employees light work in order to save lost time?" I do not like the term "light work" in this connection and would rather call it "special work," for that is what it is in our case. If a man is injured in such a way that it is impossible for him to perform his regular work without aggravating his injury and the foreman of his department can re-arrange his men in such a way that this man can work satisfactorily and someone else in the department do his regular job until he is sufficiently able to handle it himself, this is perfectly legitimate. For instance, if a man had a hand injury and his regular job required the use of both hands at all times he might be temporarily transferred to a lever job which required the use of only

one hand, or in the case of construction work a laborer might act temporarily as water boy and the regular water boy be transferred to the labor gang.

In no case shall a foreman make a job that did not previously exist for an injured employee. The convalescent employee must be able to perform 100 per cent the job to which he is assigned. This, of course, works somewhat of a hardship on departments whose employees must be able-bodied in all respects for it is impossible for them to find special work for partially disabled men. However, it would be just as much of an injustice to say that a man shall not return to work other than his former job, because in a good many instances he is able to produce 100 per cent on other work.

So far this year our severity has been reduced about 66 per cent and our frequency approximately 26 per cent. This is a comparison of the experience of the first eight months of this year with the first eight months of last year. We believe that our competitive safety campaign has had considerable influence on this reduction. I believe that any well planned safety contest will result in accident elimination to some extent. The basis of the contest and details for best results depend on local conditions. There is no set of rules which would answer for all cases. The competitive idea is just a means of arousing and maintaining the interest of the employees in accident prevention and is also a demonstration of the management's interest in the safety of the employees. If you have not tried it in your plants, I would strongly advise you to do so. It will be worth the effort.

Planning the Inter-departmental Contest

CHAIRMAN DEBLOIS: I think we should be grateful to Mr. Blank and to all our speakers today for giving us very practical, sound papers, coming out of their own personal experience.

We want a discussion on Mr. Blank's paper. He has brought up a great many interesting points and some on which there is not a unanimous opinion.

Unfortunately I have to go to another meeting, and I shall ask Mr. Peake of the American Radiator Company to take the chair. I hope as many as can will stay through to the end and get into the general discussion of all the papers. You will undoubtedly have more questions to ask as we have heard some very real stuff and the speakers are at your disposal to give further information.

(Mr. C. L. Peake took the chair.)

CHAIRMAN PEAKE: Without waiting any longer, we will go into the discussion.

MR. COLE (Wyman Gorman Co.): I should like to ask the speaker what he would say about conducting an interdepartmental contest, in a plant of say 600, where there may be considerable difference in the hazards of the various departments and possibly in the number of men employed.

MR. BLANK: As I said, we use a hazard rating or hazard factor which is based on the compensation manual rates. That takes care of the difference in hazard by using either frequency or severity rates. You are taking care of the difference in the size of the departments because your common denominator is the number of hours worked.

Of course these rates don't mean a thing except as factors. Our manual rates will run anywhere from .60 to 1.90. I think, which is perhaps one of our highest rates. The minimum rate for insurance is .60. By dividing your severity rates by these hazard factors it brings them all down to a common basis for comparison.

I think this could be worked out as well in a plant of 600 men as in a plant of 1,000 men.

M. D. MOORE (Ward Donnell Co.): Referring back to the statement that Mr.

Blank made in connection with the return of injured employees, I would like to ask if I understood him correctly to the effect that the injured man usually returned to the department in which he was injured and was given work therein that he could immediately do.

We had a case of a man losing an eye. He was a punch operator and it was almost impossible—in fact, the doctor advised against it—to return him to his former job, and it was pretty hard to use him in the steel plant because he might get hurt in some other way. As he had only one-half his former vision.

What would your supervisors do in a case like that?

MR. BLANK: We try to get the foreman in that department to take him back on another job in that department, if he can't do his own work: but in a good many cases the foreman in that department doesn't have any special work he can do and we prevail on someone else. You know everybody kicks about taking someone else's cripple, but we cooperate pretty well. They usually say, "Bill can use him on such-and-such a job."

A. BRANMORE (National Carbon Co., Cleveland): It might be interesting to say how we handle cases of that sort. When it is necessary to transfer a man from one department to another, we generally pay the man (that is, recharge the department receiving the man), as much as he actually earns, and we bill the difference back to the department where he was hurt. In that way we satisfy everybody.

Contest Rules Must Be Simple As Possible

CHAIRMAN PEAKE: Before we get off this particular subject of the contest. I want to ask Mr. Blank if he uses the improvement basis. I don't believe he does. I wonder if there is anyone in the group who uses "improvement" as a basis similar to the Carnegie Steel. They have been doing it for a number of years. They use "improvement" and frequency as a basis.

E. R. LAWLER (U. S. Rubber Co., Hartford, Conn.): We have been taking severity at 50 points, frequency of lost time accidents 25 points, cost per thousand hours work, 20 points, and frequency of minor accidents 5 points, which gives you 100. We take the rates of those four different groups for three years back and work up a rate. Then the factory making the greatest improvement in 1927 over the three previous years is the winner in that contest.

They worked that out and decided that severity was the one for which you should receive the greatest credit, so you get 50 per cent on what you improve in your severity and 25 per cent on frequency of lost time, etc. The factory that shows the biggest improvement is the winner.

CHAIRMAN PEAKE: It seems to me that one of the most important points in laying down rules for a contest is that the rules be as simple as possible, so the workmen and certainly the foremen will understand how it is set up.

Mr. Blank mentioned the hazard factor. I wonder if he found that its use has decreased interest in the contest?

MR. BLANK: That hazard factor is a simple proposition in our case. The monthly report we put out shows hours worked, number of lost time cases, number of days lost, accident severity. If anybody is using accident severity as a basis of comparison, so far it is the same as our report.

The next column is the hazard rating and then severity for hazards, as we call it. Severity is divided by this hazard rate, and that brings it to the same basis for comparison. They understand; each department has a hazard rating. They don't care about the history of it except that they hope it has been selected fairly, and in this case, having used it for a number of years they have got so they understand it quite thoroughly.

I might say this, in regard to this improvement proposition: We had a very interesting discussion a few weeks ago in regard to the basis for our November No-Accident Campaign, which we are going to conduct again this year. We were setting up our rules for it, and before we actually adopted this standard we wanted to find out whether everybody was satisfied with the rules we used last year in the November contest. So, before our superintendents' safety meeting at one of the plants this subject was introduced and we asked them which they would sooner have—last year's basis or an improvement basis. We could only go back two years because that was as far back as we had a comparable record.

We started January 1, 1925, to use this system. So we proposed they compare their November record with the record from 1925 to date, that is, January, 1925 to date. You should have heard the squall that came up because of the fact that if a fellow had an excellent record for the last two years and ten months, he was going to have a hard time to beat it, whereas, if a fellow had had a fatality in his department or a bad record, he would have a good chance of winning. So they finally decided to go back to the old system.

A very interesting thing came out in that connection. When we had the last race on the plants ran along neck and neck until about November 20. There was no serious injury, except one man lost a finger and there were 300 days charged up. On November 20 a man lost a leg. The other plant went ahead, but they weren't elated over the thing at all, because they felt badly about their fellow-employee losing his finger. Pittsburgh finally won the contest, but it made the fellows think about the loss of a finger more than they had about a fatal case before.

Charge Lost Time to the Month It Occurs

MR. STARR (Indianapolis Power and Light Co., Indianapolis, Ind.): I should like to ask a question in regard to keeping time on lost-time accidents. For instance, take the illustration cited—a man losing his finger, 300 days. Does he count that in one month, the month the accident happened?

MR. BLANK: We charge that in the month the accident occurred. A proposition of 300 days is easy. You just charge it in. Suppose you have an accident that disabled a man for six months. The doctor's estimate is taken and charged into that month. It isn't spread over at all. That severity rate reflects on conditions in that month and no other month.

Somebody is going to ask if I won't explain what we do if our estimates are not right. A man might say 30 days is the estimated disability. Perhaps infection sets in after ten days or a week and the man is off for several months. All that is charged off is the 30 days, but we carry along the severity for the year and the corrections are made in that year to date, so that at the end of the year all those little misses of a few days one way or the other are ironed out. You would be surprised to know just how little that difference is of giving and taking when you come to the end of your estimate and have gone a year beyond. You may be just a few days out. Sometimes the estimate is a little too high and sometimes it is a little too low.

MR. GREEN (Western Cartridge Co.): I would like to know how Mr. Blank figures an injury of a minor nature. According to the national table the loss of a finger is to be counted as 300 days. You may have a minor injury that doesn't involve any loss of time but maybe six months from now it will involve compensation loss of \$25. What procedure do you take in figuring lost time?

MR. BLANK: You mean he hasn't lost any time at all at first?

MR. GREEN: Yes, that happens once in a while.

MR. BLANK: That is taken care of in our corrections. It is too late to get into that month's figures, but it goes into the year's figures.

That is one place I don't agree with the scale of time losses. We have been using it for six years. Someone has proposed that we change it. I think it would be a mistake to change it. Although it isn't equitable the way it is, if you change it, it is going to change your experience. Where it isn't equitable, is in that while your compensation laws allow so much for half a finger, by the national council's scale if there is an amputation, you charge the full amount.

MR. GREEN: I understand that, but you can have a disfigured finger nail, for instance, without any loss at all.

MR. BLANK: You mean: Do we add the \$300 or do we deduct it?

MR. GREEN: You haven't any finger loss, but a little disfigurement.

MR. BLANK: We don't have any disfigurement in our state, but if we did, it would have to be figured on a percentage basis. We don't have any disfigurement of that nature as you do in New York State or in some of the others.

MR. BARNES (Algoma Steel Co.): I would like to ask Mr. Blank how far his company would go in the matter of safety work before putting on these contests. Would you get your safety rules pretty well drawn up or would you recommend the injection of this contest at any time?

All Safety Rules Thoroughly Understood

MR. BLANK: Of course, in our case safety work has been done for a good many years on the ordinary basis of using posters and safety committees, etc., and safety rules are pretty well established. It is very important to have all of your rules, etc., thoroughly understood, after which a safety contest or competition could be started almost any time. A lot of publicity is necessary. You have to get enthusiasm and interest stirred up and the more you get of it the better results you are going to get.

You can start a campaign any time and give it a little publicity in advance and have your rules thoroughly written up and understood, and I don't believe it would make much difference.

MR. BARNES: I mean your safety rules, rules governing the safety operation, safety practices, etc.

MR. BLANK: We don't have many hard and fast rules. We have general rules, but most of our rules are common sense operating rules. We have special rules for train operators and train repair men and such occupations as that, but most of our rules are safe practices and those are set down by the departmental head. It is an operating problem. Our safety work is an operating problem entirely. The operating department have entire charge of the safety work. The safety engineer is himself just an advisor who helps to promote these schemes, but the actual work has to be done by the foreman or the superintendent, the man on the job. He is the fellow who enforces the safety rules and practically makes them as far as that is concerned.

MR. MOREY (Hartford Accident & Indemnity Co., Hartford, Conn.): I would like to know just what difference you find in the accident figures between the men working days and the men working at night. Is there any difference?

MR. BLANK: I can't answer that. We never made a check of that. Years ago I made some studies of time of day and a lot of these occupational studies, etc., and after making them several times, I came to the decision it was a lot of useless waste of time.

I don't know how that would stack up. The chances are you would probably have a few more accidents per force at night. I think it would be natural to expect that, but I couldn't say because we haven't made an accurate check.

CHAIRMAN PEAKE: I think you can state this with perfect confidence, that after any outfit has introduced a night force, after they have been operating only a day

force, the accidents go up. Whether, after it has been carried on some time, there are more accidents among the night force than among the day force, is a question.

MR. GRAY (People's Gas Company, Pittsburgh, Pa.): When we first started our accident prevention work in 1925, we started off in January with a contest with no hard and fast safety rules. The contest was based on reduction in frequency rate. Our experience was that we did make a reduction in our frequency of about 98 per cent the first year.

MR. COLLIER (General Industries): Mr. Blank made the remark that his foremen conduct campaigns in regard to the prevention of accidents. How do you educate your foremen in safety prevention?

MR. BLANK: We have a number of ways of getting to the foremen. We have these rallies of which I speak. We have them throughout the year, but we have a more intensified program of rallies during a campaign like the no-accident campaign. At that time we get the foremen together and have speakers. Perhaps somebody from the general management talks to them about what they expect from them; sometimes the safety engineers talk.

We also have as a regular part of our program what we call the foremen's safety news letter, which we send out to approximately 750 foremen periodically. We don't have any stated time—weekly, bi-weekly or monthly. When we have anything, we send it out. It contains any information on safety that these men might use in their workmen's meetings. You see we have to keep feeding them something of interest for those meetings.

Safety Meetings Are Bringing Results

We rely a good deal on the meetings. We started them a little over a year ago and they are getting results. I will say for the benefit of you who are plant speakers, who go out and talk to these fellows, that I think the idea of having the foremen do the talking is 1,000 per cent better. I have gone out and talked to foremen and talked to groups of men, but when the foreman calls that group together and tells them about safety and tells them what he wants them to do, as he is the man who hires and fires them (and if he is in earnest), they line up. If the safety engineer goes out and holds meetings, they say, "There comes that guy with a lot more bunk!" I have heard the same thing said when somebody else was doing the talking: "Here's that guy that is going to fill us full of hot air!" But I think you get away from that when the foreman is on the job.

W. N. CLINTON (Metropolitan Life Insurance Co., New York City): If Mr. Blank still has breath left, I would like to ask if he will outline the hazard factor table, giving us the classification of it and what each factor is according to occupation.

MR. BLANK: That is quite a job. You are going to have me reciting from the compensation manual rates. Of course, we in Pennsylvania have a different manual than they have in the rest of the states. We have our own compensation manual, but it is based on the idea that the compensation insurance companies come in and rate your plant. They give your plant a certain rating depending entirely on the hazard and it is, of course, determined by years of experience, as you know, being in the insurance game. We feel there is enough experience to justify using such figures as our basis.

But if you want to know what some of the rates are that we use, I will say our rolling mill rate is \$1.20. The rate for the Bessemer department is \$1.40; for the pattern shop, 75 cents; for the roll shop 75 cents, that is, the machinshop classification.

Sometimes we have to interpolate a little bit in picking a rate. We can't find

that rate in the manual, so we select a rate that is the nearest thing to that kind of job and use it. The job of rating is a pretty intricate one, but once you have your rates established, if your departments don't change, your rates don't change, unless your manual changes. Your manuals change from time to time. There have been some drastic changes in rates. If any of you fellows have punch press departments, you will remember that the first rate was \$18.25. The next rate was \$8.05. They just knocked \$10 off. That came through safety work. Now it is down to \$4.85 or something like that, which shows how the general experience is reflected.

MR. CINTON: These rates are published or printed so the men all understand them?

MR. BLANK: In order to get it, you have to get your insurance manual.

CHAIRMAN PEAKE: You can do that where you have your rolling and your blast furnace. Some of us, who are rated as a whole, cannot do that. That will apply to some industries but not to others. That was why I was particularly interested in having the matter of improvement made out, which was brought out by the U. S. Rubber.

For some time the American Radiator Company had a trophy which was awarded on the basis of improvement. We had our group together to decide on a wording for the next year's trophy, and we found definite opposition. On the other hand, we hesitated on making it a straight-out accident contest, because some of our plants have a hazard which without a doubt, is higher than others. The boiler plant, for instance, is rated exactly the same in the insurance manual although the hazard is greater than in the radiator plant. Some are mechanically operated and some are hand operated. It doesn't seem fair to put them on the straight-out basis.

Individual Awards Are Sometimes Given

J. C. MADLEY (Connor Company): I would like to ask Mr. Blank if, in conducting these departmental interplant groups of safety contests where the winner is awarded a trophy for his department, do they ever award individually the men taking part? For instance, do you pass cigars to the fellows who win the contest?

MR. BLANK: That isn't done as a plant proposition. However, some of our smaller departments are running contests of their own. The gang get together and they run a little contest from month to month. The department that has had the worst experience buys the cigars for the one that has had the best experience. They work that out themselves. We have never given individual prizes but once.

A year ago last November we gave watch fobs to the foremen in the departments that had the best records. But I really think the trophy idea goes over better. It is easier to handle and I think it is just as much appreciated. We gave a fob with the mill insignia and the inscription "Safety Award." We started out to award these to the foremen of the department that had the best record in cash plant. We found, when we got through with the contest, that there were a lot of departments that had 100 per cent and no accidents, but some other departments beat them because of the fact that they had a larger force. So there was a winner and still some other fellows that were 100 per cent. So what we did was to give sterling silver fobs to the winners and bronze fobs from the same die to those who had no accidents.

We like the trophies better. Last winter we had that sculptural group for the inter-works trophy. Last November we had the bronze tablet. That is a picture of it down there (pointing). They have it permanently in the main entrance. They also had the interdepartmental trophy for this year and they had them all lined up together. It just happened they were the winners for the interdepartmental inter-

works trophy and had the others, last year's trophy and the trophy for the month of November.

I don't believe the kind of trophy makes much difference; it is just putting something up for them to fight for. The same sculptor who made this group for us last year is working on a new one for this November. It is going to be more or less in the shape of a tablet. If any of you were down in Philadelphia last year and saw that steel statue down there 60 feet high, I might mention that it is the same sculptor who does all our sculptural and trophy work.

RALPH HAYES (Florida Mutual Insurance Co.): I believe Mr. Peake could work out a basis for his accident the same as Mr. Blank. You will have a classification you could use also for your machine shop and for your foundries, which I believe could be applied on a fair basis to your improvement. Each year if you could reduce your number of accidents and losses you are bound to have an improvement reduction in your experience which you can use as an improvement basis.

MR. BLANK: Mr. Peake, in answer to your question of rating in the foundry occupations, etc., I see Mr. Dunham back there. Mr. Dunham is from the General Motors Corporation. They use the same rating. They have malleable foundries, machine shops, and assembly plants and pretty nearly everything in industry. Perhaps Mr. Dunham can explain their system.

MR. DUNHAM: We use the same system Mr. Blank has outlined, but several fellows brought up the question that in a small company or in a line of work that is not diversified you have trouble. The Fisher Body have done effective work in safety through the awarding of the tax bonus. They called in every superintendent, got them together, and among themselves these superintendents agreed which was the most hazardous. They said, "We will set this at 100. Here is another line of work. Do you fellows among yourselves think this line of work is 80 per cent as hazardous as this one?" When they got the superintendents agreed, they used that hazard as the hazard rate.

I think when you have a line and can't get different code classifications, you should get your department heads or superintendents together and let them, among themselves, decide the relative place of each line of work.

CHAIRMAN PEAKE: The main essential is to have it definitely decided before the contests starts.

ADJOURNMENT

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



General Round Table

Thursday, September 29, 1927

GEORGE HODGE, Chairman

**Assistant Manager, Industrial Relations, International Harvester Company,
Chicago, Ill.**

IRA V. KEPNER, Assistant Chairman

Safety Director, Pennsylvania Salt Manufacturing Company, Philadelphia, Pa.

The General Round Table of the Sixteenth Annual Safety Congress was called to order at two-ten, Mr. George Hodge, assistant manager, Industrial Relations, International Harvester Company, Chicago, Ill., presiding.

CHAIRMAN HODGE: We have a large arena here for the fight this afternoon, which gives those who fight and run, as we witnessed in a recent fight, plenty of opportunity. There are certain rules of the fight, however, that we want to observe. The referee will be Mr. Ira V. Kepner, safety director of the Pennsylvania Salt Manufacturing Company, Philadelphia. He is an old pioneer of the safety movement, and knows all the rules of the game. I think you will find him on his feet ready to give you the count if you don't come up to scratch in observing the rules and regulations of the meeting.

The first number on the program, will be, "First Aid Everyone Should Know." It is a demonstration held under the direction of Dr. Hart E. Fisher, Chief Surgeon of the Chicago Rapid Transit Co. It gives me a great deal of pleasure to present Dr. Fisher.

Some of the Things You Should Know About First Aid

**Hart E. Fisher, M. D., Chief Surgeon, Chicago Rapid Transit Company,
Chicago, Ill.**

We have a demonstration in store for you today which I know will interest you greatly, both from a standpoint of education and novelty. Fifteen years ago we started teaching laymen the principles of first aid, by a systematic and standardized course of instructions. This course included the teaching of what to do to save life, minimize pain and other essential factors, which, properly put into practice, would hasten the convalescence of a patient.

The first aid man is instructed to function only from the time of accident until the properly authorized medical man arrives. Many of these accidents occur in remote and isolated places where many valuable minutes, and often hours, must of

necessity elapse before the doctor arrives, on account of distance, and even though the doctor is available, precious minutes pass while he is on the way. For this reason, it became essential that laymen be trained to function in a crisis and to render first aid in the first few minutes after an accident.

Men were selected according to their position with the industry, their mental ability, amenability to discipline, capability of absorbing instructions so that they could function efficiently in time of emergency, and who knew their limitations and would not try to become so-called "self-made" doctors, or usurp the prerogatives of regularly constituted medical authority.

Employees who are selected to be trained as first aid men attend a regular first aid school for a definite course in first aid, with lectures and demonstrations by the students, until they are able to function smoothly and efficiently. They pass a prac-



The prone pressure method of resuscitation.

tical examination under the direct control of the medical department and receive diplomas from the company, upon graduation. A yearly banquet is held for all graduates, at which gold medals are presented to those who have actually saved the life of a fellow man, either by rescue or efficient first aid, while on duty or away from company property. Incidentally, the greatest number of gold medals have been awarded to employees for saving life away from the job. This year 500 employees will be awarded diplomas, and this promises to be the banner year in our first aid school. These graduates come from five different companies of which I have the honor of being the chief surgeon, and not from one company.

Now I want to say a few words about the first aid equipment necessary in any industry for service at time of injury. The accepted method today is for a smooth talking salesman of first aid supplies to talk the man in authority into purchasing his particular outfit as the best obtainable. Here, gentlemen, is where so many well intentioned first aid systems in industry stub their toes. There is no first aid salesman who can come into your plant and tell you what to use and why, what sort of a container or how much you should buy. This knowledge is obtained only by actual compilation of figures.

Sit down with a pencil and a blue print of the physical property of your own particular company. Plot the location where each accident, resulting in injury, has occurred during the previous two years, for comparison. Then plot the nature of each injury sustained and the part of the body involved. From these two graphs you will see where it is necessary to locate first aid materials for use in time of injury, either by the first aid man or the surgeon. From the classification of injuries you will be able to work out what supplies are actually necessary to attend the injuries most liable to occur. You will be agreeably surprised to learn how few



First aid for the arm fracture.

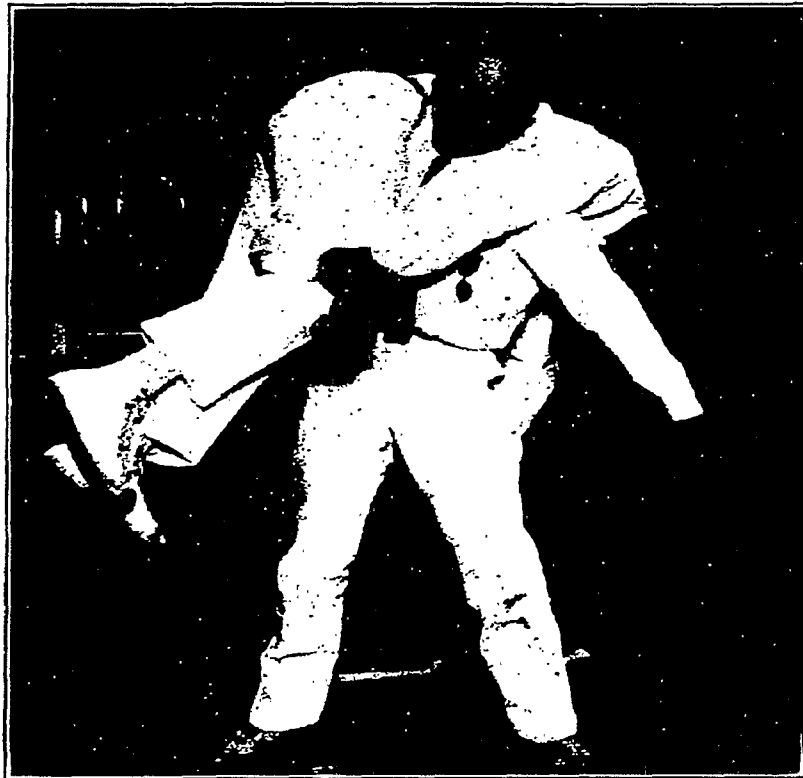
supplies are really necessary for efficient treatment of injuries. The fewer the supplies the better the first aid rendered.

The type of container can only be worked out by knowing the supplies and quantity required in each outfit. I might suggest that you secure a container that will best suit your needs. Fill it with the essential supplies and after a few years trial, you will be able to choose from experience the best container and method of packing supplies in the container, in order to avoid useless expenditure of money for needless materials and waste.

The average first aid outfit sold is either over-supplied with a poor selection of supplies, over-priced, or put up in such a form that waste is the largest factor. It is essential to avoid fluids in first aid boxes wherever possible, on account of waste, lack of sterility, breakage, or freezing in winter. It is far better to know how to use a few essential first aid materials well than to have only a confused idea of how

to use a large number of materials. A blanket and stretcher are essential equipment in a well organized first aid outfit. The last requisite is a first aid marker, designating the location of a first aid station.

Having discussed with laymen, who are to render first aid, the manner of instruction, and having said a few words about the method of selecting supplies to be used in first aid work, I will now mention the most important factor in efficient and safe first aid work, namely, periodical inspection of first aid equipment by a man, chosen on account of his ability and training, to see that these outfits are maintained in a



One man carries more than his own weight.

complete and sanitary manner. In our companies, this inspection is made every three months. On Tuesday of each week a regular first aid requisition is sent in to the medical department for new supplies, to replace those used in treating injuries. Each first aid outfit has a case record card on which is tabulated the name of the patient, nature of injury, date and what was done for him. These cards are collected and aid in checking the number of trivial injuries, injuries where no time is lost, cost per treatment of first aid, cost of maintenance at each location, and furnish necessary information whether to reduce or increase the number or kind of supplies. Last, it serves the medical department as a check against infections, etc., as it is evidence whether the injured employee reported for medical attention after first aid was rendered in the plant.

In addition to the periodical inspection by those intimately connected with first aid work, the regular inspection of physical property is made more frequently by the various officials and supervisors, who report their findings. The safety engineer is one of my most ardent inspectors, and how he loves to bring to my attention that some first aid outfit is not what it should be. I welcome Mr. Bridges' valuable



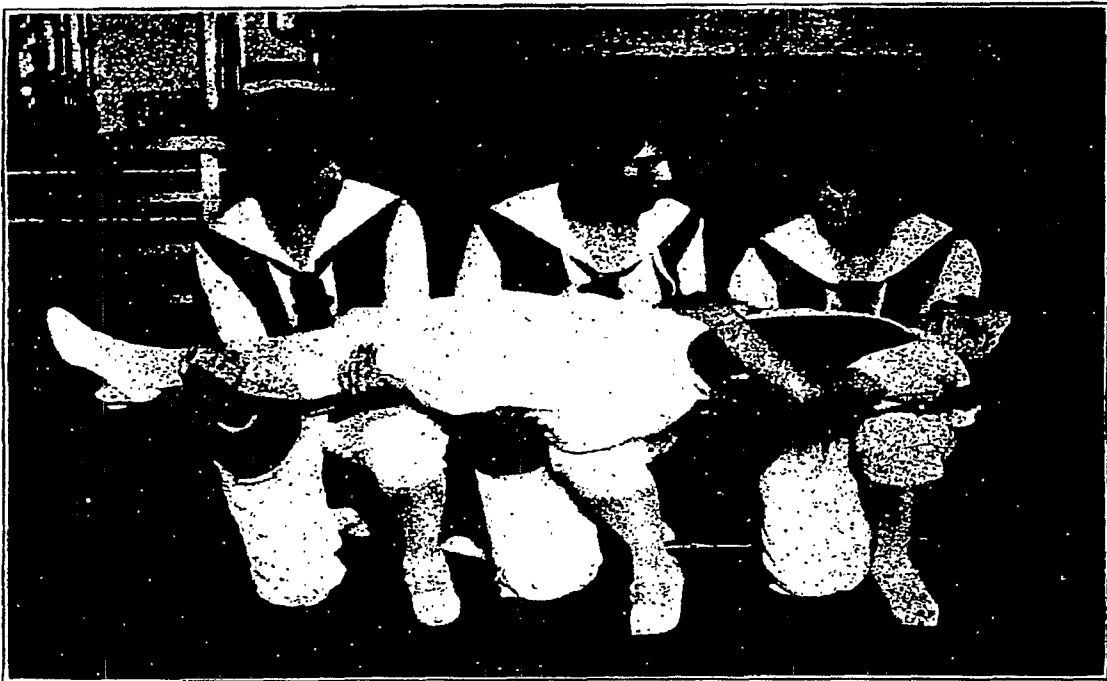
Championship team using the prone pressure method.



Beginning the prone pressure movements.

criticisms, as it is only through constructive criticism that we attain the near perfect.

Gentlemen, you will now have the opportunity of seeing the actual results of first aid training and the visible evidence that it is of value, in the ten gentlemen who are now about to perform a few first aid features for your information. These ten men have each been awarded a Gold Medal for saving a human life. These medals are either the Gold Medal of the individual company, the Britton I. Budd Medal for the Saving of Human Life, the Samuel Insull Medal, or the McCarter Medal. They are only a few of the medal winners in our respective companies.



Four of the girls' team in special demonstration.

Three companies are represented here today. The Chicago Rapid Transit Company, the Chicago North Shore and Milwaukee Railroad Company and the Public Service Company of Northern Illinois.

The first demonstration is the obsolete Sylvester method of artificial respiration. It speaks for itself, as compared to the easy, one-man Schaeffer Prone Pressure method, which we use exclusively. Its many advantages over the Sylvester method make comparison useless.

The second demonstration is the treating by first aid of fracture cases.

The third demonstration will show the different methods of transporting injured people.

We have shown you first aid in industry, and for the fourth demonstration, we wish to present eight charming ladies who will show you first aid in the home, by doing the Schaeffer Prone Pressure method of resuscitation.

For the fifth and last demonstration we will present to you a group of school

children who have been taught this work in connection with 463 lectures and demonstrations given to over 183,000 school children. Thus, we are aiming to inculcate the spirit of what to do in time of emergency until the doctor comes, to those in industry, in the home, and the rising generation.

From a public relations standpoint, the training of your employees in first aid shows that you are interested in mankind and in something else beside your particular product. However, the greatest reward is that many lives are saved each year which would otherwise be lost. Needless suffering of many workers is averted by quick action, long periods of convalescence are made unnecessary by efficient



A group of school children demonstrate first aid.

first aid to the worker, and as this means he is returned to his work sooner, it is a big economic factor both to his family and employer. And last, but not least, infections in trivial injuries are reduced to a minimum.

The medical profession is fast coming to look upon efficient first aid to injured in a more favorable light, but it takes a long time to forget what first aid meant a decade ago, with all the incompetent and disastrous results obtained by poorly trained laymen who did not know their limitations.

CHAIRMAN HODGE: I am sure this applause expresses a great appreciation of a very fine demonstration. Certainly there is no finer work in the world than the conservation of human life and limb. We certainly thank you, Doctor, for this splendid talk and demonstration.

DR. A. C. SELMON (Kellogg Co., Battle Creek, Mich.): I wonder if the Doctor has a manual to cover this work.

DR. FISHER: We have various little pamphlets that show this activity, but we haven't any here. If anybody cares for those, and will write us, we will be glad to send them, giving full results of what we have done in this work.

F. SWENSON (Western Electric Co., Cicero, Ill.): It seems that you had about two off and two on in the resuscitation. The Red Cross book doesn't tell it that way. Which is correct.

DR. FISHER: I am going to take the liberty of asking Mr. Wills MacLachlan to reply to that same question. In all the cases of resuscitation that I have experienced, and have seen and talked about with those who have saved people by resuscitation, no one has ever adhered to a textbook as to the amount of pressure to put on and how often to put it on. Your textbooks teach you to put it on and off and simulate actual breathing, 15 or 16 to the minute. That is all right for normal people. When a person is electrocuted or asphyxiated from gas or is submerged, they lack air, which must be brought into the lungs. When you have that condition, it is the same as the condition you have in pneumonia; the air goes into the lung at a more rapid rate because there is an air hunger there, the tissues demand more oxygen, therefore nature itself produces a more rapid respiration. Why doesn't that apply in electric shock and such other cases? You have an abnormal condition. You are trying to put air into the lung and oxygenate the tissues with the air you get into the lung. To tie a man down to fifteen to the minute or sixteen or eighteen is all right in training in order to inculcate discipline and routine so he will function in time of stress or crisis automatically like the solder does under fire, but no man doing resuscitation has the time to stop to count his one, two, one, two. It would be folly if he did. I have seen a number of them put on as high as twenty to thirty. It was not electric shock. The idea is to get the air in the lung and out again; it is the oxygenation of the tissues and stimulating the respiratory centers that you want.

Resuscitated After Eight Hours of Effort

I am not a disciple of any particular time. Mr. Wills MacLachlan is doing a lot of work along that line. He is familiar with the time and the methods of resuscitation. I am sure you would all be pleased to hear him give you a few words along this line.

WILLS MACLACHLAN (Consulting Engineer, Toronto, Canada): In connection with the time or period of resuscitation, the reason that we are teaching them to go slow is to get them over the excitement of the minute at the time of the accident and to give them confidence to carry on.

In connection with one point that has not been emphasized, I should like to take you to a case that happened the 20th of last May, in which a man received a shock at two o'clock in the afternoon. He was lowered from the pole and resuscitation started at the base of the pole. He was then taken to a hospital and resuscitation was carried on in the ambulance. They worked on him continuously. Between seven and eight at night he became quite black. At ten o'clock at night he was breathing normally, after eight hours' solid resuscitation work. That is one of the reasons we are trying to emphasize the training of the men in the correct way. Have them practice it, and don't give up for anybody until your patient breathes or there is definite onset of rigor mortis.

I can speak feelingly, as the chairman of the Insull Medal Awards Committee. It is a divine function to give life, but it must be a wonderful thing to be the agent of the Divinity in restoring life that but for your action would have passed out.

H. W. HINKLEY (Carbide & Carbon Chemicals Corp., Charleston, W. Va.): There seems to be some discussion as to the use of hard objects, such as stones or

sticks, affecting the nervous system in controlling hemorrhage. I should like to know if it has been your experience to find that they do cause further damage.

DR. FISHER: In applying tourniquets (and they are applied in only those cases of severe arterial hemorrhage of large blood vessels), they are applied under the direct caution that they should not be tied too tightly, just sufficient to stop or control the bleeding. If your tourniquet is properly applied above the elbow or above the knees (there are only two places on the body where a tourniquet ever could be applied), the tissues are of such consistency and of such bulk that you do not require a great amount of pressure to get control, therefore you do not do any damage; but great damage can be done in the use of a tourniquet by leaving it on too long or by an improperly applied tourniquet, exerting too much pressure and thereby causing a temporary paralysis of the nerve. But that generally comes back of itself, it is only temporary, not permanent. It would take a tremendous amount of pressure to permanently damage the nerve. The greatest caution is not to leave the tourniquet on too long.

In fifteen years of industrial surgery, I can truthfully say I have seen only about five tourniquets that ever had to be applied to control arterial hemorrhage. Most of those were in cases of amputation of the limb. There are many other ways the boys are taught to control hemorrhage without the use of the tourniquet, but the tourniquet is essential and we must have it with us. We must use some discretion in the manner in which it is applied and the length of time it is left on.

The Petroleum Resolution Starts a Discussion

CHAIRMAN HODGE: Thank you very much, Doctor. This concludes our discussion on the first aid work.

A resolution has been passed to the Chair. "May I suggest that your Section vote on a resolution addressed to the Executive Council as follows:

"WHEREAS, The National Safety Congress is more efficiently and economically held in its headquarters city, and

"WHEREAS, The city favored by the Congress when moved from point to point gains only at the expense of the delegates and their employers, be it therefore

"RESOLVED, That this Section is in favor of holding the Congress in Chicago regularly during the last week of September in each year."

I am going to ask my good friend Mr. Kempner just to say a word with reference to this resolution.

IRA V. KEPNER (Pennsylvania Salt Mfg. Co., Philadelphia): For the past ten or twelve years it has been the policy of the executive office of the National Safety Council to hold their meetings in the various cities throughout the United States to stimulate the safety idea and to organize the various cities for safety. It has been more or less an expensive proposition, but in the early stages of the Council it was very essential. For the past five or six years it has been almost impossible to find a city with proper hotel accommodations. We went to these various cities with the best intentions in the world in order to help them with their safety propaganda. In some cities we have been successful, in others not quite so good. It has always been more or less difficult for some of the delegates to find proper hotel accommodations, particularly at the headquarters hotel of the Council. I am just expressing my own personal opinion regarding the need of finding some place where these meetings can be held under one roof, and this is the first hotel that we have ever been able to occupy that will take care of the entire Congress.

Our first meeting in Detroit some years ago could be accommodated very nicely in the Hotel Statler. The last time, we were at the Hotel Statler, the

Book-Cadillac and the Tuller. Our sections were scattered and we had the delegates all over the city; when they tried to find somebody it was almost impossible. The same thing occurred at Cleveland where we had to hold our meetings in various hotels.

I should just like to have some thought and a vote on this resolution that has been presented.

At one time a majority of our members were in the East and Middle West or in the vicinity of Chicago, and a convention held either in the East or in Chicago was fairly well attended. We now find that we have members and large sections of members as far west as California, and when a meeting is held in New York or in the East it is almost impossible for those delegates to come.

I should like to have a vote of those in favor of meeting in Chicago. It says in the resolution "always," but I think the Executive Committee of the National Safety Council would be willing to change that when they saw a need for making the change.

Will those in favor of meeting in Chicago each year at the discretion of the National Safety Council please raise their hands? Those opposed?

(Majority in favor of meeting in Chicago, only three or four voting against.)

The Object of the Resolution is Explained

MR. WALTER (General Electric Co., West Lynn, Mass.): I think a great many are situated the way I am. I am representing a member of the Safety Council and I do not feel that I have any authority to make a suggestion to the committee as to the place of meeting. I think the influence of this Council meeting in any section of the country is a contribution of such value that it should not be confined to one place for all time. I think if the matter had been left to open discussion before the vote was called for, you must have had a different vote.

CHAIRMAN HODGE: It is always a good thing to have an assistant chairman and a chairman. As chairman I can overrule the other vote and take another one. That is why we have two. If something goes wrong, the other fellow can do something else. Isaiah Hale last year just had to take whatever they gave him.

QUESTION: Had you thought of excluding the Chicago vote?

CHAIRMAN HODGE: It is your meeting. The chairman has no thoughts on it at all. I do think that the gentleman from the General Electric put a little voltage into the room when he arose. I got his flash and I think he is quite right. We heard a statement in favor of holding the convention in Chicago, and I am quite sure that it would meet with Mr. Kepner's approval in taking that vote if we permit a little further discussion and take another vote.

E. P. DURPHY (Hamlin & Co., New York City): I make a suggestion that we leave this question with the Executive Committee of the National Safety Council. The National Safety Council has prospered by the guiding force of the Executive Committee for fifteen years in conducting its Congresses. If it be further the desire of the chairman, I would augment the resolution by saying that it be submitted to the individual members by letter instead of trying to obtain a unanimous opinion in this city with so many Chicago delegates present.

MR. KEPNER: The object of this argument was to have something for the Executive Committee of the National Safety Council to go on. They want to hold the meeting where the delegates want it. I might say for our friend from the East that we held one convention in Boston. If he attended, he knows why we don't want to hold another meeting so far east. It was almost impossible for those much further west than Chicago to attend. The majority of these delegates

have a lot of other duties to attend to, and when they have a trip as far east as Boston or New York, it is difficult.

It is a problem to get a hotel to accept a convention when they have to put almost everybody out of their rooms in order to take that convention for a week. The majority of the hotels that are well established will hardly turn over more than one-third of their rooms. You gentlemen who have attended the various sections here can realize what it means to have a hotel even of this size give us adequate rooms for the delegates to meet in. Just give it serious consideration.

We are not going to solve the problem. That is up to the Executive Committee. They merely would like to have an expression of opinion. This being one of the largest meetings that is held, we feel that we can get an honest opinion. If it were not for the appearance of railroading this through (of course, coming from Philadelphia, they might think that I use steam roller methods in politics), I should like to see a vote. But that is not the idea; it is just merely to get an expression of opinion.

H. E. KAVANAUGH (Commonwealth Edison Co., Chicago): This matter was taken up at the Public Utilities meeting this morning, and I believe it was referred to the Executive Committee to be submitted to the individual members for voting.

H. V. SCHLACKS (Western Electric Co., Cicero): In view of the suggestion that the Chicago vote be excluded, perhaps it is a good suggestion because we can practically assume that all the Chicago people wish it to be held here.

Chicago Delegates May Favor Other Cities

CHAIRMAN HODGES: Speaking as a representative of at least one Chicago member, I would ten times rather have the convention in another town. If you live in Chicago and you go to your office, that means that you don't get to the convention; but when you are out of the city you can give it your undivided attention. I am quite sure that if you took a vote of Chicago people most of them would vote for an out-of-town place.

The Chair will entertain a motion as to what this session desires to recommend to the Executive Committee.

ARTHUR J. JOHNSTON (Massachusetts Safety Council, Boston): May I move that this round table session take no action on the resolution before the house. (The motion was seconded).

R. S. BONSIB (Standard Oil Co. of N. J., New York City): I think that is following the policy of leaving a hard problem unsolved. I don't see any harm at all in showing an expression of opinion. I think that is only fair to the Executive Committee. They want to know how the men feel about it. Personally I have been to all of the Congresses. Anybody who has been to the last two can see the disadvantages we have been up against until we came here. We are not saying this is the best hotel or the best run hotel; they have got a lot to learn yet, but they are new. I believe in having a meeting in a regular place such as this. In the first place, it is easy to get to. There isn't any part of the country that can't get to Chicago very easily.

I, for one, am very strongly in favor of holding the meetings here, and I think it is a very weak stand simply to let it go without decision. If you are for it, say so; if you are against it, say so. Have courage enough to say what you think.

MR. JOHNSON: May I support my motion by saying that votes are taken by membership. I don't readily see how 75 delegates from one member can cast 75 votes on this resolution.

Let's not make monkeys out of ourselves by expressing an opinion one way

or the other and have the Executive Committee of the Congress do as they darned please, as they certainly will. They will go into this thing so much more thoroughly and with an unbiased opinion and get the right answer without the help of a flock of delegates.

CHAIRMAN HODGE: The Executive Committee has submitted a resolution to us. All they want is to get the feeling of the various Sections. What further action they take on it or how far they go in writing to the individuals and getting their expressions and so forth is up to the Executive Committee. They have asked the Round Table session to give them an expression of whether they would like to hold their meetings regularly in Chicago. I think we should tell them.

The gentleman made a motion that we take no vote. There was a second to it. The Chair can only put the motion, and if you don't want that we can kill it and take another vote.

It has been moved and seconded that this session take no vote on this question.

MR. SUTTON (Postum Co., Battle Creek): You say this resolution has been submitted to us by the Executive Committee. I think if you will look at the signature you will determine that is not the case.

CHAIRMAN HODGE: It was submitted by the Petroleum Section to the Executive Committee.

MR. SUTTON: This is not a section. Probably all the ladies and gentlemen here have attended another session and had this proposition put up to them, and it has been voted on in the other organized sections of the Council. I supported the gentleman's motion that we do not take action on that resolution.

(The motion to take no action on the resolution was put to vote and lost.)

MR. BONSBIB: I move you that the General Round Table session endorse the resolution as read.

(The motion was seconded and carried.)

CHAIRMAN HODGE: Well, now that we are all acquainted and have had a very frank expression here—most of my time is spent in acting as chairman of works council meetings and I certainly do feel at home now.

The next subject on the program is "How I Would Seek Safety in a Manufacturing Plant," which will be presented by Mr. A. D. Kaens, safety director of the Simmons Company at Kenosha, Wis. I am sure that Mr. Kaems needs no introduction to any safety group.

How I Would Seek Safety in a Manufacturing Plant

A. L. Kaems, Safety Director, Simmons Company, Kenosha, Wis.

I can give an answer to the subject that has been assigned to me in two words: Educate management. I would first get hold of the manager and try to convince him that he had not been properly educated. We have been for 20 years telling management that only 25 per cent of all the accidents can be avoided by mechanical means and 75 per cent by education. How they have arrived at this I do not know, for I have tried for years to get some definite figures on it, and yet I have not succeeded to my satisfaction.

The manager has done his share, as he believes. He has put in all the mechanical safeguards that he could. He has gone on and tried to help in reaching the 75 per cent by putting in organizations in his shop and educating his foremen. It has been thought all the time that the big men who put this across are the foremen. Let us see what a foreman really can do. We must know whether the foreman is the man or not.

I am going to try to point out some of the things that the foreman must do. First, he must get out production, without which no plant can exist. His production must be up to the standard. If a man wants a raise in wages, to whom does he go? The foreman. If a man is dissatisfied with his job, he goes to the foreman. On top of that, we try to say that he ought to be the man to teach safety to the men, besides. I am just wondering, if we have that kind of foremen in the industry, whether they would stay foremen long or whether they would have a position rather than a job.

Since we couldn't get any statistics on this matter (and we have tried so hard to make men realize what accidents are), I have taken our plant and compiled our statistics for seven years. We have kept close track of every accident that has occurred in which one day's time or more was lost. That showed that we had 25 accidents in the 25 per cent class, and 1,451 accidents in the 75 per cent class.

I have classified the accidents into bruises, cuts, sprains, infections, fractures, burns, and eyes. I believe that covers about the ordinary accidents that occur in any plant. Of these accidents, there were 400 burns, 344 cuts, 263 sprains, 192 infections, 89 fractures, 81 burns, and 83 eye cases. The total lost time was 15,557 days. I would go to a manager and I would ask him, if he were a full-fledged, 100 per cent safety man, how many of those 1,451 accidents he would have been able to reduce?

Every Accident Should be Analyzed for Cause

We have to find out what causes those accidents; and if that man had gone out and made an investigation of every one of those 1,451 accidents, I assure you there would have been very few which a foreman could have prevented.

Let us take the 400 cuts, due to handling of material. If you take men who must continuously handle material, pile it up in unusual places for which it wasn't intended, you are going to have bruises and cuts; there are no two ways about that. Could a foreman stop that? Of course not. If you were handling ten million pounds of wire and sheet metal a month and were handling a million feet of lumber a month, you would expect that you would have cuts. No foreman could prevent that.

How are you going to stop sprains? Sprains have no way of being prevented. A man will get sprained in spite of how careful he is and how cautious he is.

We know that infections come when we take the best of care of wounds. I have had one example of that in my personal experience. Several years ago I had to go to Grand Rapids, Michigan, to give a talk, and somehow or other I had cut my finger. I had it dressed in the first aid room properly, and yet I had a peach of an infection. I haven't yet heard the last of going to a Safety Council meeting with an infected finger and giving a talk on safety.

As long as you are going to handle materials in your plant you are going to have fractures. I will assure you it isn't due to the foreman's being negligent. Fractures can happen at any time, due to falling on bad floors or almost anything. Can a foreman help having a bad floor? That is the maintenance man's duty.

The same is true of burns. I could mention many of these things which no foreman could prevent, but someone higher up could.

The great trouble is that we have not started out in this work to analyze and investigate our accidents. If we did that, if we made an impartial investigation and put the blame where it should be, you would be surprised what would happen. We have had many sprains in our plant due to men stumbling over a bad floor. We put it up to the maintenance department and said the floor ought to be kept in good condition.

In spite of what he wanted to do, that floor could not be kept in shape, due to the fact that the building was put up to carry a certain load; at one time no truck went over it with more than 2,000 pounds, and today it is nothing unusual for us to find a load being taken over that same floor with 10,000 pounds. Is that floor

going to stand up? How can a foreman do anything about that? That is for some one else to do. That is for management to look after.

In the case of the 95 accidents, the lost time was 76,595 days. Where should we begin to try to reduce those accidents? Should we begin with the 1,451 or the 95? One of the great troubles has been that the 75 per cent class has never given us the figures that the 25 per cent have. Sixteen per cent of our accidents took 85 per cent of the lost days, and 84 per cent of the accidents took 15 per cent of the lost days.

Suppose a man had a number of machines that were giving him a lot of scrap; he would call in his general superintendent and find out what caused the great scrap. The superintendent would tell him that he had a few machines that were causing 85 per cent of that scrap. What would he say? Would he still say that they would start on the large number of machines that only gave a little scrap, or would he say, "Why don't you fix those few machines so we won't have any scrap?" Suppose the next month another such report came to his table, would he still say, "Well, that is too bad." No, he would call in his superintendent and say, "You have a few of those machines. Fix them. If you can't, we will get someone that can." Shouldn't the man who is getting hurt get the same attention as the scrap would? Certainly. But the trouble is we are not taking that same attitude in our safety work. Scrap is in the overhead; fingers aren't so much. That is why they don't get the same attention that scrap does. Yet is human life so cheap that we don't give the same attention to it that we give to material?

Our great trouble is that we do not take safety in the real sense in which it should be taken. Safety work is nothing more nor less than an engineering proposition, and if we don't follow that up we are not going to get any real results.

When We Know the Cause Then We Can Stop Accidents

As I have pointed out, the safety work is given to the foreman who is overloaded with his work, as it is. We all agree that accidents do not happen, they are caused. We all agree to that. One time we didn't, but we do now. Yet we are continuously preaching that a foreman is the big man, but with all the work he does he ought to find out what causes the accidents and ought to remedy the causes. Only by finding out what causes accidents can we remove the cause and reduce them. Management must first come to the point that it realizes it must send its men home in the same way they came to the plant in the morning. Management can not do that until it becomes really interested in how it must feel to be injured. I would just ask the manager how he would feel if he saw marching before him two groups of people, one of them, 1,451, going by and he couldn't see anything the matter with them, but when the second group came, the 95, there was a finger gone, another finger gone, a hand gone, and so on until at last some poor woman with her kiddies on her skirts came by. Where should we begin to do our work? Would it be with the 25 per cent or the 75 per cent? I believe he would agree that we would have to start with the 25 and do our share before we could ask the others to do their share.

He cannot begin to be a real safety man until he can imagine how it must feel when these poor people are injured. How would he feel if the first one who went by was his boy or the second one his girl, or it was his wife going along with the kiddies? That is what must come to him first before he does his utmost. He must realize that all those accidents are due to disinterested management.

This is not charity at all; it is a paying proposition. Since we started in 1920 to do this work in our plant, we are today producing 30 per cent more than we did at that time, with 20 per cent less trouble. If we can get the manager really interested in this work so he will demand that safety must come first and production second, there isn't any doubt at all that he can get real results, for in the first six months of this year we had 68 accidents in the 25 per cent class, with 628 days lost, and we had none in the 75 per cent class. That is what can be accomplished when we get management thoroughly interested in safety.

CHAIRMAN HODGE: Thank you very much, Mr. Kaems. I am sure that you have brought out several points that we would like to discuss, but we will go on to the next subject before we have discussion, "My Way of Seeking Safety in a Manufacturing Plant," to be presented by Mr. S. H. Slaymaker, Fairbanks Morse & Co., Beloit, Wis. It gives me a great deal of pleasure to present Mr. Slaymaker.

My Way

S. H. Slaymaker, Fairbanks Morse & Company, Beloit, Wis.

When states first began passing compensation laws some 17 or 18 years ago, employers, with the aid of state agencies in some cases, started to look about for methods and ways to eliminate accidents to workmen and the resultant costs thereof. In isolated cases the humanitarian and good business phases of accident elimination had already become apparent and appreciated, but we must admit that the greatest factor in bringing to the fore and speeding up accident prevention activities were the new and at that time startling laws being passed that made the employee responsible in any accident.

That was your real start. Employees were wrought up over the law that erased the assumption of risk, want of ordinary care and fellow servant defenses and for some new unexplainable reason the dollar paid the injured seemed greater than the two formerly paid the lawyer.

I am bringing this point out to show you that the big boss, the man Mr. Kaems spoke to you of, was at that time very much on the job. It had not become a routine matter to him. It was a very live subject. He was, in fact, rather wild about it.

And so he began spending money and using brains in an endeavor to eliminate accidents—and compensation payments. Guards for this and that began to appear and later were improved upon. Rules were adopted and rule books full of "DON'TS" were distributed by the hundreds of thousands.

Those of you who were in the game at that time will remember well the enthusiasm engendered. Nothing to these accidents. There was or would be a guard or a rule for every hazard. It would be fool proof. In no way could a workman be injured.

All right, rules were made, points of danger guarded, but accidents to workmen continued to happen. Time was taken out to check up and the most optimistic were forced to admit that guards and rule books alone had reduced accidents but 10 or 20 per cent.

Then began a search for the reason for the failure, and it wasn't long before they came to appreciate that they were dealing with the human element as well as with power saws, punch presses and planers. The light dawned on them and they saw that the human mind and human heart must be guarded against habits, thoughtlessness and carelessness. To begin in the early training of the child was the proper time and place and so safety was introduced into the home and school where possible.

But the problem of those already in industry had to be met. The workman was being injured or was injuring himself in spite of all engineering could do. They found they had to get back to the individual. A shop was only as safe as the individuals who worked therein, and to have a safe shop then the individual workman had to be made safe. Therefore it was necessary to reach the workman and teach him by word and example that in case of accident he is the loser and that the best possible safety device is the careful man.

Then the question arose how could hundreds of employers and safety men get personal contact with many millions of employees. Bulletins helped, mass meetings were beneficial, but the personal day after day contact was not there.

In the olden days when industry was a large group of small craftsmen the boss worked side by side at the bench or machine with his men. He knew the personal

life of each of his helpers, his worries and his happiness, they were just "Bill" and "Jim" to him. But as industry grew and combined, the boss, out of necessity, soon got farther and farther from the workman, until in many cases he faded entirely from the picture as far as the workman was concerned. The owner is now often a great group of stockholders scattered nation-wide, represented by a board of directors, at best a mythical thing to the workman, unknown and unseen. Officers elected or managers appointed by this board, division managers and even superintendents are a long way from the present day workman and only the foreman remains to take the place of the former owner to know the personal life, worries and happiness of the workman.

Here, then, is the man who is to the workman, the owner. The man he looks to for his daily bread. His word is shop law and him he will follow.

To the foreman we must turn for personal contact with the workman. Teach the foreman, for he is not too many to reach, that his men are under his care and that it is his sacred duty to see to it that each man returns to his family each night sound and uninjured. Let us not say that the production duties of a foreman make him the illogical man to guard those in his charge. Certainly he must keep up production and quality and keep down his waste, but if safety aids production and accidents are a waste, then the objection is answered, and you put it squarely up to the foreman to prevent accidents as the important part of his recognized duties.

The Foreman Considered the Keystone of the Arch

To prove my point I will not take the time with the pronouncements of hundreds of industrial executives, safety leaders, and economists or will I more than call your attention to the many times the importance of the foreman in accident prevention has been stressed at former safety conventions. All I will ask is that you look up any of your good safety records. Consider, examine, and analyze the department that has had the best accident experience in your shops and you will find, back of it all, a foreman who through the respect and confidence of his men has led them away from danger and installed in them the desire to make such a record.

Some one at our last safety conference at Detroit, I've forgotten who it was, in comparing the safety movement to a Roman arch, placed the foreman above all else as the keystone—on one hand absolutely responsible to the management for the prevention of accidents, and, on the other hand, looked up to by the employees for advice, for to them he is the management.

Probably the former speaker, Mr. Kaems, would liken the big boss, the general manager, to the base of the arch, the part that carries the weight of the superstructure, but for my part, I can only allow him the place of the corner stone, the part on which is inscribed a title and which alone can in itself never be an arch and which supports only that which is above it and even then only by leaning on the keystone for support.

And so I say to you, tie up to that man who is the keystone of the safety structure, the man who is a workman because he knows and is close to the workman, who is the management because to the workman he is the management. For he he a hard shell or a soft shell or just a "Bull of the Woods," he can break you or make you in your safety endeavors.

CHAIRMAN HODGE: I didn't know that Mr. Kaems and Mr. Slaymaker were going to take rather opposite sides on this particular question, but we have a few moments now in which we can discuss the remarks made by Messrs. Kaems and Slaymaker.

A. BERQUIST (Youngstown Sheet & Tube Co., East Chicago, Ind.): I would like to ask Mr. Kaems what he is going to do with the 68?

MR. KAEMS: We are going to reduce them to a certain point and to a certain point only. If any of you safety men ever got it in your heads that you are going to eliminate all those 68 accidents you have got another guess coming, because it won't

be done. I don't care whether it is you or me, those things will happen. Why did I get an infected finger? I couldn't help it. We are going to have just a certain number. In seven years and a half those accidents have gone about ten days per accident. There is something wrong with that which we can't get away from. A man hits his finger. He is insured in two companies. If he stays off three weeks he gets paid for the first week, and I'm going to tell you that he stays off three weeks, in spite of what you do. If you once cut out the 25 per cent, the others will go down of their own accord.

MR. BERQUIST: You say you're satisfied with the 65?

MR. KAEMS: Of course I'm not—

MR. BERQUIST: (Interrupting): If you are, by God! you'd better quit.

MR. KAEMS: You can't do away with them entirely. I'm going after that other bunch.

MR. BERQUIST: Well, I'm not satisfied. I'm going after the 68. There's some way of getting them.

MR. KAEMS: I'll take off my hat to you when you solve that problem. I've been at it 25 years.

MR. BERQUIST: Do you mean to say you are not going after the 68?

MR. KAEMS: Yes, I am.

MR. BERQUIST: How are you going to do it?

MR. KAEMS: By having the management interested in it.

MR. BERQUIST: Do you say the management is responsible?

MR. KAEMS: Yes.

MR. BERQUIST: Why did you put it in there, then?

MR. KAEMS: We are going as fast as we can, and I think we did a pretty good job.

MR. BERQUIST: Your argument doesn't hold water at all.

CHAIRMAN HODGE: I am feeling more at home every minute.

The Meeting After a Man Lost His Finger

MR. KAEMS: Let me give one concrete example. It was the hardest thing in the world to get that wiped out. I'll show you how it happened to be done. The superintendent of the department had constructed a die, and when it was brought to the foreman they told him to set it up, which he did, and an hour later a man had a finger off. Then we had a real meeting and the manager called every last one of them in, from die setter to shop superintendent, and told them that safety must come first and production second. He turned to those men who were responsible for the accident and said that if that occurred again they might be in the right church but they were in the wrong pew, and they knew what he meant.

MR. BERQUIST: That is your example. Let me take a minute. You say the foreman is not responsible for the conditions that exist in his department?

MR. KAEMS: I didn't say that.

MR. BERQUIST: Suppose you have a hole in the floor and you are moving a truck across the floor, with material on it. A man runs into that hole in the floor; he is supposed to see it and avoid it. It is up to management to see that that hole in the floor is taken care of. Possibly that man runs that truck into the hole in the floor, dumps the material, and it hits a man on the other side; and you have a double accident. You have to replace the material on the truck and take care of the injured man. What has the management got the foreman there for?

MR. KAEMS: The foreman was not to blame and he could not possibly be the one to take care of those holes. The trouble was that the floor was weak, and the big thing was that the manager would have to strengthen the floor first.

MR. BERQUIST: The manager has to come out of the main office and find it?

MR. KAEMS: He doesn't.

MR. BERQUIST: Who is going to tell him?

MR. KAEMS: The superintendent.

MR. BERQUIST: Who is going to tell the superintendent?

MR. SLAYMAKER: Let me say one word. A year ago now, Mr. Kaems and Mr. Slaymaker were invited to open a one-day meeting. Mr. Kaems talked from the point of the management and Mr. Slaymaker from the point of the foreman. We got a real battle started, as we did here. You must all realize that Mr. Kaems is right and Mr. Slaymaker is right, and we are both wrong; it is a combination of the two, of course. That is the solution. I think Mr. Kaems will bear me out in that.

CHAIRMAN HODGE: We will pass along with the other talks on the program. I am sure that there were plenty of things brought up in these first three rounds to provoke considerable discussion. Little did I think, when I called this an arena when I started, that it was going to work out that way. We will come back to some of these questions if the program will permit.

Mr. George Widua, Wood Brothers Construction Co., Lincoln, Nebraska, is going to present some unusual accidents that can happen anywhere and the lessons learned from them.

Some Unusual Accidents Are Described

GEORGE WIDUA: The talk that I am about to make was demonstrated here by the surface lines at the opening of this session. Our work, general contracting, takes us on navigable waters; we build sea walls, do pile driving, river embankment work, etc. Therefore, I am going to relate an accident which happened to a lineman, not in our employ, but a sub-contractor's employee. It happened in July of this year. I did not see the accident, but I got the report from the superintendent.

The current, taken from the main line and delivered over to our dredge, which we were using at the time to dredge sand back of the sea wall that we had completed, was 13,000 volts. This line was carried over to a bank of shore transformers and was stepped out at 2,200 volts. The 2,200-volt current entered the pop-heads at the edge of the water and was carried over by a submarine cable onto a steel pontoon. On this pontoon there was a pole about 10 or 12 feet high. One of these cables became loosened, and the lineman working for the electrical company immediately came over. Our dredge was working at the time. The lineman climbed on the pole and came across the 2,200 volts, which knocked him into the water, so there was not only the electrocution but the drowning hazard.

Our men on the dredge saw this. The dredge was 250 yards in the water. They immediately got the skiff, got hold of the man, put him on the pontoon, and used the prone pressure method of resuscitation. They worked on the man for at least an hour, and after that time the man was seen to be breathing. He was taken to the hospital, lost three days' time, and was then back at work.

We have about nine jobs now on the Mississippi and the Missouri which include river-retard work. At the time of my employment with Wood Brothers, two years ago, I was very much a believer in the prone pressure method of resuscitation. Before I came with Wood Brothers I understand they had as high as five drownings a year, due to the men slipping, falling off the pile drivers, and different causes. This year we had one drowning happen to a boy on the fourth of July when the works were not operating. He went into the water to take a swim and was drowned.

I am a great believer in the prone method of resuscitation in our work. We also have other work going that includes concrete construction. We have the hazard of nail punctures. By assigning one or two men, depending on the size of the job, and making them solely responsible for good housekeeping and cleanliness, we help to reduce that hazard. We have cut our nail accidents down to a minimum. We hardly hear of one any more in a gang of 400 or 500 men working day and night.

A nail puncture is a very serious infection if you don't get it right away, and if you do get it, don't try to take care of it yourself, but give it to a doctor as soon as possible.

After investigating the cause of the accident of the man who was electrocuted and partly drowned, I found he was supposed to wear rubber gloves, as all employees working on voltage with any high tension are required to do. They didn't throw off the current at the transformer; they just took a chance on trying to fit it without throwing off the power. If it had to be done with the power on, he should have worn rubber gloves.

CHAIRMAN HODGE: I think we had better run the talks in connection with the unusual accidents that happen anywhere and the lessons learned from them, as we do on a public golf course—run a time for some and slip in others between. Between the talks scheduled on the program we will be glad to have anyone present some unusual accidents that can happen anywhere.

We are going to get out of this meeting exactly what we put into it, and I want to give you the opportunity of getting in your own experiences and let the convention session profit thereby.

Another Fatal Accident is Described

M. L. RICE (Frisco Lines, Springfield, Mo.): In Springfield about four months ago, a public utilities power house had sent a man up to the coal mine to get some coal. The assistant fireman took the pick and went down to the coal bin, and the first thing they knew in the boiler plant, this man was gone. They heard the yell, and about 18 hours afterward they got him out of the coal. Recently the state factory inspector of Missouri recommended to those people that they put on a safety belt and let the man tie the rope to the coal bin and go down that way. As I see it, he should have recommended two men to prevent a similar accident.

CHAIRMAN HODGE: Mr. A. S. Johnson, American Mutual Insurance Co., Boston, Mass., is on the program to talk on this subject.

MR. JOHNSON: I wish that I could be dramatic; I don't know how. If I seem a little bit tame to you, please let the words carry the message which I feel is all-important in this discussion.

Picture with me just for a minute a shop, I don't care where. (This actually happened, you know. These are supposed to be bona fide accidents.) Take any shop where some machinery is operated by a belt from a line shaft. Production has increased so rapidly that the number of machines is not adequate, and you install another machine. You start, shut down at noon-time, and spend Saturday afternoon, Saturday night and Sunday getting in the new machine; because you can't take care of so much change at one time you extend the line shaft by a short piece with a coupling. It is a temporary hook-up. The next week end you will take down the whole line shaft and put in a new one without a coupling.

In this particular case the line shaft was really a jack shaft about a foot above the floor, driven by a large belt from the overhead line shaft. The coupling was put on, two pieces of shaft joined together. Late Sunday night everything was ready, and they tried it out and the coupling slipped. At a loss to know what to do to make it safe, they took out the set-screw and put in a long set-screw that they could put a big wrench onto. It worked. Monday morning the men started their machines. The superintendent was there, the plant manager was there, the millwright was there, the master mechanic was there. The new piece of shafting in the coupling had not been guarded. The oiler turned to the superintendent and said, "How about oiling these bearings?"

He said, "All right, go ahead, but look out for that coupling. There is a set-screw in it. Be very, very careful." His second step from that spot was directly over the coupling. His overalls leg caught in the set-screw. A sponge, a pail and a vacuum cleaner picked up the remains.

Let's leave that for a moment and go to another. Another machine shop, wooden floor, plates, the usual balls that you sometimes find on one part of a machine shop floor where they may be doing heavy plate boring and reaming. Turnings, filings, scraps and bits of iron, pieces of pipe, shafting, plates (perhaps bad housekeeping), wall plugs here and there to put on portable tools. A portable tool is being used to do some work at a section of the floor where there is no machinery, and a claptrap, spread out over this floor. Alternating current machinery, neutral return grounding, rotten piece of extension cord with cracked and broken porcelain plugs to put several pieces together runs from the socket in the wall across the plates to the machine. There is a leak, and the wire is in direct contact with the plates on the floor. The wood insulation seems to be sufficient to prevent blowing the fuses.

A helper from the blacksmith shop across a little roadway comes over into the machine shop for some purpose. It is a rainy day, the roadway is wet, it is one step from the roadway to the floor of the machine shop. One foot on the roadway, one foot on the plates and metal chaff on the floor. One hundred and thirteen volts was found to be potential between the ground and those plates on the floor. It was sufficient to knock him down. His body was wet with perspiration, and as he fell he lay between the roadway and the plates on the floor, and before anybody could get to him he was dead. They used no prone pressure resuscitation; they needed no prone pressure resuscitation there; so the man was buried.

Temporary Hook-ups Are Frequently Unsafe

Let me explain the point I want you to carry home from those two accidents. I could tell you 22 or 222 similar cases. They were temporary hook-ups. One of the most serious hazards in all industry is the temporary hook-up. All portable electric fixtures which are plugged into sockets on the wall are temporary. Every rigging job, lifting material by cranes, is a temporary job. The lashing of the load is a temporary job. The installation of machinery partly put in and later the complete and permanent installation made, is temporary. I plead with you, gentlemen, to be sure, not satisfied, but positively sure that your temporary hook-ups are not accident hazards as you leave them.

CHAIRMAN HODGE: Mr. Johnson stated that he wished he could be dramatic. I think he has evidently attended the three classes of Professor Hardy in public speaking. He certainly put across his message in great shape. I saw Professor Hardy come in a few moments ago, and I am quite sure he must be proud of his work.

Now we are ready to run in a foursome that got up at four o'clock in the morning and didn't make a reservation a week ago.

G. A. HOYT (American Car & Foundry Co.): I would like to know whether or not Mr. Kaems' talk was sincere or whether this was a farce between the two gentlemen.

MR. BERGQUIST: As far as I am concerned, I didn't know anything about it.

MR. HOYT: I had the same idea in 1920 and '21. We employed some 25,000 men. We built freight cars as well as passenger cars, and I conceived the idea that we could eliminate the foreman. As a result of that, we paid \$200,000 a year in compensation. I found out that was not the right idea, so then we began to reach the foremen. At the present time and in the past six months in 1927, our compensation losses have been only \$20,000. I leave it to you whether or not it pays to teach the foremen.

CHAIRMAN HODGE: Mr. Kaems wants to answer that, but I am not going to permit it right now. We will go right along with the subject that is before us, and I hope we will have time to come back to this all-important main bout later.

We will hear from Mr. J. E. Walters, General Electric Co., West Lynn Works, West Lynn, Mass.

MR. WALTERS: I guess I was a victim of the seventh round, so I am back. Before going to the unusual accidents, may I treat with a very usual accident for which I have seen an unusual treatment.

We all have the lame back cases, and I guess very few of us know what to do with them. I saw a surgeon treat one of them and effect a cure. He had an idea that it was a fake case, and he was going to treat them all that way. The gentleman came in and he applied a porous plaster and told him to go home and come back the next day. The next day he took hold of the porous plaster and ripped it off and put on another one. He said, "We will leave this one on for two days," and he repeated the dose. He effected a cure and he has had very few lame back cases since that.

I had to go back into the records some years to get some of these cases. In one of the foundries, the toilets, shower baths and washrooms are located together. One Saturday the attendant forgot to shut off the water heating system, resulting in building up some steam pressure in the hot water system, which backed up into the cold water line. The first man to flush a toilet on Monday morning filled the compartment full of live steam and he was severely burned, as the compartment door had a lock on it and it took him some time to get it open. Since that time, the locks have been removed from the doors and non-return valves placed in the supply line.

Accidents in Using Hard Steel Hammers

A man was chipping with a hammer and chisel. His chisel was of the highly tempered variety used in pneumatic hammers. He thought he felt something strike his eye, although he was wearing goggles. He went to the doctor, who could not find anything except that his eye was somewhat inflamed. Later, he lost the sight of that eye, and a consultation of physicians decided to remove it on account of possible infection of the other eye. After this eye was removed, it was dissected and a piece of steel, the longest dimension one sixty-fourth inch was found in the eye. The next largest dimension was about half that length, the third dimension was not measured. The piece was semi-circular in shape when viewed under a microscope and probably turned after it went into the eyeball so that the magnet would not pull it out. It is believed that this particle went through the side screen of the goggle, as the mesh would have allowed it to do so.

An apprentice in the tool room, while breaking up obsolete fixtures made of steel, for salvage purposes, instead of a soft metal hammer used a hard steel hammer; a particle flew off the fixture and hit the man in the top left inner side of the eye, passing through the eye-lid. It was traveling at such speed that it went almost through the thick portion of the eye and was removed from the opposite lower corner to which it entered. Although passing directly back of the lens of the eye, the young man has no impairment of vision. In other words, the Lord was with him in his foolish mistake.

Another instance of using hard steel on hard steel occurred in our assembly department. A particle flying off the face of a hammer penetrated four garments of clothing and imbedded itself two inches in the man's abdomen, necessitating an operation for removal.

During some construction operations on roads, one of the colored laborers was standing underneath the chute which empties the sand and gravel, etc., into the concrete mixer, and for some unknown reason the chute dropped down, landing on the man's head. By a queer coincidence, no damage was done to the portion hit, but a bone in his ankle was fractured. He was a colored laborer. I guess the lesson there is, if you want to reach a colored gentleman, get after his shins.

A pipe had been installed in a stair and elevator tower several floors high. Through some oversight, no collars were placed around the pipe to protect the space between it and the floor openings. A man on one of the upper floors had

been using a crowbar, and in looking for what he thought was a safe place to put it, jammed it in between the pipe and the hole in the floor. Another man on the floor below leaned against the pipe while waiting for the elevator, springing it over just far enough to allow the crowbar to come down through, striking him on top of the head. Put on your pipe flanges, and don't let your crowbars stand up, lay them down on the floor.

We had been changing over one of our departments, and a number of holes were left in the floor where wiring conduits had previously been put through. New machinery was placed before the holes were plugged, after which such holes as were in sight were plugged up. A machine operator dropped a large nut which struck the floor, rolled under the machine, dropped through a hole which had not been plugged: at the time another man was passing underneath, giving him a cut on top of the head. Lesson: Fix up your floors or any other repairs before you move in.

A hydraulic press used on an experimental job had been fitted with four steel disks, about three-eighths of an inch thick, located one on top of each of the four stops on the machine. The experimental job had been finished, but the disks left on top of the stops, one of which, however, had apparently later been knocked off. A slow leak developed in the supply line, resulting in the press gradually rising without anyone noticing it. It got to the top, and apparently due to unequal pressure on the stops, with one of the disks missing, caused the press to buckle. One of those disks squeezed down to a tapered shape, approximately full width on one side and knife edge on the other, flew out, went about 100 feet across the room, striking a sweeper just above one eye with the thin edge, his eye being practically cut out of his head. When you get through with a temporary job, clean it up.

These unusual accidents teach us one other lesson that I think is very general, although I find in some plants it is not. It is the safety man's job to go out and analyze and study each and every accident. I do not care how similar they are to anything that has occurred, each one of them has its individual lesson.

The White Collar Man Also Gets Hurt

Another hydraulic press in the same department while in use had a job on it where a filler piece consisting of cast ring about ten inches outside diameter, three inches high, and about one and a half inch thick, was being used, as the pressure was not wanted on the center of the job being done. While the pressure was on, a quarter section of the filler piece broke out, went out the window behind the press, crossed the alley-way and struck a corner of a building, making a hole sufficiently large that four whole bricks with some pieces had to be used to fill it up. No one was injured.

You know the fellow in the office, the man with the white collar, gets hurt once in a while, too. A gentleman was sitting at his desk using his telephone. The telephone on the next desk rang for him. As he turned to get up, he slipped and fell and fractured his hip. So you see the accidents are not all confined to the factory.

A young man was taking a letter to a mail basket. Approaching the basket, he threw the letter in the general direction of the basket, missed, and it went down between the desk and the wall. On reaching after it, he slipped and pushed his arm through a window, cutting a number of tendons. Believe me, if you want to close some of the windows on the Chicago buses around here, be sure and put on some good arm protectors.

An operator in the cold header department, not long ago, attempted to jerk the loose end of a wire out of the roll, and it suddenly flew up, the end running up under his glasses and penetrating the eyeball. It was necessary to remove the eye.

A certain accident happened, when, by the grace of God, a tremendous casualty was avoided. It happened when a 12-inch high-pressure (200-pound) steam main broke in a turbine test. This occurred at night just as the plant was shutting down,

and there were 15 boilers behind the steam main. It was due to a poor job of welding. If this had happened at any other time, you can imagine the results, with that pressure.

A sub-station operator was told on a Saturday forenoon to shut down his station. He pulled out all switches, including the overhead disconnects, and apparently availed himself of the shut-down to clean his board. He was alone at the time and consequently we could only estimate what happened, but from appearances he cleaned everything within reach of the floor and climbed the framework, dusting parts as he came to them, and apparently forgetting all about the fact that the buses above his disconnects were alive, as we found a partially dusted insulator supporting a live 11,000-volt bus. Fatal. Since that we have protected these points.

I hope the few instances that I have quoted may be of some benefit with their resultant remedies, in assisting in the good safety work. I wish to thank the referee for permitting me to last out to the count of nine.

An Unusual Accident in An Elevator Shaft

MR. COOK (The Travelers Insurance Co.): I may not be able to paint a picture such as Mr. Johnson painted, but I trust that the bare facts will drive home the lesson. In this state a couple of months ago an employee was disinfecting a grain elevator. He started at the top, using carbon tetrachlorid as a safety measure, and carbon disulphide, which, of course, might cause a fire hazard. He continued to go down through the elevator, sprinkling the carbon tetrachlorid as he went. It happens that the vapors of carbon tetrachlorid are about five times the density of air. As the vapors formed, they slowly followed him on the way down, becoming more and more concentrated. Finally, when he reached the basement of the elevator, the vapors had preceded him, and he was overcome in the basement. When he was found there, he had succumbed entirely to the poison carbon tetrachlorid fumes. The lesson to be drawn from an accident of this sort, it seems to be, is to beware of these heavier-than-air vapors. With only two exceptions, the vapors which are likely to cause trouble either from fire or from poison are very much heavier than air. The two exceptions are hydrocyanic acid and carbon monoxide. With those two exceptions these vapors will always seek the lower levels, and concentration at those lower levels may be very much greater than is supposed. Consequently, they are a bad hazard because of asphyxiation or fire.

CHAIRMAN HODGE: Mr. C. J. Alger, Corn Products Refining Co., Chicago, is next.

MR. ALGER: I am not going to discuss a number of accidents, but I have one in particular which we in our company seem to think is unusual and can happen anywhere. About six weeks ago, at one of our plants, which happens to be of the old-type construction, a workman entered his department on the first floor, and, seeing a freight elevator standing there, decided to run the elevator up to the sixth floor where he was supposed to work. The hour was quarter to seven. At seven o'clock a regular operator was employed for that purpose. He had proceeded on the elevator to about the fourth floor when suddenly he felt somebody jerking on the tiller rope. He yelled to him to stop. It had no effect. The next thing that happened, down came the elevator to the basement, with the result that this man's leg was fractured.

We have in our company perhaps 45 or 50 freight elevators. I am sure everybody here has at least a few freight elevators under their jurisdiction. We have assumed in the past that our elevators have been in first-class condition because of the fact that we have three inspections.

After this accident occurred, immediate investigation was made. As I said, this was an old-type elevator, double belt drive from a line shaft, with a loose pulley, one belt for the uplift and one for the down. When the accident was checked up, it was found that the belt on the down drive had slipped off the pulley. We started checking up again to see what the cause was. We found that the day before, the

mechanic had replaced both belts and had used rubber instead of an endless belt of leather. The chances are that the belt was not properly fitted. Nevertheless, if that condition had not existed, with both men pulling on the tiller rope, things would probably have gone along all right.

We have tried to enforce the rule in our company without exception that no elevator of any kind should be operated without a regular operator. That rule was violated. We also have a rule which is enforced that elevators should be locked at position with a padlock. That was also violated. The man who pulled on that tiller cable and raised the gate in order to do so violated the rule. We had the accident and the man had a fractured limb.

When that report reached us in Chicago, we wondered how our elevators were at other places. We were able to obtain the services of two competent elevator men. I accompanied them on an inspection. We found 50 per cent of our elevators in a defective condition. In at least half of them, the slack cable adjustments were not operating, belt governors were not operating in case the elevator fell, and in one instance we found a governor which had been set in the wrong position.

The message we want to bring to you in connection with elevators is that everybody engaged in the safety line should begin right now to check up on the inspector boys before they have somebody checking the safety men.

Testing An Underground Storage Tank

CHAIRMAN HODGE: Mr. L. M. Rice, Liberty Mutual Insurance Co., Chicago Ill.

MR. RICE: We had one accident where a man was testing an underground storage tank for gasoline and oils. This man was 64 years of age and had been in the employ of this particular company for 28 years, as an all-around man and inspector. On this occasion he was testing one of these tanks. The tank was made of three-sixteenth-inch steel, six feet long, five and one-half in diameter, the seams electrically welded, and in addition, three flanges welded on the side. He plugged two holes and inserted a one-inch pipe, and on that he had a T. On one side of the T he put the gage and release valve, and the other connected to the hose line. That hose line runs to the main air line, which in this case carried 100 pounds pressure. They were expected to run the pressure to about five pounds in making the test. They used soapy water and a brush, applying it along the seams. If bubbles are shown they indicate defects in the seam. On this occasion the tank let go and struck the man, threw him against a girder, and killed him almost instantly.

In investigating the accident, the committee found the tank badly bulged. They checked up the seams very minutely and could find no defect of any kind, but they did find that the reducing valve which the man was supposed to use was in his tool box. Therefore, we had the accident. The man thought that he had done it so often he could get by with his judgment.

In another case, doing exactly the same job in another plant, the man had a Watson reducing valve. After the examination, they found the tank bulged in the same way. We examined for defects in the welding and found none, but the committee came to the conclusion that we should put on another reducing valve because if anything gets in the valve it lets the pressure right through. In most cases they have to do that or put in special equipment.

This led up to another thing that developed through the committee in this shop. They said, "Do you know that these range boilers that we make for heaters are being used all over the country for air tanks?" Nobody had thought of that. Immediately we made a check on some 15 or 20 plants where there were no regular mechanics, and very much to our surprise we located two of them that were in very dilapidated condition. One of them was carrying 40 pounds of air and the other 60. We ourselves got a lesson from that.

CHAIRMAN HODGE: Mr. R. G. Buchanan, Edward Hines Lumber Co., Lumberton, Miss.

MR. BUCHANAN: I want to talk about two accidents that we never yet have been able to find out the cause of, but those two accidents taught us what we can do in the industry. Some time ago we had a shortage of logs. We wanted some logs in a hurry. The sawmill superintendent went to the telephone and called for the logs. The logging superintendent asked him how many he wanted. He said, "Thirty-five cars." He jerked the 35 cars off the side tracks, put them on the main line; the woods trainmaster came along and said, "Take these two engines, couple them together, and take the logs to the mill. They are in a hurry for them."

We have a curve on our main line railroad from the woods into the mill that has a 73 curve and a one per cent grade. These engines are 90-ton engines, and they had 35 cars of logs behind them. They were going over this grade. They struck the curve, and nobody ever has been able to understand why that engine that was leading went off that track. It went off the track straight as an arrow out into the woods, turned over the engine, killed the engineer, cut off the legs of the conductor on the engine, and hurt two or three other men who were on the two engines. We learned from that that we can't double-head a train with any safety.

I told that to the vice-president of one of the big trunk lines some time ago, and we happened to be on a train coming out of New Orleans. That morning they had run a second section of a passenger train carrying a delegation of letter carriers to El Paso, Texas, and they wanted to get that engine back to the terminal. I took occasion, when they coupled that engine, to go up and see if this man had paid any attention to it. I saw that the second engineer had no control over the engine at all. That is something that I don't know is being adopted by all trunk lines, but I know it is on that division of that railroad.

We learned that we cannot double-head a train. Now we bring our logs out in 15 and 16-car trains, put them on the main line or run an extra engine over the hump and put them the other side of the hump so one train can come along and pick up 30 or 40 and take them to the mill.

A Strange Accident with a Steam Skidder

Another accident we had about 60 days ago was in connection with a steam skidder pulling logs. That is the most dangerous thing you can use in logging and lumber. The steam skidder is the most dangerous piece of machinery that we've got. Those logs don't come in slow. When they get to high-balling those logs they pull them just as fast as the wheels will turn over. When they get them up to the skidder they put a short line on them, and project the end around so the loader that comes around behind the skidder can reach out and pick them up and put them on the cars.

We had a logger connect the rope on this end of the log to pull it around. Some way or other, this end became hooked up with something, we don't know what it was, and it bowed the log just in that position. This end flew out from whatever it was against and it flew 40 feet through the air. There was a negro standing on the end of the skidder, and that log hit him. Of course it killed him. It hit him right in the head. That is the only log we have ever had fly through the air. We learned from this that what we thought was the safe place around the skidder turned out to be the most dangerous place.

This negro was standing there and the logging superintendent was standing in exactly the same place where that man was standing. The logging superintendent stepped away, the negro stepped in, and the log hit him. We learned from that that there was no safe place around a skidder, I don't care where it is. If you go around and look at skidders, you can see where logs come in and jump and knock holes through the water tank; they tear up the machinery. You can't keep a skidder in repair.

I heard the shop foreman say some time ago that he hoped some day to get hold of the man who invented the steam skidder, that he wanted to bring that man into the shop because he wanted to kill him on first sight.

In investigating this skidder accident, we came to find out that there is no safe place around it. We have made this order, that any man standing around a skidder must stand behind the tank; then if the log does fly, it has to come through the tank to hit you.

CHAIRMAN HODGE: Mr. Kaems has just asked for one more round with somebody on the other side, and I think in justice to Mr. Kaems we ought to give him a few minutes, and then we will adjourn the meeting.

MR. KAEMS: You know everyone is rather touchy on some one thing if you can only find out where the place is. I just want, for this gentleman's benefit, to tell him that there isn't money enough in this country to bring me up here and make a farce of this sincere and important thing. I have spent 25 years, the best years of my life, in this work, and I have been successful in my work. When Mr. Cameron asked us to put on this subject, I wasn't stuck on it, but we thought it would bring out discussion, and therefore I consented to do it. This man told what money he saved by going back to his foreman's plan, and I am glad he did. I can say to you that in 1919 we cut off 37 fingers in our plant, and last year we cut off one. The biggest thing that was said to me was by our president, Mr. Simmons, when he said, "August we can pay for everything else, but when we take a man's fingers or his hands or his life we haven't got money enough to pay for it." That has been my motto.

After the Loss of Twenty-two Fingers

I had the pleasure, at one time, of being invited to a meeting of our chairman's organization, and among other things they said they had done 40 million operations without the loss of a finger. We run seven presses; we have a rolling mill; we have woodworking plants; we have foundries; we have every kind of hazard there is, and I am telling you gentlemen that I am proud of what we have accomplished.

I have one other thing in mind. Years ago when I worked for the commission, a concern had cut off 32 fingers. I asked the commission to let me go to that plant, which was a very finely organized one. I succeeded in having them do it my way, and they ran 22 months without an accident, and this summer Mr. Slaymaker and I went to visit that plant. The two departments that had taken off the 32 fingers had \$8.50 and \$11 respectively to pay in compensation.

I just want to say that I couldn't be bought to make a farce of this. That is all I want to say.

CHAIRMAN HODGE: I think probably there isn't any question about the sincerity of the work that you have done, about the sincerity of the work that Mr. Slaymaker has achieved, about the fine, splendid work that Mr. Kaems' company has done. I am sure that they have made a perfectly wonderful contribution to the safety movement. I know we have sent men to visit their plants, and I suppose you all have probably been at either the Kenosha Simmons plant or have had a desire to go there. I think we had better close our discussion, because we have to vacate this room for the "Smile Party."

MR. HOYT (American Car & Foundry Co.): There have been recommendations written about the foreman being the key man. Do we want to go back and undo all that the big safety men of the country have undertaken on this subject? Personally I don't see that we can get along without the foreman as the key man in safety, and with all sincerity and all the charity back of this statement, I would like to ask Mr. Kaems not to permit his talk to go into the proceedings of 1927. That is a personal matter, though, but I don't think that we ought to try to get before the young man who is just coming into safety work to believe that we can eliminate the foreman from this accident prevention work.

CHAIRMAN HODGE: Our session is held for us to present our various experiences. We have had those who believe in putting the responsibility for accident prevention on the management solely; we have had those who believe that the responsibility is

up to the foreman; we have had the various phases, and, like the *Literary Digest*, we try to give you all opinions and you can make up your own minds. I want just one more minute to present Mr. Isaiah Hale.

ISAIAH HALE (Sante Fe, Topeka, Kans.): Fellows, two or three weeks ago a stock shipper in the far west was walking around on top of the fence between the pens at one of our stock chutes. He lost his balance and fell off. In falling he naturally grabbed at something. He had a ring on the third finger of his hand, and he caught it on the head of a nail protruding from the side of the fence and literally tore his third finger from his hand. Fairness compels me to grant you that rings are not frequent, but on the other hand fairness must cause you to grant that rings are not infrequently worn by workmen in industry, and to whatever extent they are worn, I am beginning to wonder if they are not in fact more of a potential hazard than they are generally thought to be.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Fire Prevention Session

Friday, September 30, 1927

FRANKLIN H. WENTWORTH, Chairman
Secretary, National Fire Protection Association,
Boston, Mass.

The Fire Prevention Session at the Sixteenth Annual Safety Congress was called to order at nine-forty o'clock by the chairman, Franklin H. Wentworth.

CHAIRMAN WENTWORTH: This is the first Fire Prevention Session National Safety Congress has ever held. It is called this year because of the rather widespread demand among members of the National Safety Council for a discussion of this important problem, and it is certainly gratifying to find so many of the members here to participate.

We are to consider this morning a single division only of this great general subject, but the final division—that is, the application of the accumulated knowledge and intelligence which we have to local conditions.

Another division of our subject is the continuous education of the public. That must go on indefinitely. Generation after generation must be educated to a proper appreciation of fire hazards and fire prevention. That seems a very great task but we must realize that every generation has to be educated in everything else. It simply means that, beginning as early as we can with the child, we must instill into him the necessity for public safety, including fire prevention.

Fire is a good servant, as has been said many times, but a bad master. Our lives are becoming more and more complex, the great elemental forces are more and more being called into the service of men, and the only way in which we can make life possible to the masses of the people is to so train them in the handling of these forces that the race won't be wiped off the face of the earth. Public education—that is one great division.

The second great division is the technical or engineering phase of our work. We must not only realize the need for controlling these great forces, but we must have the technical knowledge which will make control effective. That work, the preparation of standards for the control of the fire waste, has been carried on for 30 years by the National Fire Protection Association, which has long worked in close cooperation with the National Safety Council. That work is being done through a great many committees. All the various technical subjects are being kept in continual review in order that those who desire it may have at hand, generally in popular form, the latest information respecting the technical control of these natural forces.

The application of these principles to our civic life is just beginning. There was organized at the last meeting of the National Fire Protection Association, a Chamber of Commerce and Safety Council Section. The chairman of that section is Mr. Clifford Penland of the Safety Division of the Memphis Chamber of Com-

merce. All you Council men know him. Mr. Penland and Mr. H. L. Shearer, of the Detroit Board of Commerce, are now perfecting an organization which shall do for the cities what you gentlemen are doing for your plants—take this knowledge which has been collected by the engineering research of the last 30 years by the National Fire Protection Association, and apply it to the city, as if the city were one large plant. All the hazards that exist in your plant exist in the city, and taking the city as a unit, as you take your plant as a unit, we may apply these methods of fire prevention. That is the public phase of the work we are to discuss this morning.

There is no situation, there is no force in nature, that man with a proper expression of intelligence and interest cannot control. We know that. We don't know much about the Over-all Intelligence; the Deity, we might say, is simply a creation of our minds, so far as we can actually know. We know that the greatest intelligence in the world today resides in the brain of man, and that step by step, as he develops his life and as his needs develop, he is coming to know that these forces, however great, however mighty, however powerful, will respond to intelligent control.

So we do not believe that there is a single situation, a single hazard in our lives, that cannot be controlled through the application of man's intelligence.

Our first subject this morning, "Studying Plant Processes to Prevent Fires," is an exceedingly interesting one.

We all know that in plants the fire prevention work falls easily into two divisions, the division of the common hazards—lighting and heating and all those things, the use of fire for common purposes—and the special hazards, the hazards peculiar to the processes carried on in those plants.

There is probably no one in my acquaintance who is better equipped to develop this theme than the speaker who is to present it this morning. The thing which has always impressed me about this speaker is his fine sense of proportion. Most of us see things in certain aspects, certain facets, and it is only through varied experience that we come to have that sense of proportion which sees a problem from the proper point of detachment and thus may more easily point out the specific forces which will yield to control.

I have great pleasure in introducing Mr. Benjamin Richards, Manager of the Underwriters' Service Association, Chicago.

Studying Plant Processes to Prevent Fire

Benjamin Richards, Manager, Underwriters' Service Association, Chicago, Ill.

Fires in manufacturing properties are usually divided into two classes, technically designated by the underwriters as those occurring under common hazards and those caused by special hazards. Common hazard fires are those which originate from rubbish and other uncleanness, heating, lighting, power, including boilers, chimneys, and also fires from lightning are included in this class. Special hazard fires are those originating in or in connection with some special processes necessary to a particular industry. Common hazard fires run about the same for all classes while special hazard fires vary quite a little among the different classes of manufacture, which facts leads to some broad separation by classification of risks by underwriters such as woodworkers, machine shops, paper mills, cotton mills, etc.

In a general way the cause of all fires is *improper maintenance*, and it is right here that a defect, so far as fire loss is concerned, in the modern industrial management may be discovered. In most industrial plants the general maintenance or upkeep department of the plant has in charge such matters as heating,

lighting, arrangement of power drives and such other features as may include the causes of all, so called, "common hazard" fires. A while ago when industrial plants were smaller and the management less involved, we could look to the maintenance department, or at least through that department to the general manager, to guard also the special hazards incident to the process work, and under such conditions the maintenance or proper safety against fire in the process as well as under the common hazards could be fairly well controlled.

Of late years manufacturing processes have become highly specialized, volume of production has been greatly increased and the values involved in any particular process have doubled and tripled over the former conditions. At the same time the general type of construction has materially changed toward a tendency to get many or all processes concentrated into one large room, the whole aim being to concentrate and to speed up work, especially the assembling and finishing processes. All this development is traceable to the employment of technical specialists whose efficiency and skill of production is one of the new wonders of the world.

Specialization Divides Authority

Like all specialists, however, these well meaning gentlemen have often failed to look beyond their specialty, and through their persistent effort toward efficiency and efficiency only, sometimes have neglected safety and possibly other important factors which should enter into the manufacturing problem. These men differ very materially from the old style manufacturer who under his daily task was compelled to consider many or all manufacturing problems, whether they related to finance, construction, purchases, sales, production, maintenance, employment or safety. Specialization has resulted in a divided authority in these matters with usually such a complicated organization that an appeal over the head of the management of one of these departments to a superior officer can be made with difficulty; and when such appeal is made, more often than not a fair, informed and unbiased judgment of the point in question is not obtained. The production man is usually a highly paid official, more or less dominating the whole organization, and as he is either indirectly or directly responsible for the profits of the whole, his words naturally go a long way when the question of overruling him, or compelling a change in his plans in the interest of safety or other desirable end, is under discussion.

Fortunately there are exceptions to the prevailing type. Indeed, all of these production men would be the last to acknowledge that they are sacrificing safety to accomplish their ends, but to one who has for years studied their methods and talked with them it does appear that there is a marked tendency on the part of these specialists, who are so successful in their own lines, to ignore the ideas of other specialists equally familiar with their own particular lines, especially when such specialties lie outside the scope of the usual work. Some of us who have studied manufacturing processes in their relation to the tremendous fire losses of this country, have been often told by these production experts that their process was entirely safe, or that the particular conditions under which they were operating were in some respects superior to those used by everybody else, so that they could not suffer losses to property and life as do their neighbors under some such similar conditions.

Very often the defect in management is higher up than the production man. This defect may be best expressed as a false idea of economy, due mainly to the ignoring of the experiences of others who have lost their properties through fire, and to what may be called lack of balance in management whereby the management is too much interested in certain phases of manufacturing rather than showing a broad general interest in the entire manufacturing problem, as best exemplified by the old type manufacturer who bought his own stock, supervised its manufacture, employed his own labor and sold his own goods.

An attempt is made in the large industries to parallel the old condition, so far as it is possible, by meetings, or so called conferences, where sit the heads of all the different departments; but so far as fire protection and general safety is concerned it may be assumed that seldom more than half of those sitting at the table know anything about the subject at all. I remember one such meeting of the department heads of a very large industry at which they decided that a fire pump (almost essential to the safety of the plant) involving an expenditure of two or three thousand dollars could not be afforded; after which they promptly recommended an appropriation of about twenty thousand dollars for a swimming pool for the employees. Again, the larger the concern the closer it usually is to high finance and the high finance is usually a long way from the plant, so that even when a recommendation for safety is locally approved it has a tendency to dwindle in importance as it goes up the line until, when carried up to those holding the pocketbook, it appears to have no importance to them at all. Somebody in every large plant should have a liberal appropriation to apply to fire protection and general safety without question, as his best judgment may dictate, assuming of course that such a person knows his business.

Shall Protection Be Charged to Maintenance or Production?

Another discovery we commonly make covers a matter which might well be called a defect in accounting. Under the arrangement we have in mind the production man may be thoroughly cognizant of the need of safeguards surrounding his proposed high pressure production layout, but the cost of the protection, both fire protection and safety to life, is charged to the production of his particular department. He must under such conditions work against his own good judgment, as he cannot very well take the position of recommending protection expense to a process which he is selling to his superiors on the basis of the savings which it will produce. Very often when an appeal is made and the management insists on the protection, there is then conflict as to whether the cost of the protection shall be charged to the maintenance department or to the production department. I believe that this modern attitude toward protection has been an indirect cause of many a fire loss.

Very many of our large losses and most of the small ones can be charged to these general defects in management. Bear in mind that no process, however dangerous, can be worked out by production specialists which cannot be reasonably safeguarded, both from a fire and loss of life standpoint, by those who are expert in this particular and highly technical work. The fire protection engineers are not a step behind the process engineers, and indeed often plans of protection have preceded the general introduction of some hazardous process. The responsibility for losses therefore is entirely upon the industries themselves and they have in their hands, and always have had, means for making all these processes safe.

Of course occasionally there may be a concern whose financial standing will not enable it to build good buildings in which to house a hazardous process or to safeguard such processes after they are housed, but these cases are exceptional and do not apply to the large modern industrial plant which we are here discussing. Unfortunately the larger plant often employs people who have been brought up in a plant of this inferior class, and they are quite likely to surround themselves with the former conditions, to the detriment of the modern plant, which again is a question in management.

We have seen excellent fireproof buildings made veritable fire traps by production managers or maintenance men filling them with wooden partitions, platforms, hanging shelving and other products of the lumber industry, although

for years there have been on the market many non-combustible materials from which partitions and enclosures may be built, even at less cost than if built of lumber. We see production managers store skillfully purchased stocks of goods and supplies in the same room with, and alongside, a very hazardous process, where all the profit of the low price obtained by the purchasing department could be destroyed in ten minutes by a fire in the process; yet the production man seriously tells you that he cannot produce economically unless this million or so dollar's worth of supplies is ten feet from his ten thousand gallon tank of naphtha paint: neither he nor the management could possibly convey these goods to the assembly chain through fire doors in a brick wall or by means of automatic conveyors through similarly protected openings! When the ridiculousness of this position is finally impressed upon those in charge, they are more likely than not to resort to the statement that the fire wall will interfere with light and air, although it is generally recognized that such a wall would make ventilation easier, and artificial light is burning in any case, or light for the process is being furnished from the roof.

I once observed a case where a rare raw stock necessary to the industry had been collected at a tremendous expense after two years' work, the stock coming from isolated places at the ends of the earth. The stock itself was worth over a million dollars and must have cost at least fifty thousand dollars to collect, yet, when it arrived at the plant, it was placed in a large wooden shed partly used for a garage where it all could have been destroyed by fire in twenty minutes; and under the market conditions of raw stock at that time this could have shut up the plant indefinitely.

All Your Eggs in One Basket

The essentials of safety in any industrial plant, so far as fire is concerned, are very simple. They are best expressed by the common expression, "Do not put your eggs all in one basket." Raw stocks and supplies should be separated from the process and production departments by good fire walls, or preferably be in a separate building. Goods just as soon as made should be immediately passed to another fire division for storage, packing and shipping. Various modifications of this principle, as may involve valuable patterns, dies, jigs, rare stocks, etc., should be further considered.

Of late years the craze for housing under one roof without walls, all in one large area, all processes, stocks and finished goods of the industry, has what some consider strong arguments in favor of such a plant arrangement. While undoubtedly there are some advantages for such a type of plant, it may be safely assumed that it is a very expensive type to operate, unless one assumes 100 per cent production for 300 days in the year perpetually. With such a plant many acres are unnecessarily heated and lighted and involve other heavy overhead expense in spaces which are used for storage only, a condition which would ruin some of the older industries working on close margins. Storage buildings can be moderately heated and lighted for about 10 per cent of the cost of heating and lighting an ordinary work room, and the cost of heating we have in mind will cover the expense of heating the rooms, say 40 degrees, to prevent sprinklers from freezing and in order that the expense of a dry pipe sprinkler system may also be avoided. Modern conveyors and escalators to receive the goods from the siding and distribute them throughout the warehouse and to feed them by gravity to the processing and assembly rooms all tend to further economy and fire safety. Storing finished goods in a manufacturing room subject to the fire hazard when such goods represent the maximum of values in thought, labor and material expense can only be described as foolhardy. Finished goods should be stored in absolute safety in

rooms of a warehouse involving no special fire hazard, that the goods may be shipped and one's trade maintained even though the manufacturing plant may be shut down temporarily from a process fire.

I once had a mill that used a stock not procurable in this country, in fact the stock has to be procured from waste places of the earth, like the South Sea Islands, and the industry was absolutely dependent on that stock, there being no substitutes. This particular plant, which was a very large one, sent a crew of men all over the world to collect this stock and they were gone two years. It cost anywhere from \$50,000 to \$75,000, possibly \$100,000 to collect that stock, and as a result of the two years' labor it came in by ship to our port and was shipped to this plant and represented a stock upon which the industry could be assured of continuing for two years. When the material arrived at the plant they stored it in a large wooden shed, the end of which was occupied for a garage, with no sprinklers. The stock itself, representing \$3,000,000 and two years' work, could all have been destroyed in twenty minutes, and that industry at that time could not possibly have continued because there was not enough of that stock in the world at that time to continue. It illustrates the point I have here, showing what thoughtless things are done sometimes. Of course when we appealed in that case above the local management, to the top, the executives saw the error right away and put the stock under sprinkler protection.

The same principle of subdivision applies to the process work itself. As a rule, the average manufacturing plant has only one or two spots which are very dangerous from the fire standpoint. For instance, in a cotton mill this is the picker room, and about 75 years ago the industry learned to cut off this department so that it might enjoy as many fires as it pleased without interfering with the other processes or the business as a whole. The old agricultural implement factory usually consisted of many buildings located 30 or 40 feet apart, the idea being that more than one of them would not be lost at one time. The latter arrangement of course is impractical under modern economic conditions but the practice as represented by the cotton mill picker room is used today and is just as practical to meet the modern conditions as it was 75 years ago, yet this principle is notoriously ignored by plant designers, architects and production engineers.

Carefully Segregate Flammable Materials

Assuming that a slight saving might be made on production by having all the processes in one room, when figuring the matter on a production basis only, it may yet be easily seen that, if all factors are figured into the problem, such as the probable cost of interruption by fire, insurance costs and other matters relating to safety and isolation of the hazardous process, even at the expense of the pride of the production specialist, subdivision is essential. Why destroy acres of non-hazardous production machinery because of one hazardous necessary spot in the whole assembly? However, as to the matter of expense it may be safely assumed that in 99 cases out of 100 there is no ultimate extra expense involved in providing safety.

Fortunately safety measures fit nicely into plans for low production costs. We have seldom, if ever, sold an industry any elaborate fire protection but that industry has later acknowledged the part which this protection plays in earning its share of the low production cost. Just as proper warehousing saves heat and light, general overhead for repairs and maintenance, so safeguarding a manufacturing process saves on production in many ways. Knowing of the safety, the help appears more efficient, a better class of help may be employed, the process may be speeded up without increasing the danger, and as fires in

certain processes are absolutely unavoidable the losses from shut down become unimportant. For instance, the automatic foam protection which the insurance companies some years ago developed for the protection of the large automatic dipping processes in the automobile plants has reduced the time of shut down from these fires to (in one case) 20 minutes where formerly the same machine without the fire protection was shut down a week by a fire. Besides there was practically no loss in the one case as against many thousands of dollars loss in the other.

There has been no loss of life under this modern foam protection, where there were many cases of death before.

Know Your Plant—Best Possible Solution

Any production manager is, or should be, familiar with the particular part of his production where fires may be expected. In a machine shop the heat treating department involving the use of fuel oil is the dangerous place. In other metal working and woodworking plants the finishing, such as the use of paints and lacquers, is the most hazardous process; in the textile mills the preparation of the stock; in paper mills the wood preparing or other stock preparing buildings. All these departments can be easily isolated, and with little more cost can be housed in fireproof buildings, so that the fires which occur in them cannot interfere seriously with the work. Formerly the heart of the industry, the power plant, was found defective, but the importance of building fireproof power plants has for some years been recognized and we have little, if any, trouble from this defect in the modern plant. The use of pulverized fuel and the burning of oil has resulted in some serious fires in these fireproof plants but these are again matters which can easily be safeguarded if one is interested in conforming to the rules of the underwriters. If this same principle, long recognized as necessary to power plants, can be recognized in building and arranging that portion of the plant housing hazardous processes, a very great gain in safety can be easily made.

This appeal for a sensible internal arrangement of stock processes and goods in the plant is one which we cannot over-emphasize. The problem is especially severe for the smaller plant, such as the woodworker, where, assuming a three or four story building, for light and air the painting process is placed in the upper story. The painting process causes most of the fires. When the fires occur they are of such a nature that a large amount of water is usually necessary for their extinguishment, either from sprinklers, hose streams or both. In such a plant the assembly or work room is just below this floor, and down on the lower floors and possibly in a basement finished goods and stocks are stored.

The ridiculousness of this arrangement, from a fire loss standpoint, can be easily recognized when we observe that every little fire in the paint department, and they are many, must necessarily cause a wetdown of all the processes and goods below. In other words, a three or four hundred dollar fire in the paint room is quite likely to run into hundreds of thousands of dollars on account of the defective arrangement of occupancy. We are trying to help the situation some by developing some waterpoor floors for such rooms in the hope that most of the water can be diverted to the outside of the building before it gets to the stories below, but this is a difficult and expensive cure for a fundamental defect. Obviously the only proper cure is to confine the finishing to one building or one fire section, and the process and finished goods to other sections. Such an arrangement can be worked out just as well for a small plant as for a large one.

So far as the protection of the more highly dangerous hazards is concerned there is more or less controversy. Quite a few people, mostly within the industries but unfortunately many connected with the insurance companies, are likely to assume that ordinary means of protection, such as the chemical extinguishers, hose, sprinklers, etc., will safeguard these hazards. In the general proposition this may be true, but even if such fires are controlled by these devices there is usually a needless loss involved in their extinguishment. It is essential therefore that special engineering service be obtained to outline the special protection needed for any particularly hazardous process, and assuming such advices come from a reliable source they should be promptly complied with, as all possible arguments favor such special protection.

There are particular underwriters' rules governing the use of fuel oil; and for severe cases even more safeguards than outlined in those rules can be proposed, such as automatically shutting off the oil by sensitive heat detecting devices which can operate before the operation of the ordinary sprinkler. Dip tanks, tempering tanks and other open tanks of highly flammable liquids can be automatically protected so that when they flash fire the fire itself will automatically operate foam devices, drains or covers with the result that the fire is promptly extinguished with nominal loss and no danger to life. Enamel and other bake ovens can be automatically filled with steam or inert gases and they can be provided with explosion vents to avoid all possibility of loss of life or interruption from fire or explosions.

Paint Spraying Presents Hazardous Problem

The most recent and possibly the most hazardous process we have to consider today is the prevailing method of applying paint and especially pyroxylin lacquer by the process of spraying. This involves a serious consideration of arrangement and protection that these fires may not result in loss of life and in damage to other processes and goods. The serious losses in this process have been due mostly to ignoring the danger on the part of certain of those interested in production and to improper fire protection. It is safe to say that all these fires may be easily controlled. It is only necessary to recognize that they are extremely quick fires, releasing a large amount of heat in a very few moments, so the ordinary fire protection cannot cope with the hazard. Much more water is needed than can be applied through an ordinary sprinkler system and much prompter action is necessary in applying this water than is obtained through the ordinary operation of the fusible link now used in sprinklers. I just heard the other day of the sixth fire in one of these rooms where the hazard is very great. The first two losses were serious, as proper protection had not been provided; but the last fires, and this last one in particular, although the fire was as great as ever before, involved practically no loss, the protection provided having taken care of the fires nicely. These hazards may be easily controlled by certain supersensitive devices arranged to turn on a large amount of water upon development of the first rise of heat, and arrangements are made whereby this large amount of water discharged for extinguishment may be disposed of without involving a loss on other property or goods. There are underwriters' rules for caring for this paint spraying hazard which do not call for any sacrifice in modern production methods, and the records to date indicate that when such rules have been complied with there has been no material fire loss in such protected areas and no loss of life.

To sum up, you will note that I have dealt with the need of studying fire hazards in a broad way as they relate to the general production and manufacturing management. The particular details for the protection of all these hazards are available to all interested, so our problem is not so much the dis-

cussion of these details as the discussion of their general neglect. The title of this paper is "Studying Plant Processes to Prevent Fire," and this is an appeal for the actual study of these processes to prevent fire and to avoid danger to life upon the part of the production experts and those having in charge the management of our industries.

It is fair to assume that this safety feature is just as important a factor as one of the items to be studied on introducing a new process as are the construction, occupancy, finance, labor and production problems which go with it. Possibly more progress could be made if the production man were relieved of the burden of expense for fire protection, as it is now charged to his process. It would seem that all costs of insurance, fire protection, safety to life and co-related matters should be grouped into one account, called a protection or safety account. Very often the cost of insurance is kept separate from these things and the management is much misled as to his cost of protection, of which total cost the actual money paid for insurance premiums is but one item. Fire protection is an expense chargeable to all industries and if the cost of upkeep of fire apparatus and protection, with the cost of insurance, were charged to such an account the actual cost of the protection as a whole would be accurately determined. The cost of fire protection, regardless of conditions and the quality of insurance purchased, is always about the same, being the sum of insurance premiums plus the cost of fire protection and its maintenance. The higher the premiums paid the less the cost of fire protection, while a high cost of fire protection involves low premium payments. There is therefore no reason why any special fire protection cost should be applied to a particular process or be chargeable to that particular department, as it is a fundamental overhead charge for protection, perfectly legitimate, and represents a cost to which all departments of the industry should contribute and a saving in insurance cost reflected back on the overhead of all departments.

Where There's A Will There's A Way

This point is respectfully submitted to those industrial managers who have not given this matter careful consideration, as the first principle to apply in studying methods to reduce fire losses from processes and other causes. With this principle established there will be little resistance to expenditures for fire protection throughout all the departments, and protection will be recognized in the daily planning and estimating of the work and so become one of the necessary and ordinary subjects for consideration in all plant layout work. Having proceeded thus far, the working out of the detail for protection is a simple matter for where there is a will there is a way and, as I have before stated, there are ample rules and regulations and advisors always ready to give freely all the time necessary to those interested; and they are making a sincere effort to prevent property and life losses and to secure the attendant benefits of continuity of production and ultimate saving in manufacturing costs which such efforts are bound to produce.

This last statement may be questioned, and in anticipation of this thought I might state that while it may be undoubtedly true that some insurance agents and representatives of some insurance companies may not be able to point out a clear way to solve these special problems of fire prevention, yet it is a fact that any insurance companies which are worthy of the confidence of manufacturers who must place with them responsibility for carrying liabilities of millions of dollars and thereby recognize their necessary financial integrity, have, through their highly trained engineering organizations, large and experi-

enced agencies, laboratories and company associations for underwriting large risks, ample facilities for meeting and mastering all problems involved in the hazards of manufacturing processes.

Moreover these company organizations are always ready to meet their clients more than half way in offering advices on construction, occupancy and all other features incident to a manufacturing plant even though not involving manufacturing hazards. This service is offered freely without cost. Manufacturers who have the good habit of submitting to the underwriters all those things while in the blue print stage save thousands of dollars by the simple fact that it is much less costly to change a plan on the drafting board than to tear out and rebuild after work is completed. All architects and engineers (as some are already wisely doing), should voluntarily and without the suggestion of the property owner present construction plans to the underwriters, who undoubtedly would appreciate such cooperation which would enable them to learn as well as criticise.

We also hope that the day is not far distant when we all may assume that a production engineer who prepares plans for a hazardous production lay-out without including therein adequate provision for its safety is incompetent and does not know his business.

Doubtless you know of the very large amounts of money and time spent by the underwriters in general, impartial study, investigation and propaganda, all offered to the end that tremendous and unnecessary fire losses, together with their attendant loss of life, may be curtailed.

Did the Mule Kick Close Home?

CHAIRMAN WENTWORTH: Mr. Richards' paper is so rich in content that it is rather difficult to know where to begin to discuss it. It is something to be read and pondered over when it appears in our proceedings.

As I listened to the paper, it seemed to fall logically into two divisions:

One, the plant management and its special responsibilities, and the other the engineering phases of coping with these special hazards.

Mr. Richards certainly pays his respects to the production manager. It reminds me of the story of the darkey who was asked if his mule ever kicked him. He said, "No, sah, he never kicks *me*, but he sometimes kicks pretty close to where I just *was*."

Mr. Richards kicks pretty close to the production manager who is so keen to produce goods that he overlooks a very necessary element in the safe production of those goods.

He also attacks the methods of bookkeeping which place upon the fire prevention department a wholly unjustified burden of expense. He calls for the distribution of that expense over the whole production process, as it properly should be made.

The engineering phases to which the discussion may very well contribute is the idea of the segregation of the hazard. Pick out the special hazard and so protect it that fires may occur continually, daily, and yet the production of the factory may not be interfered with.

The other point is the protection of the stock in order that the stock may not be depleted by preventable fires.

What is the experience of the members of the Council along those special lines? It seems to me that Mr. Richards has enunciated the principles, his paper is the preliminary to the discussion of the specific incidents which may very well go in the record to illustrate the points that he has made. Has any member any special experience relating to the segregation of a special hazard or the penalties for not doing so and the protection of stock and the penalties for not doing so?

Are all your plants so perfectly disposed in these matters that you need to give

them no thought? Have you any questions that you would like to address to Mr. Richards?

BENJAMIN RICHARDS (Underwriters' Service Association, Chicago): There is a representative here of a very large organization which has not the defect which I pointed out. I think Mr. Abbott, of the Fisher Body Corporation, could enlighten us quite a little if he would tell us of the excellent cooperation between his safety department and the head of his concern.

MR. ABBOTT (Fisher Body Corporation): I have a very great appreciation of the paper which Mr. Richards has just read. I believe there is food for a great deal of thought in what he has told you this morning. That is especially true concerning a subject which has been discussed very much recently, and that is the spray finishing operations. Those of you who represent the automobile industry know, of course, that the pyroxylin finishing operation has been one of the very revolutionary things which have come into the automobile industry. Not only in the automobile industry but in other lines of industry has it almost completely replaced the former methods of painting and varnishing.

Good Housekeeping and Ventilation Go Hand in Hand

The Fisher Body Corporation, of Detroit, which I represent, has probably finished between four and five million bodies in pyroxylin finish, and I think I am safe in saying that the plants are safer today with pyroxylin finishing operations than they were under the old methods, providing the hazard is studied and proper safeguards are applied. It is almost entirely a matter of good housekeeping and proper ventilation. Sometimes we hear the question asked, what is proper housekeeping and what is proper ventilation? Those are individual conditions which must be analyzed according to the conditions under which the process is being used.

There is one advantage in pyroxylin finishing operations in regard to housekeeping. The residues, which constitute most of the hazard, are of a dry nature, whereas in paints and varnishes the residues were adhesive and it was almost impossible, under some conditions, to maintain good housekeeping.

We are practicing with all of the finishing operations, the installation of waterproof floors, with drains, adequate ventilation, properly protecting the storage of raw materials, and a thorough cleansing and cleaning of the booths and the ducts each day or at the close of each day's production. We have made a careful study of the safety of the finishing department, and as a result we have had no serious fires.

Inasmuch as we are the largest users of pyroxylin finish in the world today, there seems to be no reason why the finishing hazard cannot be adequately protected, and as Mr. Richards and Mr. Wentworth have said, fires can occur without severe losses in time and production. If the departments are properly segregated, properly protected, there is no reason why we should have any more severe losses than we had under former methods of finishing.

I should like to touch just a moment upon this thought. There seems to be prevalent in the field an idea that there is something extremely mysterious about pyroxylin finishing fires. I should like to say that there is nothing mysterious about it, that there is nothing about pyroxylin finishing that cannot be adequately protected or understood by any intelligent person who will apply a little thought and study to the process.

I think in a way it is much easier than it used to be with paints and varnish, because under the old methods it was like a snake in the grass; you never could tell when spontaneous combustion was going to occur in your plant at night or at times when the factory was not in production. If the pyroxylin is properly segregated and not mixed with other materials, there is very little danger from spontaneous fires. I don't think we have ever had a fire in our plants from spontaneous sources from the pyroxylin finishing. If you have those hazards to contend with in your

plants, it is just a matter of making use of facilities which are now at your command. Through the National Fire Protection Association and the various engineering departments of the insurance companies, I think the hazard is thoroughly understood at present, and competent engineering advice will be given by these agencies to any concern that desires any information on the subject.

CHAIRMAN WENTWORTH: Mr. Abbott's remarks are certainly reassuring and emphasize our belief that any processes can be controlled by the proper application of intelligence. It is true that in all the records of fires which the National Fire Protection Association has in its files, not a single one of these spray finishing plants that has burned can point to proper installations and proper housekeeping. If the regulations will be followed the fires will not occur or can easily be controlled.

Give the Inspector a Chance!

C. E. FOHRY (Willys-Morrow Company, Elmira, N. Y.): I might speak about the effect of an underwriters' inspector's report that we recently received with regard to inspections made in our plant. Naturally when the report came in, and it covered quite a good deal of detail, the first inclination was to resent quite a good many of the things that the inspector reported. But after sitting down and studying the thing very carefully, those of us in charge of that work were forced to admit that perhaps we had overlooked a great many of the important features that the inspector was able to discover in his rounds of the factory.

There is one thing that I do want to say. After we cooled down and thoroughly digested the report we had to admit that it was one of the finest reports from the standpoint of fire protection that we ever saw. This inspector went through our plant, and he didn't miss a thing. He got everything that was there. To us it seemed those things were not there until we finally took the report and went over the plant and checked each of the details that the inspector covered. We found lots of things about our plant that we never knew existed that might be considered fire hazards.

I bring that up simply to show that if we had received that report and continued to accept it in the frame of mind we were in in the first place, we perhaps would have overlooked many valuable suggestions from the standpoint of fire protection.

Of course, there were lots of things that seemed minor and trivial, but at the same time they were potential fire hazards. I simply want to throw that out to the fellows who are here today; if an inspector comes through and makes a report, it is worthy of attention, it is worthy of serious consideration, because there may be something hidden away some place that you in your casual routine going over the factory will not see nor view in the light of an outside inspector. We consider such inspection valuable and you can depend upon it that our company is going to give it every consideration.

J. E. GRANGER (Fire Department, Cleveland): May I ask Mr. Abbott to explain a little further the method of cleaning these booths? There are three different methods, to my knowledge, and all of them are in their infancy. I believe it would be an advantage to those using pyroxylin finishes to know what the Fisher Body Corporation is using most successfully at this time.

MR. ABBOTT: The cleaning process varies somewhat with the nature of the installation. I think the most efficient and the safest is, where you have waterproof floors and they are properly drained, to wash out the installation every night thoroughly with a hose stream. In our later installations we are providing high pressure lines; we go right into the booths at night. The maintenance men wash the ducts, wash the interior of the booths, the floors and ceilings and walls of the spray room, if necessary. We have found this to be the most adequate way of getting rid of the residue.

In some cases where it is not possible to afford the waterproof floors and so forth, dry cleaning must be done. There are several ways in which that can be accom-

plished, and accomplished safely. One thing in maintenance is handling the dry residue, and that constitutes, I think, 75 per cent of the hazard in pyroxylin work. Most of the fires which have occurred up to the present time, have been traceable to one of two things: either the lack of proper maintenance or improper methods of maintenance. Some have been due to friction sparks igniting the dry residue while it was in suspension in the air. Others have occurred from allowing the residue to become combined with other residues which were of an oil base and, therefore, resulted in spontaneous ignition. In dry cleaning where you haven't the water process, I have known of some cases where coatings of soft soap were being used successfully to spray the interior of the booths.

We do not allow any change in the method of maintaining our booths without an order from the fire prevention department, and before we make any changes in maintenance methods, those changes are very carefully analyzed to determine whether or not the change is going to be more efficient than the method which may be in practice.

Soon after a disastrous fire in Detroit some time ago, I was flooded with a deluge of literature from different concerns which had a cure-all for all pyroxylin fires, substances that you could spray in the booths. Our orders are that no spray of any description shall be used in the booths without an order from the fire prevention department; and anything that has advanced along that line is, as I said, analyzed to see if there is any virtue to it.

We are considering now and are making some experiments (not merely one or two, but over a period of a month), to determine the efficiency of some of these so-called coatings for interiors of booths. Sometimes it is soap, sometimes it is a paint. There are several grades that have been put on the market for that purpose. In the maintenance, care should be exercised, whatever method you use, that non-sparking implements should be used where you are handling the residue dry, and it should be immediately submerged in water as soon as collected, for safety, because as soon as it is wet there is no danger.

Gas Often Mistaken For Smoke

Some of you may not know that fires occurring in the residue first decompose it into flammable gas. That gas should not be mistaken for smoke. When it reaches the proper density, it will in turn take fire and burn. I recall investigating one fire not long ago where the residues had been combined with other residues in the plant and left in a truck over night instead of being removed from the building, as should be the case with all residues collected during the day, for safe practice. They never should be left stored in the plant over night.

This fire occurred at about midnight from spontaneous ignition, which occurred from paint residues combined with the pyroxylin residues.

The chief of the fire department came in on the fire call and said, "What in the world was in that truck?"

One of the maintenance men said, "Why?"

He said, "There were huge volumes of smoke coming from it and then the smoke would take fire and burn up in the air."

That was merely the gases which had been generated by the burning residue.

In the later installations where we have the washdown, we have open-head sprinklers in the ducts and in the stacks which are on manual control valves, and during the washing process at night these valves are opened and the ventilating stacks and ducts are washed down by the sprinkler lines, open heads, the same as the inside of the booth is washed with the hose lines.

CHAIRMAN WENTWORTH: Is this residue readily soluble in water so that it is a perfect cleaning operation with the hose stream?

MR. ABBOTT: Yes. There is absolutely no danger. It is soluble in water. There

is no danger as soon as you have it wet. We have found in some cases that the residues collecting on the roof or on the outside of buildings near the exhaust stack, after a period of time, seem to be non-flammable. For a time, maybe the first one or two wettings, and then when dried out, it will burn, to some extent. It is also slowed up very materially by the combination of other dry dust, such as atmospheric dust, but we always treat it the same as if it were the clear lacquer dust, so far as safety features in connection with it are concerned.

ROBERT SCOTT (Atlantic Coast Line Railway Company, Wilmington, N. C.): May I ask Mr. Abbott, where automatic sprinklers are installed in the building and in the booths, do you use the deluge system?

MR. ABBOTT: Our attitude in connection with the deluge system is that where the hazard justifies the installation we are installing it. We have one plant where we have just put in a deluge system. I extend an invitation to any of the members present to come to Detroit at any time, and I will be very glad to show you the arrangement on this particular floor. We had a test on the valves last Monday night: by putting fire in the booth and operating the release device the booths were completely deluged automatically in eighteen seconds.

Is the Deluge System Justifiable?

MR. SCOTT: From the experience that you have had so far in the employment of the deluge system, do you feel that that experience is justified?

MR. ABBOTT: We do in large installations where the hazard justifies it. That is entirely governed, I should say, by the extent of the operations, the location of the hazard in the building, and the exposure which it creates. If we were doing pyroxylin spraying in the third or fourth floor of a six-story building, and we had female employees below in a trim shop, our building might be ideally situated, a fire resistive building, the booths properly constructed and the proper ventilation, yet there might be other things which would make the deluge system highly desirable from the standpoint of protection to human life as well as property. In some cases we are looking at it from that standpoint.

In spraying operations, for instance, in a building on the fourth or fifth or sixth floor, when you have quite a number of employees in that building, the safest way is to put out your fire as quickly as you can. We are installing in some cases entirely from that standpoint.

MR. SHAW (Hercules Powder Company): I understood the speaker to say, in answer to your question, that these pyroxylin residues are soluble in water. As I understand it, the chief ingredient of the residue is nitrocellulose, and that is not soluble in water. If I have misunderstood, I should like to be straightened out and see that the record does not convey any misunderstanding to others.

CHAIRMAN WENTWORTH: Mr. Shaw makes the point that nitrocellulose is not soluble in water. Perhaps Mr. Abbott would like to extend his remarks to cover that point.

MR. ABBOTT: I think that is more of a technicality of chemistry than the subject that we are just discussing. What we were getting at is the safe handling of the residue rather than the exact chemical technique of the residue being soluble in water. As soon as it is placed in water there is no further danger from the fire hazard as long as it is kept wet.

MR. SHAW: That is correct, I agree with you, but I don't think the record should show that these residues are soluble in water, because they are not.

CHAIRMAN WENTWORTH: The next item is "First Aid Equipment for Fighting Fires." Most of you, I think, are familiar with the organization which the next speaker represents. Thirty years ago, at the time of the birth of the National Fire Protection Association, Underwriters' Laboratories was also born. It was born out of a real need. When we came to make the standards for metal window frame

protection, for example, we found the need of actual laboratory tests. We could not make a rule for window protection without a definite experimental experience. That was one of the items which gave the impulse to the creation of Underwriters' Laboratories, which now possess the most wonderful shop of its kind in the world.

Outside of the original tests at the laboratories, which are so interesting, has been developed an inspection at the factory, of devices and materials. Underwriters' Laboratories has developed a most important service which assists the purchasing public, when it buys a fire prevention device or buys any device or material related to fire protection, giving a certification that that device will do the thing which it is designed to do.

The Department of Factory Inspection and Label Service of Underwriters' Laboratories is presided over by our next speaker, whose ability, executive force and intelligence are well known to many of us, Mr. Curtis R. Welborn, Superintendent of Label Service of Underwriters' Laboratories.

First Aid Equipment for Fighting Fires

Curtis R. Welborn, Superintendent, Label Service, Underwriters' Laboratories, Chicago, Ill.

One of the attempts to explain how humanity acquired the use of fire is handed down to us in mythology in the story of Prometheus. This Titan, who evidently possessed all the dash and courage characteristic of his race, stole from the gods some glowing embers for mere mortals. For his transgression he was chained to the rocks and an eagle was directed to devour his liver each day.

That story, if we are to think of losses from the use of fire in terms of dollars and cents, is carried to a very satisfactory conclusion. A very proper punishment for a rash act because something was placed in the hands of careless and indifferent human beings without instructions as to combating it in event it became unruly, that was to prove a curse as well as the benefit for which it was intended.

During the year that has just passed, the colossal stupidity of individuals in our country and Canada has left us with a 560 million dollar ash heap, to say nothing of the loss of life. I think all of you will agree that we do not have to be interested in, or fanatics on, the subject of fire prevention, or even straight thinking fire prevention engineers, to shudder at the figure. It is a tragedy, the economics of which should cause, and is causing, (thanks to the efforts of the splendid secretary of the N. F. P. A.), the business world to take cognizance of the unwarranted loss of life and property. This, however, is not a problem for the fire prevention expert and business man alone and it will not be solved until every man, woman, and child has been made to realize that it is a personal responsibility.

In my opinion its solution is predicated on one thing, and that is enlightenment. Without fear of contradiction, I believe that a substantial percentage, yes—even 90 per cent of all fires—could have been extinguished by the intelligent application at the right time of any standard fire extinguisher; and, from my point of view, the matter of curbing this unwarranted waste resolves itself into two major divisions, namely:

- (a) Creating the demand for first aid fire appliances.
- (b) Instructing purchasers in the procurement and use of the machines.

The first division is perhaps essentially the job of the manufacturer, the insurance fraternity and the N. F. P. A.; but the latter is the business of everyone interested in saving life and property from the ravages of the demon and may be separated into three phases:

- (a) The procurement of proper standard equipment.
- (b) Correct distribution.
- (c) Adequate maintenance.

Incipient fires have different characteristics and thus necessitate different methods of combat. The different characteristics, due largely to the kinds of material being consumed, necessitate the selection of different types of first aid equipment.

These fires have been grouped into three classes with respect to character, and into two classes with respect to means of extinguishing them. The classifications with respect to character of the fire are A, B and C, and with respect to extinguishing them are cooling and smothering or perhaps a combination of the two.

A class "A" fire is one originating in ordinary combustibles like wood, paper, and rubbish.

A class "B" fire is one originating in oils, grease, etc.

A class "C" fire is one originating in electrical equipment where a non-conducting stream is essential as a safety measure.

My purpose in defining fires is to emphasize the fact that the installation of first aid hand fire appliances is a study, and failing to study the premises with respect to the existing hazards may result in an unwarranted loss, to say nothing of the unfavorable impression created with respect to the use of such appliances. It, therefore, becomes a responsibility of those of us interested in the reputation of first aid fire extinguishers to see that unfavorable impressions are not created and this may be accomplished in only one way—by advising the prospective user of, and securing for our own use, the class of device that is best suited for the particular premises and at the same time assuring those interested in installing such apparatus that standard extinguishers are readily identified by the inspection manifest of Underwriters' Laboratories attached to the shell above or integral with the manufacturer's name plate.

It is unfair to these hand appliances to demand them to be a panacea for all ills. Each type and design has its limitations but these limitations have been determined and the devices classified accordingly. For convenience to the users, Underwriters' Laboratories' label conveys the information concerning the adaptability of the device for an A, B or C fire and just how many extinguishers are considered a unit of protection. This unit is composed of from one to five first aid fire appliances, depending upon the extinguishing value of the kind of appliance comprising the unit and is designed to protect 2,500 square feet of floor space where ordinary combustibles are involved. Care should be exercised in the location of the device. These distances from the hazards to be protected have been tabulated by the National Board of Fire Underwriters in their publication known as "First Aid Fire Appliances" and which may be obtained upon request. It is my thought that every plant superintendent should have this document in his personal library and institute some program of determining whether or not the regulations are complied with on the premises under his jurisdiction.

Dangerous to Neglect Fire Extinguishers

The last, but by no means the least of the three phases of everyone's business is the item of maintenance. My position requires that I spend a great amount of time in manufacturing and distributing establishments of this country and Canada, and quite naturally one of the things that always attracts my attention is the fire fighting equipment provided. Many of the industrial risks have a system of inspection that compels them to designate some properly qualified individual for the maintenance of first aid hand fire appliances but many other places neglect them. Neglect is the death knell of fire extinguishers. There are two things of major importance in the matter of maintenance of the majority of extinguishers and these are: Protect them from freezing and discharge and recharge them annually, taking special care that the manufacturer's recharges are used in the respective devices and their directions carefully followed.

Gentlemen, I have not attempted to discuss the mechanism, operating characteristics

and technical details of first aid hand fire extinguishers for two principal reasons; firstly, because it would take most of the day if it were attempted and secondly, because I am not an extinguisher technician. As for what extinguishers are and how they work there is a document assembled by the N. F. P. A. that presents the heart of any extinguisher speech, discussion or what not that may be made on the common types. The pertinent facts pertaining to these devices, originated in our published advices to users so we are more than pleased to receive and answer questions regarding them.

There are just two more things I wish to emphasize and they are the relation existing between first aid hand fire appliances and safety and comfort to human beings. Early in my talk the statement was made that a substantial percentage of all fires could have been extinguished by the intelligent application of a standard fire extinguisher. If the distribution of these machines had been adequately made during 1926, 10,000 seared souls probably would not have entered eternity. It is rather a cold blooded way of treating such a subject but have you ever considered the worth of 10,000 human beings in terms of units of fire protection? Suppose that of this 10,000 people, 7,000 were adults capable of earning \$1,000 per year, and that, I believe, is rather conservative figuring. In other words, seven million dollars in one year is lost to our economic structure, to say nothing of its contribution to our domestic welfare and happiness. In all probability this potential wealth would not have been contributed to society in this manner but if we estimate the average cost of an extinguisher at \$10, that amount of money would place an extinguisher in 700,000 American premises.

Shall the "Red Demon" Govern Our Tax Rate?

With reference to the comfort of human beings, I feel quite safe in saying that none of us enjoy paying an exorbitant tax to the city nor a very high insurance premium on our worldly possessions. After the "Red Demon" has devoured any, or several, blocks of any of our cities and towns, do you suppose the cost of administration will be adjusted proportionately to the reduced revenue from this loss, or do you suppose the insurance premium will be lowered when they are based primarily on losses? It is my guess that neither will be the case and most likely in the first instance the administration cost will be prorated over the remaining untouched area and in the other case there is a splendid opportunity for an adjustment of rates. In other words, the sane and careful people of this country are at the mercy of the careless and indifferent and those of us interested in this problem are paying for it. It is my hope that the time will come in this country, when things go up in smoke somebody goes to jail, and stays there until he satisfactorily explains that the conflagration was unavoidable.

Present conditions are inexcusable blunders affecting the future and, gentlemen, what finer monument can we build for posterity than that which we erect when this enormous annual fire loss becomes a negligible quantity!

It is your responsibility and mine to try to stop it, and we can contribute effectively by encouraging the use of hand fire extinguishers. Leave the construction details to the manufacturers and Underwriters' Laboratories and do your part by equipping your premises with an adequate number of properly distributed standard machines and *maintain them*.

CHAIRMAN WENTWORTH: Mr. Welborn brought out the points, what first-aid devices are for; the character of building in which they are installed; the proper distribution. And then the very necessary point of proper maintenance. Those are the points to which our discussion should be addressed.

E. S. LICHT (Empire Gas and Electric Company, Geneva, N. Y.): I should like to ask Mr. Welborn why it is that sometimes fire underwriters say that fire

hose must be installed in hydro electric plants and substations. If they were ever used in the case of an electrical fire you could see what the result would be. Why is that?

CHAIRMAN WENTWORTH: Mr. Licht has asked why the underwriters sometimes request the installation of hose in electric generator stations where the projection of water might injure the machinery.

MR. WELBORN: That problem lies wholly with the local underwriters having jurisdiction.

CHAIRMAN WENTWORTH: If the underwriters can't properly make out their case for the installation of hose, then perhaps the industry will be unconvinced. There are certain occasions, if a building gets on fire, after the electrical fire is extinguished perhaps, where hose streams might be very valuable in case the station contains combustible material.

Systematic Charging of Extinguishers Important

MR. GRANGER (Cleveland Fire Department, Cleveland, Ohio): In referring to the annual charging of extinguishers, I would suggest that be made semi-annual for two reasons; first, to give a demonstration and experience in the handling of them, and next it would be additional security against some misuse or failure to operate when badly needed. I think a year is too long. It is not much expense to do it semi-annually. I believe charging semi-annually is at least well worth the cost.

BENJAMIN RICHARDS (Underwriters' Service Association, Chicago): I should like to see in the record a little statement respecting what the other gentleman brought up. I think there is quite a little misunderstanding about the use of water in electrical fires. I don't know much about electrical apparatus myself, but I do know that a manufacturer protects a large dynamo by water spray sprinklers in the fields of those machines, and I also know that the electric people put outdoors—subject to rain, snow and ice—bare terminals under very high potentials. I also know that there are thousands of cases where a little hose stream of water from a sprinkler on an electric fire would avoid a very large loss. Fire happened in one case I have in mind at a switchboard. The fire department came and put hose streams in, in this case seven of them, where one sprinkler on the switchboard would have prevented the loss. That loss ran over a hundred thousand dollars. With sprinklers, in spite of short circuits and other technical defects, the loss would have been very nominal and the station would have been operating, probably, the next day.

I don't know, myself, what is correct in the argument between the electrical experts and the others, but I do think that there is quite a misunderstanding, especially as some of these machines are already equipped with water sprinklers and therefore a hose stream won't hurt them any.

Usually the short circuits are on the switchboard before the water is applied and a little extra water can't do much harm. Again, we have paper mills specifying that motors, dynamos, and so forth, should be waterproof. One mill I know required the General Electric to run the machine under water a certain time before they purchased it so a few hose streams around the electric apparatus are not quite so harmful as one might think.

R. B. KELLY (Anaconda Copper Mining Company): I should like to ask Mr. Welborn if he considers that the installation and use of a carbon tetrachloride or similar fire fighting apparatus is sufficient as first aid fire fighting.

MR. WELBORN: In the N. F. P. A. booklet I distributed this morning there is very clearly outlined the limitation of the various types of apparatus as published in our list of approved devices.

MR. KELLY: I should like to say a word in connection with what the gentleman

said in regard to fighting fires in electrical machinery. The Anaconda Company uses very high voltage in its substations and also a high voltage in the operating departments. We frequently have some severe fires due to lightning. While we are, as we consider, well protected against lightning, it frequently develops fire. We do not use, however, a fire hose stream, we use chemicals, and we have never yet failed to subdue any fire that may have occurred in any of the generating machines or on the switchboards with those chemicals.

We have come to the conclusion that it is far better equipment to use than to put in what is known as the sprinkling or deluge system in an elaborate electrically equipped plant and perhaps ruin the entire installation by the use of water. We had an experience of that kind years ago, and our experience in using the chemicals has taught us that they are amply sufficient in subduing the average fire that may occur in an electrical substation or generating plant when the employees or the operators are trained in the use of apparatus and are prompt in adopting its use.

W. T. FILMER (Youngstown Sheet and Tube Company, Youngstown, Ohio): Concerning these N. F. P. A. pamphlets I believe it would be just as well if we would all go back home with them and emphasize the fact that they represent an authority as to what is the proper field for the various first aid equipment. Many people are inclined to be overcome by the argument of a salesman, and a salesman will sometimes advise the use of equipment which is not the best suited for the particular hazard involved.

I know of a case where people purchased a large amount of equipment which proved locally unsuitable for the hazard. We ought really to look at these devices from the standpoint of the National Fire Protection Association and see whether or not the equipment we are buying is the proper equipment.

Never Too Young to Learn

C. P. REMMEY (Captain, Fire Department, Memphis, Tenn.): I want to cite one instance of the value of teaching school children the proper use of fire extinguishing equipment. Three years ago in our public schools we found that the state law was not in any sense of the word being observed with reference to proper and adequate fire extinguishing devices. That situation has been well taken care of in the city of Memphis. The school boards cooperated handsomely. We now have an adequate number of the proper kind of extinguishers placed. But we consider a very important point in the operation of fire extinguishers just this: No matter how correct the directions are on that canister for use in time of fire, it is unreasonable to expect a layman to know how to operate it in a smoke-filled hallway where visibility is cut off, and he cannot be expected to stop in such a time of excitement to read the directions. We recognized that situation in training our 40,000 children in the public and parochial schools in the proper use of these devices in time of "peace." In time of peace be prepared for war.

The importance of this was emphasized very clearly a year ago. In a school which three years ago had only a one-quart extinguisher for over 105,000 square feet of floor space, there was a fire last year when it was equipped with 21 two and a half gallon soda and acid containers. This fire occurred under a \$45,000 auditorium addition, due to a strictly preventable cause, the storing of waste paper bailed. There seems to be a tendency on the part of our wonderful Parent-Teacher Association to economize, and to make money from any source whatsoever, and they have a policy of storing this material in auditoriums.

The fire occurred at 4:15 in the afternoon, after school had been dismissed. The building was not occupied, but fortunately on the court a number of basketball players were preparing for a game. One of the young chaps saw smoke issuing

from beneath the storage room door under the annex. We have a boy in each school trained who is called fire marshal. It is his duty to be observant at all times and make adequate reports to my office.

Sixteen of these extinguishers were used effectively. I want you to mark the training of those chaps. Under the direction of the fire marshal, the aids went throughout the building, collected the extinguishers, brought them to the doorway. The panels of the door were not broken in until the extinguishers were already assembled, and then such a charge of fire extinguishing fluid was put into that roaring inferno as is beyond your estimation. The enthusiasm and efficiency of those trained school chaps put out a fire that would have cost \$45,000. In the short space of twenty minutes the fire was practically extinguished, before the fire department arrived and laid their first line. That showed, I believe, the value of training.

In times that are free of excitement the directions on the extinguishers are dandy, but in the excitement and stress you don't read directions. I have seen them picked up and thrown down. They thought all they had to do was to take them off the wall, set them down and they would explode.

Teach the school children. That is the best bet. In the homes where the equipment is placed they will be good firemen, they will beat the fire department at its own game.

Extinguishers on the Wall but Useless

CHAIRMAN WENTWORTH: Captain Remmey's statement regarding the protection in the schools reminds me of the experience we had when our field engineering department made a survey of the Plymouth, Massachusetts, schools last year. You know Plymouth was the landing place of the Pilgrims. Our field engineer found the new high school had purchased a dozen nice new two-and-a-half gallon extinguishers. They were hung on the walls in their proper places, but they were all empty.

Mr. Bugbee suggested perhaps Raymond Hitchcock was right, that it might have been better for civilization, if not for thirst, if the rock had landed on the Pilgrims rather than the Pilgrims on the rock.

MR. RYAN (Chicago Fire Department, Chicago, Ill.): I might say that in Memphis a great thing might be overlooked. One of the real things that everybody should be taught is to have somebody call the fire department first and then fight your fire afterward. That fire department was pretty slow—twenty minutes.

CAPTAIN REMMEY: I take great pleasure in answering Captain Ryan. I probably lengthened the time very much because I was not at the scene of the fire, but the history of the Memphis Fire Department is outstanding. We have nothing to be ashamed of when our engine houses are visited. I have the same to say about Chicago, but our time is second to nobody's.

CHARLES SWEGER (Matthiessen and Hegeler Zinc Company, LaSalle, Ill.): Nothing has been said so far about the danger of using carbon tetrachloride around sulphuric acid.

CHAIRMAN WENTWORTH: Has anybody any special ideas about that? Mr. Welborn, do you wish to say anything about it?

CURTIS R. WELBORN (Underwriters' Laboratories, Chicago): I have had no experience with it.

CHAIRMAN WENTWORTH: The antagonism of different chemicals to one another is a question by itself. The general subject, I think, has been discussed to the point where we realize that the need for the proper extinguisher being selected is first, the proper distribution is second, and the proper maintenance third, all of which are set forward in the N. F. P. A. pamphlet which Mr. Welborn has so kindly donated.

If any of you desire a copy of that pamphlet drop a postal card to the National Fire Protection Association in Boston, and one will be promptly sent.

The next paper is on "Fire Brigades." It is unnecessary to say to this distinguished company that the trained fire brigade is a very different organization from the volunteer fire department. We find in our discussions in the N. F. P. A. that sometimes the layman confuses the factory fire brigade with the village volunteer fire department. The volunteer fire department is not, of course, held in quite such high regard. You remember the story of the school girl who was asked to transpose the sentence, "The fire was extinguished by the volunteer fire department before much damage had been done."

She transposed it to read, "The fire was extinguished before much damage had been done by the volunteer fire department."

The fire brigade properly trained, properly operated is a wonderful adjunct to any large going concern. Our speaker of today, Mr. R. G. Landuyt, of Montgomery Ward & Company, has been chief of such a department in the great concern that he represents for 25 years. He concludes this year his 25 years of service, and he is to receive, to my knowledge, a gold watch and fifteen paid-up shares of the company's stock.

You will be surprised when he comes to the platform, to see what a youthful fire chief he appears to be.

MR. LANDUYT: Mr. Chairman, Mr. Richards, Gentlemen of the Council—First of all I want to thank our Chairman here for the introduction. It is customary for me to appear as responding to a fire alarm instead of receiving an introduction.

I always like to follow the army style and that is "put it in writing." If you will pardon me I will read my paper.

Fire Brigades

Reni G. Landuyt, Fire Marshal, Montgomery Ward & Company, Chicago, Ill.

This is the first time the National Safety Council has had the subject of organizing private fire brigades on its Annual Safety Congress program.

About five years ago, the officers of Montgomery Ward & Co. appointed a committee to study private fire alarm systems, fire brigades and fire drills. Even though we are in fire-proof buildings equipped with fire-fighting equipment and are covered by different kinds of insurance, our first consideration was to safeguard the lives of our employees.

With the idea of safety to lives in mind, the committee agreed that exit drills and brigade maneuvers, both under tests and in actual emergency, can be conducted to much greater advantage under an installation of a private automatic fire alarm system, such as is required as a matter of law in many states.

A fire brigade is valuable in exact proportion to the quickness with which it arrives at the scene of the fire and begins to function. In other words, reaching and attacking the fire in its incipient stages is the important consideration. Similarly, fire exit drill is valuable in proportion to the speed and precision with which non-brigade members are safely evacuated from the involved area.

Fire drills if properly conducted can be confined to a very few minutes. It is quite important the elements of surprise be present at the time of drill, that is, that the alarm be given without warning.

Organization

The motive underlying a fire organization is fundamentally one of mutual protection; manager and employee, alike, are vitally concerned with the preservation of

life, and the permanency of position which the safe guarding and protection of the plant insures. The interest of each party is the common interest of both. Fortunately, the conditions which render many so-called fire drill and brigade activities inadequate and ineffectual are not traceable to a failure on the part of either the employer or employee to understand the relationship or to appreciate how vitally important are these activities. The necessity of the fire brigades and fire drills is almost universally recognized.

Why then, are such organizations so seldom perfected to the point of effectiveness? There are a number of reasons. The failure may be due to imperfections in the method of building the organization, e.g. failure to observe the greatest care in the selection of the members or to establish proper regulations, particularly with respect to discipline or, as frequently happens, it may be due to restrictions placed upon the conduct of the drills. Brigade activities are sometimes side-tracked for matters of but momentary importance. This is bad because the fire problem is one of ever-present concern. It is dangerous for by falling short of being effective, brigades really constitute a menace—a weak substitute which employer and employees, alike, are quite generally misled into accepting as a source of security.

It is my purpose to describe what is right conduct in these matters and at the same time point the way to the development of an ideal organization.

Scope

A fire brigade necessarily must conform to the size, the location and the structural and occupational peculiarities of the plant; must take into account the number of employees, particularly males, the kinds and amount of extinguishing apparatus, etc. It is necessary, therefore, that any plan of organization intended to reach several plants, to be practicable, must be very general in scope; must, on the one hand, allow the manager or superintendent some freedom of action to work out the details best adapting the scheme to the needs of his own plant, but yet must rely on him to do this in a way that will approach the ideal brigade as near as possible.

Brigade Membership Generally

At the outset it should not be overlooked that membership is a real responsibility. The importance of creating an appreciative attitude in this direction can hardly be exaggerated. Members who really feel their responsibility for the safety of fellow-workers and of the plant are more than likely to feel that brigade membership, of itself, confers a distinction.

Only intelligent, cool-headed, strong and active men should be chosen. Once chosen, each should be immediately and thoroughly informed as to the location of the stairways, fire doors, fire escapes, elevators, fire appliances, values, etc., and made familiar with the fire call numbers.

In order to afford members the requisite special knowledge in their duties in the brigade, it is essential that each be instructed and trained to perform any of the duties should it be found necessary at the time of fire to switch from duties regularly assigned.

Chief of the Brigade

So much depends upon the proper functioning and co-ordination of the fire-fighting forces and egress drills that it is false economy to employ other than a high-grade man for the position of chief, or to divide his time with other activities. In plants of any size he will have little time for other work if he continuously produces an efficient brigade organization; if he conducts frequent drills and performs the inspection and maintenance work with the attention and care it requires.

In addition to being physically strong and mentally fitted by experience, the chief's status in the plant should be such that his position will command the respect of the

employees, thus giving reasonable assurance that his instructions will be carried out. A distinctive uniform for the chief is very desirable.

The chief should have charge of all matters pertaining to exit drills, practice maneuvers and organization and should designate all persons to fill the positions in the brigade proper. He should personally supervise the conduct of all drills and rigidly enforce measures of discipline for failure on the part of any employee or any member of the brigade to fully observe all rules and requirements. He should by personal daily inspections, see that sufficient unobstructed space is given to aisles and passageways to permit quick access to all exits; he should see that all fire equipment is in place, in good order and unobstructed; that recognized good practice in fire prevention is employed. He should prepare an accurate semi-monthly inspection report, on blank provided for that purpose.

Assistant Chief

He should be qualified to perform the duties of the chief in the absence of that officer and perform such other fire services as the chief may direct.

Battalion Chief

Where the department is divided into battalions, a battalion chief should be assigned, and his selection should be, so far as can be done, based upon the same qualifications as assistant chief.

Captains

The utmost care should be exercised in the selection of captains, as upon them largely depends the efficiency and success of the drills, and in cases of fire, the direct supervision of the active fighting operation. Therefore, strong, active men accustomed to the control of employees, capable of a fair degree of self possession, of reliable judgement and of acting quickly in an emergency, are essential. It is important that they have the trust and confidence of their employees generally.

Captain Plays the Important Role

The captain under the supervision of the chief, should have immediate charge of all employees in his area, in all matters pertaining to the brigade and exit drills; should be held responsible for enforcement of all rules and report to the chief any employee who wilfully neglects their property observance; he should see that each movement corresponding to the alarm signal is properly and promptly executed; be responsible for the condition of all aisles, passageways, etc., in his area.

When, by pre-arrangement, in drill practice, or as a result of an actual fire, it may be necessary to depart from the regular instructions or procedure, such change should be made at the sole direction of the captain or chief.

Hose Men

In no case should there be less than three (3) men assigned to each line of hose to be operated. Hose men should be strong, active, and gritty, capable of taking lines of hose under pressure upstairs and able to withstand considerable fatigue, heat and smoke.

Extinguisher Men

An adequate number of men should be selected to handle the chemical extinguishers, fire pails and other small auxiliary equipment. This equipment forms a very important part of the protection and must not be roughly handled. Instructions in the handling of it should be so devised as to eliminate carelessness and abuse.

In case of actual fire and if it is necessary to use hose, extinguisher men can act as hose men with those already appointed.

Door Guards

Door guards should see that the marching from the rooms, and in descending the stairways is orderly, without crowding and at a uniform speed, with careful observance and spacing between files. They should be especially watchful of

persons stumbling or falling, to prevent trampling, and no conditions should be allowed which will involve a halt after the exit march has started.

Guards should be stationed as follows:

(1) One guard on the room or interior side of each door available as an exit from the room involved, who should see that the door is promptly opened after the first signal and is kept open until all the occupants not assigned to brigade duty, have left the room, and who should then, personally, immediately close the door.

(2) One guard on landing midway on staircase descending to the next floor below.

Searchers

There should be at least one man and one woman—cool headed and strong—appointed as searchers for each fire area who should immediately upon the first alarm, visit the toilet rooms and any other rooms in which there may be occupants who might not hear the signal to give the alarm.

Elevators

Elevator attendants should be instructed to take cars immediately upon the sounding of alarm to certain designated floors.

Telephone and Pull Boxes

The phone call and pull on city box are not to be made, except in cases of actual fire. The switchboard operator in turn should notify in the order named, the fire department, the fire chief, the plant engineer and the manager.

General Alarm

Should a fire assume such proportions that it is necessary for all employees to leave the building, a signal should be sounded indicating complete dismissal.

Cooperation with City Fire Department

To promote intelligent and harmonious relations, the public fire department officials should be invited to inspect the property periodically. This will insure their familiarity with the arrangement of buildings, and with the best means of access and escape; will acquaint the department with the nature and location of materials housed, particularly such as might involve an explosion, or the rapid spread of fire, and in other ways work to our advantage. Consultation between the brigade chiefs and City Fire Department men are helpful in keeping up-to-date in fire fighting methods.

The fire marshal should accompany all inspectors while making inspection trips through the building.

Montgomery Ward and Company has followed this plan of organization.

Installed a private automatic fire alarm box and gong in each section of the building.

Organized a private fire brigade. The building is divided into many battalion areas and a fire brigade for each battalion area is under the direct supervision of the deputy fire marshal.

Printed fire discipline bulletins, fire drill instructions for employees and a fire department manual for members of house fire department.

There is a special marking on the salary card of every employee who is a member of the fire brigade, and in the event that a member of the brigade is removed from the employee of the company, the timekeeper immediately notifies the fire marshal and another employee is appointed to fill the vacancy.

The fire-alarm system is operated daily for fire drills.

When an alarm is turned in for a drill or fire, the signal of section is sounded four times on all the gongs in the building, in less than a minute's time.

All employees in section of signal, walk in an orderly manner to the section beyond the adjoining section or down stairways two floors below section of signal.

The fire-brigade members respond to the section from which the alarm has been sent and take the position to which they have been assigned.

When a fire drill is completed, a fire extinguished or other emergencies taken care of, a release signal is sounded, indicating that all is well. Then we have roll-call for the members of the fire brigade.

We also have A. D. T. Company fire alarm boxes on every floor and our entire sprinkler system is under A. D. T. Company supervision. That also means we can turn in a city fire alarm signal, by creating a sprinkler or fire-hose water flow.

The Fire Department's Manual

MR. LANDUYT: I will take a minute's time to describe our house fire department manual. When we prepared this manual it consisted of 20 pages. The committee agreed it was too much to give the fire department members a lot of pages of reading matter to cast to one side. So we made it very, very brief. The first page covers fire alarm signals, second page, three different kinds of fire alarm systems we have in our buildings, and how to send in alarms, general information, organization of the house fire department, the duties of the house fire department members from the chief down to the very last man.

Our battalion consists of two companies, a fire fighting company and a dismissal company, the fire fighting company to extinguish the fires and the other to take care of the employees. Total responses to each fire alarm signal, 24 men, and in case the "strike-out" signal as it is called by the City Fire Department is not sounded within a period of less than a minute and a half after every fire drill, additional men are instructed to respond to the alarm at once.

The different companies are night watch, early morning and day.

We have in the building many valuable records, money, jewelry. In case a signal is turned in from any one of those sections, the house police department also responds.

We have the location of the house fire department boxes and the location of the city fire alarm boxes.

The last page has a typical floor plan showing the location of every fire alarm box, and also a skeleton plan of the building showing the battalion area and fire alarm signals for each battalion.

We have two kinds of fire alarm boxes in our building, the private fire alarm box and the city fire alarm box.

This is the private, marked with two white stripes.

The city fire alarm box: I also want to call your attention to the glass in the box. In my experience in traveling with the different manufacturing plants and institutions, every fire alarm box I have seen has glass in it. Our own house fire alarm boxes have glass that is painted with a white circle. When you are at least 100 feet from the box you can still see that the glass is in the box and it is set ready for use. The same with the city fire alarm box. This point may be a little far fetched, but the city fire alarm boxes have a spring behind the door. The moment the glass is cracked the door flies open. What is exposed? The lever. If there is any city fire alarm box in your plant and the door is open, some curious employee comes along and wants to know what it is all about. He pulls the lever all the way down, the result is a false alarm, and in this big city of ours the city firemen have responded to many false alarms and sometimes had a fatal accident amongst the members of the Fire Department and also citizens.

The point I am trying to bring out here is to mark the glass to show that your fire alarm box is set as it should be.

Our sprinkler system is also marked. We have many hundreds of drain valves and sprinkler valves. These are the types of cards used hanging in a frame right below the valve.

CHAIRMAN WENTWORTH: Mr. Landuyt's paper is largely a matter of detail and it will afford us splendid material for inclusion in the records so we may study it at our leisure.

There are, however, a number of points which he may wish to discuss, particularly that the fire chief of an organization should have no other job. I suppose that depends somewhat on the size of the organization.

He also makes the very good point that the local fire chiefs, brigade fire chiefs, should keep in close touch with the City Fire Department. In some plants, to my knowledge, that has not been done as successfully as it might.

ROBERT SCOTT (Atlantic Coast Line Railway Company, Wilmington, N. C.): It seems to me that this paper is so complete and so replete with information there is nothing much for us to ask about, but I should like to suggest a rising vote of thanks to this gentleman for such a fine presentation of his subject.

(A rising vote of thanks was extended to Mr. Landuyt.)

How Is Interest in Volunteer Fire Brigade Created?

MR. HARDY (Youngstown Sheet and Tube Company): This paper has certainly been a revelation to us people who have not exactly the same condition as exists in such large houses as Montgomery Ward's. We of the iron and steel industry have different conditions under which to organize and maintain our fire brigade.

I should like to hear a discussion on methods and manners of securing and maintaining interest in a volunteer fire brigade organization in an institution of large proportions. We can't do it in smaller concerns, but where we cover areas and have departments covering the whole territory, and battalions of eight and ten companies and perhaps ten battalions at that, to keep the interest of the members keyed up to the extent of being ready and prepared and working all the time is the question which I believe bothers the large volunteer organizations.

CHAIRMAN WENTWORTH: I think this is an interesting point, how we can maintain the interest of the fire brigade—what keeps the men on their toes? Have any of you any special ideas on that subject?

MR. ABBOTT (Fisher Body Corporation, Detroit): We had an experience some time ago which may illustrate that point and the method used has been productive of very good results. We were a little skeptical as to just what the interest was going to be among the men when we organized the department. We started out by taking all of the men who had been selected on the fire brigade, over to one of the leading hotels and giving them a banquet. That was attended by all the managers and by the general manager of that particular plant who acted as chairman and introduced the speakers of the evening. It is remarkable the interest that was prevalent all through the plant immediately after that meeting, with regard to fire protection, where we didn't have the number of men that we wanted who were chiefly foremen and sub-foremen. The next morning before the plant opened, the fire chief of the plant had applications from nine more foremen who wanted to act on the fire brigade. The night before we thought we were going to be short. We now make a practice of giving the fire department in that plant an annual banquet at the hotel. We have created a lot of very good interest in that way.

MR. LAVORGE (Missouri Pacific Lines, Houston, Texas): I just want to say in connection with the interest of the men in the fire brigades, our idea is to bring the men into Houston, and devote the morning to safety and the afternoon to fire protection. We seem to have succeeded in arousing considerable interest in regard to the records made by the various fire brigades.

That came about in a rather peculiar way. I happened to write to the magazine about a record by one of our fire brigades, and when I went to San Antonio one of the members of the fire brigade said: "I see where you said something very fine about the Quincy, Louisiana, fire brigade."

I replied, "Yes, I did. They made a very good record."

"We can beat that," he said.

"If you can, that is fine."

That was the start, and from then on each and every one of our brigades has been trying to outdo the other. When we had the shopmen's picnic we had a little contest fire for the fire brigades. We erected an old shack and it was set on fire. Each shop had its brigade on the ground, at some distance of course, and the first ones there, and those making the best performance (we had judges appointed) were the winners of the prize, whatever it might be.

We give the members of our fire brigade and safety committees passes also. Those passes designate whether they belong to the safety or fire brigades, and we find that by doing those things we have succeeded in arousing a great deal of interest. It is a real pleasure to go around among the men because they are continually asking what is it that so-and-so is doing.

When we bring the men to Houston we assign a man to discuss the care of the hose, the care of the Foamite extinguishers, the care of other types of extinguishers; to another care of organization of fire brigades. It has worked out splendidly.

MR. LANDUYT: I am going to tell you how we keep up interest in my private fire department organization. There are many times when a department manager says: "Chief, do you know of a good man?"

"Yes, I have a man on the third floor, a member of the house fire department. Give him a chance." And many of the boys have better positions today because they are members of the private fire brigade.

MR. RYAN (Chicago, Ill.): Chief Landuyt read his paper. The paper is very fine for daytime. I should like to know what occurs at night.

MR. LANDUYT: I mentioned in reading over the house fire department manual that we have a night watch company. They use the city fire alarm boxes and the house fire alarm boxes.

The entire staff of the engineering department are also members of the night fire brigade.

Volunteer Service Made Attractive

MR. RUTTAN (Eastman Kodak Company): We have a domestic fire department, yet it is hardly what you designate as a volunteer department. It is a designated department. We have a fire chief and two assistants and full time paid men with motorized equipment.

We employ in the neighborhood of 8,000 people in our works, in almost every sort of occupation under the sun, with almost every hazard under the sun. We manufacture pyroxylin, we manufacture film. It is a business where those who are familiar at all with the processes can readily understand it is hazardous.

The men are selected on the basis of their familiarity with and their knowledge of the hazard in particular buildings.

Our equipment and maintenance men, such as men in charge of water works, men in charge of special machinery and of ventilation and light, are all represented on this department. They are called together by a whistle. This alarm, in our opinion, is necessary to gather together some 100 hand-picked employees, and they represent nearly all the buildings, as I said before, of which there are 118.

The interest stimulated in the men is more along the line of giving them a special treat. I mean by that the most of those who actually do the work, outside of heads of departments, draw vacations with pay. They are recognized for promotion and advance as being employed in their regular work. If they are being found trustworthy it is a marker in their favor of selection for a step higher up. However, in our plant we base our first aid in case of fire upon an intelligent, trained employee

system of training in the schools. We don't permit any man or any woman to work in a hazardous department without first passing through this school.

Every course, as I said before, is used. There are a number of departments and we have specialized our instructions so that there are about a dozen different kinds of instructions issued, but seldom two instructions to the same employee. If he is to work in building number so-and-so, he gets a specific instruction, educational in nature, which explains everything he has to handle, and just what he is to do. That is done simply as an assistance to the foreman. He is then allowed to go to work in the department and is not allowed to go to work in that department without those instructions.

If he is transferred from one position to another, that is to say from one course of employment to another, he again goes through the school to get his instructions as to the proper thing to do, and the laboratory tests are illustrated so that he knows exactly what he is to do when he goes into that department. It makes it very easy in that way to promote men and consider them for promotion, first as to their actual function, and the indebtedness of the company to them, carrying with it certain favors.

We rely strictly upon policy. The company has a policy. Safety is a policy and fire fighting is a policy. It is just as incumbent upon each employee to take part in the protection of the job, of the building, of himself from injury, or the like, as is his employment itself. For instance, he pledges himself to be careful at all times before we employ him. If he does not, we have a penalization system whereby we lay him off a day or three days or a week prior to dismissal if we find he is a hazard to other employees or the plant.

CHAIRMAN WENTWORTH: The final paper this morning is "Plant Housekeeping and Its Relation to Fire Hazards."

The speaker to present this is Eugene Arms, engineer of a group of companies insuring flour mills. You can imagine how keenly necessary absolute cleanliness is in that sort of property. The speaker is admirably equipped, therefore, by his own consciousness to dramatize this subject to us. Mr. Eugene Arms, manager of the Mutual Fire Prevention Bureau, Chicago.

Plant Housekeeping and Its Relation to Fire Hazards

Eugene Arms, Manager, Mutual Fire Prevention Bureau, Chicago, Ill.

John Wesley might have been thinking of fire prevention when he said, "Cleanliness is indeed next to Godliness." Certainly filthiness is very closely related to the fire demon.

Cleanliness is a habit, even as filthiness is a habit. Habits, as deeply rooted as those, are not changed in a day, nor without effort on the part of the individual or individuals concerned. The street urchin does not suddenly decide to take a bath and thereafter keep himself clean. Neither does the owner of a poorly kept plant order his foremen to clean up and keep the place clean and get results. Habits are too deeply formed to be broken with so little effort.

Let us consider for a moment why cleanliness is so all important to fire prevention. Ignition must, of course, first take place, then the fire feeds on whatever combustible material it finds, and is finally detected and controlled or not, according to the means available. It simplifies our fire prevention work materially to make these three divisions and consider each separately. Now let us see how filth affects each division.

Spontaneous combustion is one of the very common causes of fires. This is the term applied to gradual oxidation of porous substances. The heat generated increases the rate of oxidation until the ignition point is reached. Fires from spontaneous combustion are particularly destructive because they usually

factor. Dirt and filth start fires, spread fires and make methods of control ineffective.

An important point, possibly the most important point, is the effect of cleanliness on the habits and actions of employees. We are told that soap has been one of the greatest factors in the civilization of the world. Personal cleanliness creates higher ideals. Just so, plant cleanliness creates careful employees. Only the most slovenly smoker would throw his cigar stub in the center of a clean floor. He seeks justification in the fact that others have discarded their litter in a corner, and, finding it there, adds his stub to the pile. It is human nature to follow where others have led, particularly if that is the line of least resistance.

The very effort necessary to cleanliness creates a higher morale. Pride on the part of the owners and managers carries down through the ranks. A clean bearing is seldom out of repair. The pride that induced cleanliness insures a smooth running bearing, while the bearing that is buried in grease and dirt runs until it is too hot to continue.

We naturally distrust the man with a week's stubble on his chin, soup spilled down his vest, and the mud from many rains on his shoes. That man is careless in everything and we should distrust him. A certain amount of pride is essential to well being. So it is with an industrial plant. Bad housekeeping is a direct result of carelessness, and carelessness is responsible for a very large proportion of fires.

Study Your Plant and Study Your Man

Many of you gentlemen are fire prevention engineers, and I do not need to preach to you the doctrine of plant cleanliness. You learn it from all of your text books, all of your instructors, but most of all from that greatest of all teachers—experience.

Your question is how may we best impress the plant manager and superintendent and get results? The first step is to draft your program. The plant must be examined very much as a physician diagnoses his patient. The chronic disease of uncleanness may have its seat in one place, or the entire anatomy of the patient may be diseased. Find, first, the cause and then prescribe the remedy. That sounds difficult, but it seldom is. It may be that the design of the plant and the condition of the machinery and the process of manufacture are such that the entire organization, from the owner down, is discouraged from a serious attempt to keep it clean. Such being the case, the program must include a general overhauling. Or the fault may lie entirely with the carelessness of the management. I believe it was Elbert Hubbard who said that no imitation is greater than the length and breadth of one man's shadow. Then find that man. Much time and effort are expended talking to the wrong man. Not always, but usually the right man is the highest man that you can reach in the organization. Start on him at least and get his endorsement of your program. No set rules of approach can ever be devised.

I have little sympathy with that school of high pressure salesmanship which teaches that salesmen must beat their prospects into submission by force of argument. It certainly does not work on me, and I do not believe there are many men in responsible positions on which it can be worked. Desire must be created, certainly a desire to own or manage a clean, well kept, orderly and efficient plant. Study your plant and study your man. Accompany your fire prevention argument with an appeal to pride, the safety and well being of employees, higher morale among the employees, or all of these things, and such others as are suggested by the conditions.

In our work we have found the organization of an inspection and fire brigade among the employees to be the most practical means of enlisting the interest of the men. On the inspection work the plant is divided into departments, and two men are selected from each department to take their regular turn on the weekly inspection. All suggestions are submitted to a committee composed of the management and workers. On the fire brigade each man is assigned a job when the fire alarm rings, and each department is put under one head, with a fire chief over all. That is the bare skeleton of the organization. The details must be suited to the industry and to the plant.

Pride in an industrial plant must originate with the management and emanate down through the ranks. It cannot be expected to originate with the employees. It, therefore, becomes the duty, and it should be the pleasure and pride, of every management to make housekeeping one of the major subjects of its industrial program and be content only when the highest standards are maintained.

CHAIRMAN WENTWORTH: There is hardly room for discussion of Mr. Arms' valuable paper regarding the value of cleanliness. He makes the point which we may well remember, that the very effort for cleanliness creates a higher morale in the organization. You know yourselves that when you go home tired from your work, in your working clothes, when you are weary and dirty, you are not very ambitious, you haven't much courage; but after you have your bath and get into an evening suit you immediately have a higher respect for yourself. It is the same way generally. Cleanliness, an up-and-coming attitude, gives you courage and raises your morale generally.

Are there any questions you would like to ask Mr. Arms? Are there any special points you would like to make regarding good housekeeping and its relation to fire hazards? It is so obvious that unless you have something to illustrate that fact, it is hardly necessary to discuss it.

Plant Cleanliness a Matter of Education

Mr. Pigford (Flintkote Company): I think Mr. Arms has brought out some very splendid ideas.

Mr. Arms brought out the subject of keeping the plant clean. I think the best way to keep the plant clean is by education of the employees. All employees from the manager down to the small office boy or the junk man should be educated.

I should like to ask Mr. Wentworth if the N. F. P. A. has considered the issuing of fire prevention posters, such posters perhaps as we see up here by the National Safety Council. Posters issued weekly or monthly would enable us to do great things toward educating our employees. We could reduce fire losses in that manner all over the country.

CHAIRMAN WENTWORTH: The N. F. P. A. has issued a series of pamphlets on common fire hazards, cleanliness, and so on, but of course as the years go round other ones are desirable. I shall be very glad to give thought to the suggestion of the speaker that the N. F. P. A. bring out a series of posters on plant fire protection especially, including this very important element of cleanliness.

We express our appreciation to Mr. Arms for his very valuable paper.

There are one or two items which I should like to bring before the convention. One is the matter of fireworks. At the meeting on home safety the other day there was introduced the idea of abolishing fireworks for private use, keeping them out of the hands of individuals. This resolution was considered and it has come to me to present to this meeting. I should like to see if it finds favor with you; if it does, if you care to, vote and pass it.

"Whereas, There is great annual loss of life and property in America due

to the private use of pyrotechnics by young children and adolescents of all ages in observing the holidays, Independence Day, Christmas, and Chinese New Year, and

"Whereas, It is desirable to substitute as soon as possible for the present orgies of fire and noise rational methods of observing these holidays, it is, therefore

"RESOLVED, That all private purchase, possession, discharge or firing of fireworks or pyrotechnic display of every sort whatsoever should be prohibited, public display of fireworks by properly qualified agencies under the direct supervision of experts in handling of fireworks only being permitted."

How do the members feel about prohibiting private use of fireworks altogether? My own experience as a parent is that I can't keep fireworks out of the hands of my children because the neighbors have them, and if they can't shoot them off at home they will sponge on the neighbors' supply, and they think their father is a pretty hard parent anyhow if he doesn't let them have them. This is something we must do collectively. I can't alone protect my children against those hazards.

On the other hand, we find, with ordinances prohibiting fireworks as exist now in Chicago, Evanston and elsewhere about here, bootlegging in fireworks goes on just outside the limits of these cities. Fireworks booths are set up, and naturally the fireworks may be purchased and lugged across the line, as certain other things come in from Canada.

Will Fireworks Also Be Prohibited?

Are we entering on a new prohibition idea by advocating the entire abolition of fireworks in the hands of the common citizen? What is your thought on that? If any of you have any clear opinion let's have it and vote on this resolution.

H. E. CARR (Youngstown Sheet & Tube Company, Indiana Harbor, Indiana). It seems to me the way to defeat that is by education. If we could undertake a very definite campaign for a period of even six weeks before these holidays, we could emphasize it so that anybody who got hurt would only have himself to hold responsible. I believe that would be better than to try to establish another form of prohibition which cannot be enforced.

CHAIRMAN WENTWORTH: The idea advanced by the speaker is to precede this sort of legislation with education, but education has been going on for many years and a great many cities have already prohibited private use of fireworks. That is something, and the more cities that attempt to prohibit private use, the more such ordinances are discussed, the better opportunity for public education. We cannot defer very well our movement for the enactment of these ordinances.

The National Fire Protection Association has been working to advance this idea for a good many years. There is no logical connection between patriotism and orgies of fire and noise, any more than there is any connection between Christmas and fireworks. In the South they have their fireworks during the Christmas holidays. What relation have fireworks to the birth of Christ? It is rather remote. It is just a notion, a desire to break loose and make a racket. It is a very juvenile, adolescent idea, it is an ungrown race which desires to express that sort of thing. It would be a good deal better for the youth of our country to concentrate on the idea of independence rather than the idea of recklessness and making noise.

MR. ARMSTRONG (Eastman Kodak Company): The gentleman speaks of education. For the past two years I have been doing educational work in an industrial plant. When it is absolutely impossible to educate the parents to a point where they will not allow their children money for the purchase of fireworks, we are up against a pretty tough proposition. We haven't been able to do anything with the parents. Every year and every year the same thing goes on. In every city of any size there are two

or three or four hundred injured, and two or three or four eyes lost. It always happens to kiddies eight or nine years old.

I think there is just one thought that ought to come back to all of us. It may be our kiddie next year, and I think the only way to eliminate this is to get legislation which will absolutely prohibit it.

W. A. WILSON (Frank Graven Sash, Door and Metal Company, Los Angeles, Cal.) It seems to me, gentlemen, that we can approach this also from another angle, advocating fireworks at such times as administered by the municipalities. The city in which I have the privilege of living controls this by having on these days large demonstrations in the public parks that are supervised by the fire department, and especially over in Pasadena they put on wonderful demonstrations at those times. It is done for a fireman's benefit fund, in order to help them carry on this work, but the people contribute very largely to it, and outside of this large place where it is conducted, there are no fireworks of any type.

C. A. BROOK (Homestake Mining Company, Lead, S. D.): We are getting around it this way: We go up on top of a hill and have experts come and set off the bombs and shoot off the skyrockets. That keeps the kids from wanting so many firecrackers, but at the same time they do buy them.

We are getting away from it gradually. We are trying to get an ordinance so they can't sell them. Last year we had three or four bad burns, from firecrackers.

CHAIRMAN WENTWORTH: The American Legion last year outside of Evanston maintained a row of bootlegging fireworks stalls.

MR. RYAN (Chicago): Where did the idea of prohibition of fireworks originate?

CHAIRMAN WENTWORTH: I think it started with our organization a great number of years ago. We first undertook the campaign in 1910 when the figures of the American Medical Association showed the loss of life every year was so astounding that we thought something should be done. We enlisted our members throughout the country to make a campaign before the Fourth of July in 1910 and gradually over five years we reduced this loss of life. There is still too much of it. As Mr. Armstrong has said, every year there are children blinded for life, dying from tetanus poisoning, burned to death from even the little "Sparklers" also which are reputed to be innocent and innocuous. We want to get it out of the minds of the children that they must play with fire. It is foolish. It is true, as Mr. Armstrong says, that some of the parents are worse than the children. My neighbor lays in a stock and shoots them off obviously for his children, really for himself.

Grown-ups Are Still Children in Many Ways

There are grown-ups just as crazy to make fire and noise as there are children. The masses, like children, will always crave spectacles. It is the suggestion of our friend from Los Angeles that the city take this matter in hand and give them their fill of something to gape at at a specific time, then prohibition of individual usage becomes easier.

Are you ready for the adoption of this resolution? Are you ready for the question? (The resolution was adopted).

CHAIRMAN WENTWORTH: The next item which we were asked to discuss is the subject of smoking. Our statistics show that smoking is the present greatest cause of fire loss in the United States and Canada. How are we to cope with it? You know how enormously smoking has spread, not only among our male youth but among our female youth. The smoking by young women and old women has extended so rapidly as to swell this tremendous loss, and you know how the tobacco companies have successfully increased their output of cigarettes by treating the tobacco and wrappers with nitrate. The old ones were not so treated. The old Sweet Caporal that I smoked when I was a small boy, clandestinely, if you put it down it would go out. The modern cigarette, being treated with nitrate, burns rapidly, increasing the con-

sumption tremendously, but also increasing the fire hazard because it burns to its complete end. Tobacco companies do not seem to be interested in fire prevention. We have attempted to interest them, especially in our cleanup campaigns, to convince them that if they will assist in our cleanup work it will reduce the hazard of their product, because a cigarette, as Mr. Arms has said, thrown upon a marble floor won't set fire, but a cigarette thrown in a rubbish heap, causes fires.

Is there anything in your minds that we can do to make smoking a safer operation except to work as hard as we can for greater cleanliness, better housekeeping, the abolition of rubbish? Can we do anything with the smokers themselves?

You know what a nation of fire-throwers we are. The other day in Boston, going into a matinee, a Harvard college boy flicked a cigarette into the lace dress of a woman and set it on fire right in the crowd. I was watching the marathon race in Wellesley last summer and a boy threw a cigarette into a baby carriage and ignited the covering. It began to burn. The nurse saw it at once and extinguished it. That is the way we throw fire about, and it is the careless user of fire, the careless smoker, who has us all in his power.

What can we do to reach the consciousness of the smoker? There are so many of them and they are increasing so rapidly. I have taken perhaps more time as Chairman than I should, but I wanted to introduce the subject as adequately as possible to save time. Matches are a part of the smoking hazard, of course.

The Common Match Must Go

MR. ARMSTRONG (Eastman Kodak Company): We have done practically everything possible along fire prevention lines. Mr. Wentworth is very familiar with our plant. We have a very beautiful plant which we don't want to burn down. We are doing a great deal of educational work. We have a regular school to which we have employees go. One thing we have not been able to do is prohibit the bringing into the plant of the common match. That is our big problem. We don't have smoking in the plant, but although we furnished for a good many years packs of safety matches like this, we still have common matches. We have had fires from these packages being in a man's pocket. When two packages get together, one end gets underneath and sets them off. We had several fires in men's pockets. Then we went to the Vulcan type match and we sell that match at less than cost. The employee can buy at the gate as he goes out, a dozen boxes of these matches for five cents. Still the common match comes in. We find them around the work rooms where we have inflammable solvents and vapors and nitrocellulose. Where you have that sort of material you don't want common matches around on the floor.

I think the only way we are going to keep the parlor match from coming into the industry is to prohibit its being brought in. I don't think that will work any hardship on the match manufacturer because they will consume as many matches anyway.

CHAIRMAN WENTWORTH: Do you mean by the parlor match the strike-anywhere match?

MR. ARMSTRONG: Yes.

CHAIRMAN WENTWORTH: The old "parlor" match head was not inert; it would fly off. That has practically been suspended.

MR. ARMSTRONG: The strike-anywhere match can be lit by stepping on it or running a truck over it on the floor. We have actually had it happen in our plant. Our problem is to get the other side of the family at home to use the safety match. The men don't seem to be able to put it over. We have discussed this with our management. In fact I discussed it just before I left Rochester. We are willing as a company to go on record as desiring to create any necessary legislation to prohibit, if necessary, the manufacture of strike-anywhere matches.

CHAIRMAN WENTWORTH: That is an interesting observation, that the Eastman Kodak Company would vote for legislation to prohibit the manufacture of any match except to strike on the box.

MR. SWEGER (Matthiessen & Hegeler Zinc Company, LaSalle, Ill.): It is up to the foreman. In our plant I have never seen a case where anybody found anything but a safety match because it is up to the foreman to find them. In regard to smoking, in some departments we allow smoking and in some we do not. In places where there is possible danger and a place is provided for the men to smoke, we have notices that the men appreciate it and take special care of those places. In some places it is all right for the men to smoke. In other places it is really dangerous. The men where they are allowed to smoke seem to appreciate it. We consider that is safer than to prohibit their smoking, in which case they smoke and when the boss comes around they throw their cigarettes in a pile of trash.

Women Smokers Present Difficult Fire Hazard

MR. ARMSTRONG: We provide those places for men to smoke in our plants, the same as the gentleman has just spoken of. We also have a blank for an employee to sign. This blank reads, "I have examined my pockets and found no matches." We permit the carrying of safety matches into the plant. We permit the employee to keep them in the locker. They are furnished with a steel locker, and perhaps you will better appreciate our problem when I tell you that we have in one plant 8,500 employees to deal with. There are about 2,500 women and practically seventy per cent of them smoke, including the women. We make no distinction now in regard to our propaganda on smoking and carrying matches. I will tell you, gentlemen, you folks who have fire hazards in your plant probably have not thought some of you of this. The women carrying the strike-anywhere match are your greatest hazard, due to the fact that a woman takes to her machine, and carries with her always, a pocketbook, and she carries in that pocketbook her matches if she smokes. Those matches can be set off by vanity cases and keys and materials of that kind.

If you have the female carrying matches along with the male, your greatest hazard is with your female employees, due to the fact that they carry them to the machine and lay them on the machine.

MR. SWEGER: I might mention that the biggest fire we had in the last twenty years, and it wasn't much of a fire at that, was caused by mice getting into the foreman's clothes in a wooden locker. The foreman was the heaviest loser. There is nothing but safety matches in that plant.

ROBERT PERRY (Fisher Body Corporation, Detroit): We have smoking rooms provided for our men and they smoke in those rooms. I have never caught a man sneaking a smoke since those rooms were established.

We have no women smokers at the Fisher Body Corporation.

CHAIRMAN WENTWORTH: This is a rather positive statement. I can say quite positively that my daughter doesn't smoke, but I couldn't take oath to it.

MR. ARMSTRONG: I should like to ask Mr. Abbott what they do in their plant in regard to matches.

MR. ABBOTT (Fisher Body Corporation, Detroit): We recently started a campaign in one of our plants to eliminate the ordinary strike-anywhere match. We have done it in one plant. Other than that we have never had any restrictions on carrying matches in our plants. I know of but one fire that I can directly trace to a match being dropped on the floor and being stepped on. That was definitely known because it was observed in front of a paint spray booth.

Other than that I don't know that we have any fires or ever have had in our plants any fires that are directly traceable to matches, although there is no doubting the fact that it is dangerous to allow them in many departments where there is highly combustible materials.

I think sometimes, gentlemen, that we get at these subjects from a very illogical point of view. What has been said here about providing a place for employees to smoke will accomplish more, in my estimation, than to tell them they can't smoke.

We are having so many laws and ordinances and we are being told on so many hands today that we can't do this and that we can't do that.

I hunt and fish a little and smoke a little and I am constantly being told in my hunting that I can't do this, in my fishing that I can't do that. I must have a license to fish and a license to hunt and a license to drive my automobile, and I remember as a child that the Fourth of July was one of the days of the year that I looked forward to because I enjoyed the fireworks and shooting the firecrackers, and somebody asked why we do it. Mr. Wentworth gave us a little display of his knowledge of history by telling us where the Pilgrim fathers landed and I guess some of us forget that we had a Declaration of Independence. We like to remind ourselves of it once in a while with a Fourth of July celebration. That is where it originated. I guess it took guns and firecrackers and a lot of those things to accomplish what we had done, it is a reminder in a way of our national history. I think every child enjoys those things, and if we attempt to tell the child that he must not have them, I think we are not going to be able to quench his desire. It is natural in every child's life that he should want it. I do think that we accomplish more in educational work on these subjects than any other way and I think there are many things that have gone over that have been accomplished by education, rather than prohibitive measures. Knowing as much as we do today of volatile liquids and their hazards, suppose we never had the automobile and we were told tomorrow that we were going to have millions of automobiles in our streets, each one of them with a tank of gasoline of from five to ten or fifteen gallons on the rear end with a red light burning over it every night. We would hold up our hands in holy horror and probably say that the world would be blown up. We probably would have some special meetings of the National Fire Protection Association immediately.

I say that because I think it is a matter of education. The average man uses an automobile and uses gasoline today and does it safely. There are a few accidents, of course, but there always will be a few at the best.

I believe in educational work along those lines rather than any other way except where the question is extreme.

Even Mice Are Becoming Educated

MR RYAN: About ten years ago didn't the National Board of Underwriters make a test of mice with matches? Didn't they have a cage full of excelsior and a number of matches in the cage, and the rats starved themselves before they gnawed the matches?

CHAIRMAN WENTWORTH: Tests have been made, I don't know how thorough or complete. It is pretty generally believed that mice and rats do not ignite matches with their teeth. They do build nests. Rats are pretty active animals. If you have slept in a country hotel you have thought a team of horses, probably, was going down the partition. They are pretty rough animals and they might like to sharpen their teeth, perhaps, but they don't eat phosphorous, I think.

We have had an interesting session. It has seemed eminently worth while. I think we can go back to the officers of the National Safety Council and say that this has been an exceedingly interesting meeting, profitable to all of us, and we will all look forward with pleasure to reviewing these excellent papers in the record.

On behalf of the Congress I thank you for your attention and your sustained interest in this important subject, and perhaps the Council may have it in their hearts to give us another such meeting next year.

ADJOURNMENT.

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Health Service Division

Tuesday Morning, September 27, 1927

LOYAL A. SHOUDY, M.D., Chairman

Vice-President for Health, National Safety Council; Chief Surgeon Bethlehem Steel Company, Bethlehem, Pa.

The Informal Conference of Industrial Physicians and Surgeons was called to order at nine-thirty o'clock by the chairman, Dr. L. A. Shoudy, Vice-President for Health, National Safety Council.

CHAIRMAN SHOUDY: Our subject this morning is: "How far should medicine and surgery go? What is the limit that we should attempt in industry?" In other words, not only your particular industry, but in all industries. What are our limits? What are our beginnings? What should we strive for?

I don't know all who are with us this morning, but I shall call on some of you and I wish you would consider this an informal gathering and tell us what problems are bothering you in your particular industry. Bring it up in a general way and let us see if we can answer it.

I shall call first on Dr. Sawyer. How far should medicine and surgery go in industry?

DR. WM. ALFRED SAWYER (Medical Director, Eastman Kodak Company, Rochester, N. Y.): That is a pretty big question to answer offhand without considerable qualifications. It is a question that interests me, too. I sometimes check up and wonder whether we are doing all we can in the Eastman Kodak Company. Our problems are largely medical, or sickness. We are interested in the question of education. We are interested in the care of those who are sick—in their getting well as fast as possible. I suppose it is an individual matter. You can go as far as you can, sell to the organization and profession ideas that are good and sound; but no business will go on with things long if they are not sound and do not seem to be producing some result.

I have been talking with some of the men about being able to prove the value of these things. It is difficult to put it down in dollars and cents. I haven't been able to do it. I know it is good and you know it is good, and I have often said we couldn't get along without it any more than we could get along without the telephone. I had an experience a few years ago in Philadelphia with the John Wanamaker stores. During the summer vacation, when John Wanamaker, Sr., was away, Rodman Wanamaker liked to do new things, and one of his stunts was to test out whether the things they were doing for the employees were appreciated. He said: "We will close down the cafeteria, the medical department, the rest rooms, and several other employee activities. Close them all up tight." He said he wanted the people to take a vacation.

Well, I wish you could have heard the protests that went on. They had more trouble than they could handle. Everybody fainting—a lot of people got hurt

in that store—all had to be sent to the Jefferson Hospital several blocks away, and they were just in hot water all the time. When it was all over they said: "Never again!" They couldn't get along without it.

I think that is true with any medical work in industry. It becomes an integral part of the business, and if you cut it out you swamp your supervisory force with the responsibility. Studies have been made as to the cost of this work. The National Industrial Conference Board tried to find out what they were spending per employee. They found it ranged from \$2 to \$10 or \$12. There are organizations spending \$70 and \$80 per employee—all depending on the problems, of course.

I should like to hear some of you, who have specific data or proof of its value, talk upon this. One of the men said yesterday afternoon that he thought the way to prove it to your managerial force was to cite specific instances where you did good and prevented this and that. It seems to me, after all, it is the actual, concrete incident that convinces the average person.

If we are going to put industrial medicine over we must do it through the executive force of the company, no matter what the size of your organization, small or large, start physical examinations of your executive force. Make it a real program, and they will soon see the value of it; and when you sell them you will have no trouble with the men at the bottom, of course.

The Corporate Measure is the Monetary Standard

CHAIRMAN SHOUDBY: Dr. Sober, how far should medicine and surgery go?

DR. F. J. SOBER (Fisher-Body Company): That is rather a hard question. Corporations usually measure everything by our monetary standard. Of course that is a matter which is hard to determine in dollars and cents. When we bring a case to their attention, where we feel we have accomplished some results, it is hard to convince them. How are you going to get it to them so that they understand it? Just how are you going to put dollars and cents value on it? If there were a definite way to determine that—a man's health was worth so many thousand dollars and you deduct a certain percentage for the day that he didn't feel 100 per cent or anywhere in that neighborhood—then we might be able to get the thing on a basis that the management could see.

Of course, most of our large corporations are manufacturers, and they wish the public to consume their product; and among the public who consume a great deal of the products of large manufacturers are physicians, and when we go too far out of our way, seemingly, in our efforts to keep up the health of the workers, we do definitely cut in on the income of the man who is not connected with the industry and who is out practicing his profession. It seems to me that in the larger cities where a great many doctors gather and locate for geographical reasons, for reasons of density of population, that the physicians in those centers should at least be very careful of the extent he carries on his work. He should not take all the work away from the doctor in the city. It is a different problem for the physician in the small community, in which the industry is the backbone of the town. In the small town it is a case of taking care of practically all of the inhabitants because the provider of the family is probably employed in that industry.

CHAIRMAN SHOUDBY: What is the policy of the Fisher Body Corporation when a man comes to you sick?

DR. SOBER: We give him temporary relief, if possible, and let him have the preference of calling his own physician. We have never made it a policy to make him feel that we should take care of him. We take care of him temporarily if he is taken ill at the plant. One of the reasons for that is because we have no benefit association. Of course, we are interested in the health of the

individual, but not to the extent of having a benefit association. However, industry is requiring some medical service as a part of the contract.

CHAIRMAN SHOUDY: To my knowledge this is the first time we have had a chance to hear from the United Fruit. Of course, the problems which United Fruit has in places like Cuba are entirely different, but I should like to hear from Dr. Crawford and have him tell us how he would look after the sick and injured men. How far should medicine go in industry?

DR. F. X. CRAWFORD (United Fruit Company): In the tropical divisions it is entirely a United Fruit proposition. These places are entirely fruit ports and we take care of them industrially as well as taking care of them while sick—we take care of both sickness and injury cases. Everybody in the South pays two per cent into a medical fund. That fund entitles him to treatment, no matter how long he is sick. If he is not sick he still contributes. That, with the company's money, takes care of him and his entire family.

In the North, in our Raviere Sugar Refinery, we take care of the injured man and hold him if we can. We feel that if a man is injured in our plant we should try to hold him, notwithstanding the fact that we are taking something away from the man outside who is practicing medicine.

In illness, we give him first aid treatment and I think we do refer him back to his family physician. We don't intend to keep the men under our care if they are merely sick and not injured. If the man insists, we gladly do it, but we refer him first to his family physician.

CHAIRMAN SHOUDY: What are your own views as to how far a medical program should go in industry?

Medicine and Surgery Should be Fraternal

DR. CRAWFORD: I believe, as I am doing in accidents at the plant. I think from the financial standpoint, from the cost standpoint, I try to hold them if I can and treat them at our plant. If not, we refer them to their own physician after the initial treatment. We hold, probably between 80 and 85 per cent of our accident cases.

I believe that is an all-right proposition in the illness cases. I feel I have no right to take away from the outside man the question of livelihood when a man is ill and we don't pretend to treat him. That should be left to the family physician.

CHAIRMAN SHOUDY: Dr. Cheney, of the Armour Company, how far should a program of medicine, taken with surgery, go with industry from your experience? Now leave Armour behind for the time being and tell us what you really think.

DR. V. S. CHENEY (Armour Company, Chicago, Ill.): I cannot leave Armour behind. We are doing what I think ought to be done. There are a few things which we must work out. I maintain that medicine and industry should be fraternal, not paternal. Years ago when the industry was started by P. D. Armour, he took it upon himself to take care of the injured employees. He took care of them personally. If a man wasn't right they would send him away and Mr. Armour was personally responsible; but as the organization grew he couldn't do that. The medical department was organized and that duty has now devolved upon us.

In our organization we take care of all cases that come in to us, both medical and surgical. Even injuries that occur outside of the plant are brought in to us. They come to us in an advisory capacity, they want advice. We give them the facilities of our laboratory, of our organization, and then we send them back to their private physician with what information we have gathered. The doctor can accept our diagnosis or not, as he sees fit. They ask for our

cooperation. We have gone even a little further and have had them bring their children in for examination.

The physical examination is also a part of the medical work. We were disappointed in not being able to give them a general physical examination. We had unusual difficulties in giving these examinations because our men work in gangs, and when they need men to work in a gang they can't give them a thorough examination; so we make a superficial examination before each man starts work, but we extend to him our assistance and make him feel that our medical organization is for his benefit. If he is sick or a member of his family is sick and he wants advice in regard to that, we will give it to him. We will even examine a member of his family if we know he is worrying about his family. It affects his efficiency. But we don't try to treat him. He comes to us for advice and we give it to him. We refer him to his family physician.

A Program of Extensive Tests of Executives

With regard to matter of physical examination: We are now making extensive tests of our executives. We think that is the place to start, as Dr. Sawyer said; and these examinations are periodical once a year, or twice a year, or three or four times a year, depending on the man's condition.

A man cannot be promoted from one position to another until he has passed the physical examination. A man even in the outlying districts of Cuba, before he can be promoted, has to come to Chicago and pass a physical examination. We are trying to impress upon our executives the importance of keeping themselves fit, that it is up to them to keep fit and not up to the company. It is up to them, with our advice, to maintain their physical health.

I have always likened our organization to a great big family, of which I happen to be a medical brother. In regard to their families, we don't try to take care of active cases of illness, either of acute or chronic cases, but we get them into the hands of a good physician and see that they are properly taken care of.

When a man is reported sick, or the employee has reported sick, we are notified for a certain number of days. We get in touch with his doctor, if he has one, if not the visiting nurse from the Metropolitan Insurance Company calls on him and sees what the condition is; and in that way we keep in touch with the doctor who has charge of the case. If we think a man ought to go to a hospital and he cannot afford it, we find a way and give him the care he needs.

Recently our men have been put under group insurance, both in the general office and in the plant. Practically 90 per cent of the employees have availed themselves of group insurance. It is not compulsory. With that group insurance we get a nursing service and now the cases are reported to the nurse. Every case of absence is reported to the nurse after they have been away for a few days. She makes the examination and investigation of these cases. She does not report back to us if the people are not sick. She says they are away for personal reasons, but it isn't spying upon them. That is one thing we objected to. Our foremen and superintendents thought that as physicians we ought to see if a man is really sick. We won't do it. We have to maintain their respect and their feeling of loyalty. We want them to think we are their friends. We won't spy and do anything of that kind. The whole system, as I see it, is that of a fraternal medical supervision. We believe that is worth while.

DR. SAWYER: Do your men do bedside work?

DR. CHENEY: We have no nurses. The Metropolitan Insurance Company takes care of them. They do bedside work.

CHAIRMAN SHOUDY: I should like to hear from Dr. Clough.

DR. F. E. CLOUGH (Home State Mining Company): I should like to take the other extreme of Dr. Cheney and say industrial medicine should be a benevolent despotism and not a brotherly affair at all.

Looking at the history of industrial medicine, I am a gold digger. Naturally, you say, it is easy to put over a medical concern. It isn't, because gold is the only thing remaining standard in price through all the rise of other commodities. We started our medical service in 1877 and have been at it ever since. So I think I am an old timer.

Why did we start it? Well, the gentleman from the Fisher Body gave the reason. We were out in a little isolated community. There weren't any doctors, and in self-protection the company had to put in men to do the work. What did we do first in industrial medicine? We took care of the injured man a little ways, and then a little bit further; and then we found out that we were taking care of the injured men, and we decided to take a whirl at doing medical work. So we started charging them a dollar, or a dollar and a half, a month per employee and gave as little as we could and stuck as much as possible in our pocket. That wasn't satisfactory and it reflected against us. I say we are coming to this, and I don't know if you can prove it in dollars and cents, but I believe that in the large cities you are not going to give unlimited service to the employees and those dependent upon them. In the smaller communities, it is ideal. I have been in the industrial concerns all over the country and I know if the workman realizes the company has any type of medical service he will get it. If you eliminate it you have a sad employee and if you give him that medical attention you have a better employee.

The Sky the Limit of Industrial Medicine

I believe, therefore, the only limit there is to industrial medicine is the sky. From the time that the baby is born, or before the baby is born, up to the time that an employee or any member of his family dies, the care belongs to the industry. It is a question of how far the medical concern can go in helping the men.

We have given unlimited medical service to the families of our men. It costs us a lot of money—more than many concerns like to spend. I say that where you are manufacturing a commodity where the price can be passed on to the consumer, the cost between first grade and slipshod service (I don't mean in quality but in quantity), the cost you are passing on to your consumer is not enough to make any difference. It is walloping our brother practitioners to take away a certain amount of work from them, but if you are a real 100 per cent surgeon first you don't consider the outsider at all. You consider only the employee and the company for which you are working; and when you do that you will give the best type of service you have.

When it comes to estimating this service in dollars and cents, there are places where you can show that you are actually making money. Every once in a while you save a sick case—perhaps an employee or executive—perhaps an ordinary accident comes up in which the medical department does signal work and great results are obtained. Every one of those cases, perhaps, avoids a serious accident. Perhaps the management thought the man would die, and you save the cost of a death benefit, and if you are running government statistics you have run off 6,000 days. You have saved your concern

\$3,000 in our state. Where you have a death benefit you figure you have saved money, saved almost the cost of running your department.

I don't know, to me this idea of just plant hygiene and giving a little bit of first aid treatment when they are sick, and tell them to see somebody, is a joke, so far as industrial medicine is concerned. I don't think that is industrial medicine at all. With all due respect to you who are doing this work, we should realize that this work should be just as efficient and thorough and complete as the running of any company department and be considered a part of the overhead of the company's cost, just the same as running the machinery department. The health of the employees is just as important as keeping up the machinery.

In spite of the fact of state medicine, I think the further the company goes in giving this type of service to the employees and their families the stronger they will be with their employees.

Medicine is Accepted as Part of Operative Cost

CHAIRMAN SHOUDY: The difference of opinion is what we want. Men, I think that we are all safe in saying that industry has accepted medicine as a part of an operative cost and a part of an overhead to be considered in the cost of production; but the question of how far we should go and what we should do will depend a great deal on how far we ought to go and how far we are able to sell it to the concern for which we are working. It so happens that Dr. Clough has been able to put it over 100 per cent in the community in which he is working. I don't know in a big city whether that plan can be put over. The Endicott-Johnson people, one of the eastern concerns, has taken over the whole medical situation 100 per cent. What should the medical department of any industry do? I should like to hear from Dr. Cunningham of the Kohler people.

DR. M. D. CUNNINGHAM (Kohler Company): Our system is very much in accord with that of the last speaker.

CHAIRMAN SHOUDY: I know you men have your own experience. You must have back in your head a number of things that I would like to see done that we don't know. Dr. Cunningham, we want you to tell us what you think ought to be done.

DR. CUNNINGHAM: We go as far as we can, make the sky the limit, and we feel that we are getting a great deal of benefit from that as well as the employees. We are limited as to how far we can go because, up to the present time, we have had some trouble in getting the entire cooperation of the employee himself. However, we are overcoming that by rendering real service and we find that on our periodic examination. We try and give the man everything we can possibly give him and we are limited in our examination. Then we refer the man to where he will get the best possible treatment at some special department of medicine or surgery.

CHAIRMAN SHOUDY: At whose cost?

DR. CUNNINGHAM: At his own cost, if it is a case of illness, but if it is a case of industrial illness then at the cost of the company, from beginning to end.

CHAIRMAN SHOUDY: Dr. Schram, not from the standpoint of the Fairbanks-Morse people, but from your views, what should industrial surgery include and how far should it go?

DR. C. F. N. SCHRAM (Fairbanks-Morse Company, Beloit): I am glad you put it that way—those things for which the state makes the company responsible. I think the company physician or surgeon should have absolute, complete control. For those things for which the state does not make the company

legally responsible, I think the man should absolutely have his choice in regard to a physician or surgeon. If that means that the company takes care of him, why the company takes care of him, and when the company takes care of him they should assume the financial obligation. The sky is the limit on preventive medicine. If the medical department is going to function it is a human maintenance department, and if it is going to help the people it is not a question of doling out a cathartic or dose of salts; it is selling health to the individual from the day he starts to work, and keeping him well; and when industry steps in and does that it is going to function as a real department. Until that time comes I don't believe it is going to function as a full department in a part of industry. I am not in sympathy with crowding out the man in private practice, at all. I do want to go as far as Dr. Cheney goes in trying to give the man a full diagnosis. I believe in giving the man and his physician, should he choose an outside physician, all the helpful aid possible in making a diagnosis.

CHAIRMAN SHOUDY: Do you believe then that the company should take care of the man and his family or just the man?

DR. SCHRAM: According to the community—absolutely limited according to the community. In the big city I question the advisability of going into the home except as an advisor. We offer the service just as freely as can be and if the members of the dependent families wish to avail themselves of the diagnosis we help them all we can.

Does the Company Get Value for its Money?

DR. WM. ALFRED SAWYER (Medical Director, Eastman Kodak Company, Rochester, N. Y.): Is there anybody here whose organization offers to employees medical service at a cost price as a voluntary thing? Do they say: "We will give you service if you want us to?" Has that ever been worked out?

CHAIRMAN SHOUDY: Is there anybody who offers cost service to their men? Do any of you tell a man to come to you and you will give him the service at cost?

DR. F. X. CRAWFORD (United Fruit Company): There is nowhere else to send them in the tropics.

CHAIRMAN SHOUDY: In Cuba they have a "Central" where they take them.

DR. CRAWFORD: Can some one tell me the company's return on money expended? What is the return from every dollar expended?

CHAIRMAN SHOUDY: Do you mean whether he puts the money in if he gets the return?

DR. CRAWFORD: No. What return does the corporation get from the dollar expended?

DR. MCKITTRICK (Indianapolis, Ind): I don't know whether I can answer that as to the exact dollar. I can only answer it in this way: The reduction of the insurance rate. In other words, I have one plant that has a manual rate of a dollar and a half per hundred dollars payroll. This plant is under medical supervision at the present time and for the last five years it cost 50 cents on the hundred dollars. Now I think that this is a point on which we have to talk with the average industrial man. If we are able to prove to him that we can reduce his rate from a dollar to 55 or 60 cents per man per hundred dollars, that man will pay some attention to it; but if you go in and try to show him the nice side of your work wherein you are taking care of his sick employees, injured employees, taking care of his family, keeping his men at work, keeping his men in a condition that they will give 100 per cent efficiency, you are likely to have a man tell you about what one told me one day when I was trying to put this over. After I had made my speech he blew cigarette

smoke into my face and said: "Doctor, you are a poor salesman." It is dollars and cents that you must use and the only way I can do anything is to show them that we can reduce the rates.

I am talking of industrial insurance. Of course most of our states have it. Indiana has an average industrial law, under which all must work. Under this law all employees, of course, are cared for, that is, injured employees. Sick employees have no concern with this.

Quite a few of our industries are taking care of their sick. I am mighty glad to see that this subject brought out a number of points, and particularly one which I think we should look at very seriously; that is the point of state medicine. I am afraid if we do as the gold digger expressed himself, that we are going to sell our employees to that point that he, in the future, may try to control our state legislatures in having the state take care of our sick. That is something we don't want. I do think that there should be some provision, some care for the sick, for the family; but I don't believe that the industrial employer should have to pay that expense altogether. It is my opinion that the best thing we can do as industrial physicians is to act in an advisory capacity as diagnosticians. Then steer the man and his family to the proper physician in the territory in which he lives to take care of him. Of course, that meets with exceptions for in small territories you cannot get to specialists, but I am speaking of the large centers.

Another point, I believe, should be brought out. You have asked us how far industrial medicine should go in industry. I feel that there is quite a chance for us, as medical men, to assist the personnel department, the safety inspector, and such men as that, and give our employees much more benefit, much more help than the mere matter of giving the sick a headache tablet and so on. Even in the small sized plants there is always some problem for the medical man to solve.

The Physician Should Watch All Unhealthful Conditions

In our automobile plants in Indianapolis we have trouble in solving the problem of gas which accumulates in the rooms. You will say your industrial man ought to be able to take care of that by putting in the proper ventilation. You will be surprised how ignorant some of them are in that line. Some of the men get dermatitis. These conditions must be met. Our rubber plants, like the Rubber States Rubber Company, have problems such as dealing in dust and oils that are continually giving the employees acetanilide poisoning. These conditions must be remedied. Our men say they have sufficient suction apparatus to take care of this, and I find the suction apparatus is not working at all. We must deal with these points just as much as taking care of our sick.

CHAIRMAN SHOUDY: Dr. Schram brought up another question when he mentioned free choice and how far that should go.

Dr. Stewart, what is your reaction as far as the relation of the injured man is concerned? How far should the doctor go?

DR. L. STEWART (Pennsylvania Bituminous Casualty Company): In answering that question I think one must be guided by the reaction of his associates, his fellow practitioners, who are in the majority, in any large community at least.

Within the last year in Pennsylvania we have made a decided effort to improve our compensation law to make more provision for the injured man, and in return make more provision for the physician who looks after him. The bone of contention in that direction has been whether the industry will have the right to select the physician or whether the man will. It was felt no progress could be made in getting any legislation that would improve the

condition without stipulating that industry would have the privilege of selecting its own physician and in Pennsylvania we have, notably, Dr. Shoudy heading the Bethlehem Steel Association. It is absolutely impossible for an organization of that sort to be hampered by any stipulation at law whereby a man would have a choice of his physician.

I don't think any man in industrial medicine desires taking the injured or sick man away from the general practitioners or the community physician. It seems to me today the answer must be a compromise. It must be possible, it is absolutely essential. If Bethlehem is willing to expend enormous sums of money and provide physicians and hospitals, it is obvious their employees must accept that superior service. However, after the limits of the law have been complied with—I am speaking of compensation, there is a 30 days limit in Pennsylvania—it seems to me that if the injured man so wishes he may seek attention elsewhere, but always under the supervision or under the benevolent watchfulness of the medical organization of the industry under which he was injured. I was impressed by what Dr. Cheney said of the attitude of Armour. I have talked with Dr. Sawyer about their attitude at Rochester. I believe the industrial surgeon cannot advocate his cause to the exclusion of the man who is not an industrial surgeon. Therefore it is not practical to oppose care of the injured or ill men by the community physicians, but certainly it is possible to take a benevolent or friendly, brotherly interest in these men who are ill. Certainly it is right and proper to have the nurses of the organization or the physicians check up on their progress and make sure proper medical attention is being given to the men.

The Efficient Way of Caring for Employees

I don't think that is a proper solution but I think it is the only solution. If this were to be done 100 per cent efficiently, every organization would take care of the man from the time he was injured or became ill until he recovered. That is the efficient way of handling the work and that is the way in which the organization will save money, not only in dollars and cents but in the health and efficiency of its men. But I don't see how it is possible to have a division of the industrial physician and the general physician.

A point has been raised in this connection as to the cost in dollars and cents, or as to a way of estimating the cost of service to employees. I can see, from the discussion, where an executive in the Armour Company, if he realizes that he must be fit physically, will take care of himself if he is ambitious. I can see where the efficiency of all the members of an industrial organization can be vastly improved by medical supervision. That is an intangible thing. You can estimate that only in the success of your organization. It applies to the Fisher Body Company, The Armour Company, The Eastman Kodak Company. That is intangible. You cannot estimate it in dollars and cents.

However, some years ago, working under the compensation law of Pennsylvania, I attempted to show the directors of my corporation wherein surgery was able to save them money by giving the employees the proper medical attention. I didn't have to do this. But at the inception of the compensation law my organization agreed that it was good business to give all needed attention to injured men and that has been our policy. However, after years passed, and this started in a small way, I went back through our statistical department and took 23 consecutive, unselected cases of injury and banked the type of injury against the provision of the Pennsylvania Compensation Law. For instance, if it was a loss of a leg or potential loss of leg we banked \$2,580. (I think that is the cost in Pennsylvania.) We banked that against what it cost to rehabilitate that man and put him back to work.

In these 23 consecutive, unselected cases our potential cost was \$6,000, approximately. Our actual saving was approximately \$39,000 or \$40,000. It has been some time since that was compiled and I am not clear on the details, but our saving, roughly, was approximately \$30,000; and when you have the compensation law under which you are operating and able to bank the type of injuries and the actual cost of the work, you get an accurate way of estimating the cost. Among those 23 patients there were two deaths. One was a hernia. The man died from invalidism. The other was a fractured femur. Even considering those two deaths in the cost, we saved \$30,000 on that.

CHAIRMAN SHOUDY: Dr. Benedict, what should, and how far should, the industrial medical problem go? Be careful, don't tell us what Alabama Power Company does to maintain a medical department but tell us what you think ought to be done.

In Preventive Medicine There is No Limit

DR. S. R. BENNETT (Alabama Power Company, Birmingham, Ala): I have been very much interested in what has been said and I really feel that the subject has been covered thoroughly. My personal opinion, and naturally my personal opinion works in with my organization, is that I feel in preventive medicine, including examination of employees, the sanitation, the health of the employees in your plants, etc., there is no limit. That is very essential; that is something that I feel every organization owes its employees. From the standpoint of the accidents the same is true. Some of us have compensation laws under which we work, and under those compensation laws we are practically compelled to take care of the employee. Of course, some of the compensation laws, many of them, have a limit. We do not, and I think the corporation should not, consider the amount expended in bringing a man back and placing him in an efficient position again. The question of how far we shall go in the treatment of the employee from the medical standpoint is one that has to be handled with gloves. Only recently the state of Alabama medically was turned topsy-turvy due to this question: How far should the physician and surgeon go in industry? As a consequence we got into the state association, there was a terrible fight, and the fight is still smoldering, as it has not been definitely settled.

As I see it you give medical attention to the employee or to the employee and his family. Taken from the standpoint of the employee: If in a big city where there are plenty of private physicians, private practitioners, the medical man of a corporation takes it upon himself to deliver all medical attention to that employee, that is simply putting in one more peg towards state medicine. The same is absolutely true, I believe, so far as the family is concerned. You divide that. You say, "Well, what about the man, for instance, the gold digger's proposition?" The gold digger's proposition is entirely right. He is isolated, he cannot obtain for his employees medical attention of the proper kind. Therefore it is his duty and it is money well spent for the corporation to take care of that employee and at the same time increase the efficiency of the worker. I don't see how he can do otherwise; but in the city the proposition is entirely different than it is in a town of 15,000 or 20,000 people, because here we have competition from the industry supplying all needs to the employee, and that in its turn gets the enmity of the local physician. Don't forget that where we have one industrial physician there are ten men in that community who are not industrial physicians and those men have just as much to say in a state medical society as we have. It is one to ten that we lose.

Therefore, I feel that we ought to treat the employees in small towns,

but in cities we ought to cooperate with the employee to the fullest extent. However, I think it is a mistake to treat the employee's family in large cities. It might be better for the employee; but remember this, that when you take away from the employee his respect and say to him, "You must have doctor so and so," you almost invariably create a dissention because they have their private physician. In isolated points I think it is the company's duty, where there is no doctor for 15 or 20 miles, as we have in a number of instances near big dams and steam plants. I think it is the company's duty to take care of that employee just as the gold digger did because he cannot get the proper medical attention. The nearest doctor has to come 20 miles. His charges are large and from a standpoint of efficiency I think taking care of the employee is essential.

Therefore, I say this: It is my opinion that in the small town and in the city, industry better watch its step so far as taking care of the worker and his family is concerned. In isolated points where medical attention is distant, the corporation should go the limit and give everything to the employee and his family that it possibly can.

CHAIRMAN SHOUDY: Gentlemen, I have called on some of you. Is there anybody else who can contribute to what the doctor should do in industry?

Another Point of View on the Problem

DR. W. C. NORDHOLZ (Automatic Electric Company, Inc.): You are talking about what the doctor does in industry and his place, and we were talking about the employees just as so many pews. A year ago I did some social settlement work and there was one lesson I learned; it was that you shouldn't give something for nothing. If the man is injured while he is at work you must do everything you can to help him, but when you are giving him something for nothing you are taking that away which you can never give him back again. It is his independence. That is a problem. Are you going to make all these men paupers? They have done it in Germany and they are doing it in England. We have a plant in Germany and a plant in Liverpool and London, another in Belgium. That is what you do. We haven't nearly the efficiency in our plants in European countries, where they get everything for nothing, that we have right here. Our plant is three times as efficient as any of those abroad.

If we are going to take care of the families of the employees we are working into state medicine. We are going there fast. When you do that you are taking the individual's incentive for really doing something for his fellow man away from him. In place of what you are going to do for our people in the industry, think of what we are doing to them.

CHAIRMAN SHOUDY: In what way?

DR. NORDHOLZ: In taking that away from them which you cannot give back. If he is working for your plant or mine you pauperize him. You bring him back to state medicine. I say, don't let's make him pay taxes. That has been the ruination of your own medical profession and your men there. With all the efficient men we have in our European plants—they are very efficient men—our mechanics in our American plants will turn out several times as much work because in Europe they are No. 1 or No. 2 on the payroll and nothing else. The government is controlling their medical situation.

CHAIRMAN SHOUDY: That is true in Belgium.

DR. NORDHOLZ: It is just as true in England and Germany. We have the same condition in London and Liverpool. Our own statistics show that with a plant three times the size we have in America, our plant right here on the West Side

is turning out just as much work as the English plant. We have more efficient machinery but our men turn out three times the amount of work. They have something to work for. We don't give them something for nothing. We advise them, but that is all. We talk about headache pills and so on. That is quite an essential thing in industrial medicine. He needs something to relieve him for the time being. I don't think that ought to be booed, at all. You give him something that takes care of the belly ache. I think that has a big place.

CHAIRMAN SHOUDY: We come back to the same thing every time I get together with a group of medical men: How far should you go with your men in industry? But going back 10 or 12 years, I can see that I have been helped by coming to the different meetings and getting the other fellow's ideas and seeing what he said and did and thought that could be applied to my own problems; and I am sure we get a great deal of benefit from this.

First and foremost, we should agree on the doctor's and surgeon's contribution to the industry regarding physical examinations, and so forth. The degree depends on what you want to do in your own plant. That is the first thing. The medical man comes in contact with the employee. Then, if you please, a compulsory examination and tell him: "Here is what you can do and on a certain day we would like you to come back and see us. The medical department is open." Advise with the man. Isn't it right that we in the industry should see that one of the biggest things that we should furnish to the man himself, is, that he is able to function or perform his work that has to be performed from day to day? If he is sick, to see that function is restored to that man to work the same as before. The restoration of function is one of the first things the doctor could offer to the injured man.

The House Must Be Kept in Order

So far as sickness is concerned. It is up to us as physicians to see that in so far as we can the man has a livable place in which to work, that he is healthy as it is possible to make him under the conditions of the job which he has to do. Isn't that our work? If the man is sick and he comes to you for relief, if you can relieve him, shouldn't you relieve him? Isn't it well for us to maintain in our own workshop a clinic that will be able, as far as it is possible, to diagnose the trouble of the man, especially if the trouble originated in the industry in which he was employed? If it is spray-painting, is spray-painting responsible? If the man comes to you and you tell him what is wrong, isn't it proper under present conditions for us to tell that man: "Here, we feel you are sick and should consult your doctor." Aren't we doing wrong at the present day if we don't say to the doctor who is not in industry: "Doctor, maybe I can help you. Here is the man's examination chart when he came to us. Here is what we do know when we examined him." If he knows he is not able to meet certain requirements the doctor should call on you for help. So far as the care of the man is concerned and letting him pay his bills, isn't it better in the majority of cases to let him pay and go to the doctor he chooses and work with that doctor in your community rather than handle everything for nothing and say you will take complete charge?

If you kept your house in order, if you saw that when a man came in he was given an examination, that you gave his doctor the privilege of coming back and checking against that chart occasionally, if when the man is injured you have told your company you feel it is their responsibility to give that man absolutely the best possible surgical and hospital attention to restore the man's function 100 per cent, haven't you done everything you could?

In relation to the outside medical world, balancing them against what you owe the man in your plant, haven't you done under present conditions 100 per cent when you have done all these things? This is what we feel you should do. If you get

in touch with his doctor on the outside and tell this doctor: "This is what we know about this man and we should like to help you," isn't that as far as we can go today? In the isolated cases we must take care of them 100 per cent.

DR. H. E. BRICKER (Philadelphia Rapid Transit): I have been here listening and it sounds to me as if the doctor in industry or the industrial physician is giving himself chiefly the question of being intimate. I don't think he is there because he made it himself, at all. I don't believe his progress will be helped by him or hindered by him. I believe the doctor in industry is a victim of circumstance. His chief job is to keep the brake on the other fellow. He must go as far as the employee may demand that he go. In my particular industry, and fortunately I had the privilege of starting it, the medical department was started with nothing in mind excepting to improve the grade of people we took in. It wasn't long, however, before the compensation act and the men who worked there began to demand certain things and my chief job was to keep the brakes on so they wouldn't go too far. I had to give them what they wanted. You may have a lot of things in your mind that are advanced. I believe diagnostic medicine and preventive medicine is part of his job. He must do it. But the other thing is that this curative side of industrial medicine is entirely up to the man. You all have had experiences in your plants in which a man has come to you and demanded something and you put the brakes on: "I am sorry, son, but we can't do it." It will eventually come back to you, not because you want it to, but because you don't want it to.

I have gone from a two by four room to a 20-room department and there is still more to come, not because I want it, but because I don't want it. I think we are going a little too far, in my own mind, but I cannot keep it back. There is one thing I will keep back and that is attention to his family. We must know something of his social condition, but not accept responsibility for the family. We don't have to sell it to a soul.

That is our idea so far as curative medicine and surgery is concerned. The law takes care of one side, the man will take care of the other.

The Workman Who Goes to the Large City

CHAIRMAN SHOUDY: Is there anybody else who wishes to speak on this subject?

DR. RISKE: I have listened with interest to what the last speaker said. In isolated industries the industry had to go to the sky. If workmen were all nailed to one spot that might be a good thing, but your state medicine is developing from the isolated spot. The man working in an isolated spot works for four months or a year. He is given every attention. He goes to the big city. He demands everything he received from the other place. That fact is distributed throughout the multitude and gradually the citizenship is going to demand that the employer take care of him. As the employer widens out he is creating a materialistic feeling, he is robbing that man of his incentive, of his self-respect, he is taking from that man something that cannot be replaced in any way; and the further you go the further you will have to go, but it is all gradually leading to state medicine. Even in the isolated communities, while the employer should take care of his injured man and there should be no limit to that, even in Pennsylvania the state law of thirty days limit is wrong. He must be rehabilitated. I think in the isolated community the physician should charge the man a fee for anything that industry is not accountable for.

CHAIRMAN SHOUDY: Do you feel industry owes a man anything so far as helping him diagnose his condition?

DR. RISKE: Well, I think you can go along with him, but if it comes down to diagnosis you would have to have an equipment equivalent to the clinic in Cleveland. You have to have a staff, an immense staff, particularly where the industry is a large industry, and I think if the community offers that the industry should not be required to go into diagnosis of diseases outside of industrial diseases.

CHAIRMAN SHOUDY: How about the other standpoint of the industry going along 100 per cent and helping the local hospital?

DR. RISKE: I think it is better for the industries and for the local hospital to let the man contribute financially and thereby let the man stand on his own feet.

CHAIRMAN SHOUDY: Is there anyone else who desires to add anything? I know it gives you all, as it gives me, something to think about when you go back to your job, when people ask how far should we go, and what should we do; and it is up to you to put the question up to the people who really want to do what is right. Dr. Benedict, somebody wrote me the other day about this question of state medicine. He said the biggest buffer of state medicine was the way in which industrial men, surgeons and physicians, were working in industry today, that they were one stumbling block to the people who wanted to put on state medicine, that we were cutting out state medicine. What was it you said to me?

The Problem of Medical Attention to the Employee's Family

DR. S. R. BENEDICT (Alabama Power Company, Birmingham, Ala.): This is a mooted question and comes up so much I would like to see this conference go on record; and I think it is the place where it should go on record as to what we really feel and how far we really should go.

We are all in accord when we say that the sky is the limit in preventive medicine, sanitation, etc. We are all in accord in the prevention of accidents—we don't disagree on that. We come down to the question of medical attention to the employee. How far shall that go?

Then again the other question is: Shall we render any medical attention to the family? As to the medical attention to the employee, I believe this association, this conference should take a position as to whether the physician renders only attention from a medical standpoint, of obtaining a diagnosis and cooperating with the outside physician or whether he eliminates that and does not render that service.

There is also the question as to whether the employee and his family should receive medical attention at isolated points. I think that if it is to be boiled down and if this conference could go on record as stating a clear-cut position it would be a wonderful help in boiling down and finally arriving at a conclusion and placing before the medical profession this matter which I feel sure all of you realize is in the minds of a great many of the physicians in this country. It would be quite a step and I really feel this thing should be brought to a head now.

CHAIRMAN SHOUDY: It has been suggested that a committee be appointed to draw up a resolution and bring it before the conference this afternoon for passage.

DR. BENEDICT: I should be glad to make that as a motion.
(The motion was seconded and carried.)

CHAIRMAN SHOUDY: I shall ask Dr. Sawyer, Dr. Benedict, Dr. Clough and Dr. Stewart to serve on that committee.

Now I want you to listen to somebody who is not a doctor. I have had scraps with him, but I have always thought it over afterward and looked at it from a different point of view. I should like to have Mr. C. B. Auel, of the Westinghouse Company, talk to you on what we have been talking about this morning, of the man, of the physician and of the surgeon in industry. Mr. Auel, we have been discussing how far should medicine go in industry without doing wrong and still doing right.

C. B. AUDEL (Westinghouse Company, Pittsburgh, Pa.): This is one congress where I had determined to come and simply absorb information and knowledge. I have refused to appear on any of the programs, but I guess I shall have to violate my determination at Dr. Shoudy's request.

I might say I am absolutely convinced in my own mind that health is going to

prove to be the greatest single phase of the safety movement; and while there are mighty few who think of that now there will be a big majority in due time swing over to that same viewpoint. I don't believe that the gentleman who spoke, saying that the employee will compel you to go the limit in connection with his ailments, is wholly right. I think there is a combination of circumstances that are driving the employers to go the limit, and that limit will be more and more extensive as the years go by. Possibly in union-ridden shops the employee will drive the employer. In other shops it is the employers who are compelling one another to go the limit; because if there are two employers in any one neighborhood and one of them does a whole lot of things that the other does not, he is going to get the cream of the workers in that neighborhood. So perforce the other employer must do more or less of the same thing, whether he wants to or not. It is an absolute fact that compensation laws are being construed more and more liberally and in ways that the originators of the compensation laws possibly never had in mind.

There is still another factor which is compelling the employer to go more and more into the physical condition of the employee. Many of the states have clauses in their compensation laws reading something like this: Any accident arising either in course of or out of employment is compensable.

The Law in Pennsylvania Is Quoted

In Pennsylvania the law reads: "in the course of," in other states it reads both. I take it that a phrase "out of employment" would mean something like this: If you had a man employed in your brass foundry and he works a number of months or years, and for some years, perhaps to better himself, he leaves your plant and then develops the shakes, the ague, nevertheless you are still responsible because his ailment arose out of his employment with you. But would you believe it that in Utah within the last year Swift & Company had a verdict rendered against them for a man killed while crossing a railroad track en route to his job, even before he arrived at the Swift plant? The law says: "Accidents arising out of employment," etc. They took the stand that he would not have had to cross the track and therefore Swift & Company are responsible.

In our works practically all the accidents that we have now are due to unmitigated carelessness and we are at our wits end as to the next step we should take. Some years ago in analyzing carelessness, after passing it up year after year, we arrived at the conclusion that carelessness was an effect rather than a cause. In trying to arrive at the cause of carelessness we felt that probably two of the biggest causes were worry and ill health; and going further into ill health we found that the main troubles were tuberculosis and venereal disease, and also intoxication. That in turn led us to put in physical examination, among other things. The worry we passed up for the time being, but when asked: "Bill, how the hell did that happen?" He said: "Damned if I know. I came to work in the morning. I was up all night with the missus and kiddies. I didn't have any sleep. The machine came down and my finger went off." The same thread of thought appeared so many, many times. We felt we were compelled, in a decent sort of way, to get back into the homes of our employees; not that we wanted to, but to have a contented workman on the job we were compelled to get back into the homes in many cases, and where it is done decently the workmen are only too glad to have you help them.

Our legal department helps our doctors get into the homes, but with no intention of cutting out the family physician. For every case we take away from the family physician we throw a dozen to him. We are up against this thing. We reject ten per cent of the applicants and that percentage has risen until we feel we have reached the limit in rejections; yet if we were to do the right thing we should reject more than ten per cent. But if we do that we cut down production. What must

we do? A physical examination is not going to keep all the undesirables out and when you let them in you increase your accident risk. If you aggravate their existing conditions you are wholly responsible.

It seems to me, whether you want it or not, you are going to compel the state to take on some of this work, and I have drawn up a bill which is now before the Pittsburgh Chamber of Commerce in the hope they will back it before the next Pennsylvania state legislature.

Briefly, I would like to have every workman with a handicap registered by the state at one of the state employment agencies. This is a big job. It must be taken piecemeal; so in the beginning I would have the state register only men with visible handicaps, like one eye, one leg, one arm, and when they register such men give them cards, which those men should present to you; then if you can find jobs for them the fact that they are registered will absolve you from payment of compensation in the event of further injury.

The Meeting is Enthusiastically Endorsed

After the state has had an opportunity to digest what it will cost them and they tell him it will cost really very little, I would then have the state go a step further and take men with more serious handicaps; perhaps both legs or totally blind, and I would eventually include fellows who have never been hurt in industry but fellows with handicaps which they have had from birth, totally deaf, or men subject to epileptic fits or with weak constitutions generally. It seems to me that that is where we are heading, and I say that we are absolutely against state insurance of any kind. We don't want it but we feel if the employers are decent enough (and the employers are going to make a great mistake if they let this opportunity go by) to give the handicapped employees an opportunity, then the state is doing no more than right in taking on the compensation risk; in that way we will keep our poorhouses from becoming filled and tend to elevate the grade of self-respect among our workers.

DR. WM. ALFRED SAWYER (Eastman Kodak Company, Rochester, N. Y.): Why don't you get an expression from this crowd if they like this sort of thing?

CHAIRMAN SHOUDY: This is our first attempt to get together and talk it over. Do you like this kind of a meeting? (Unanimous applause.)

This is just a beginning. Next year we hope to do this. How many are in favor of conducting an informal meeting next year? We will make it this way—we will pick out one big problem, send it to you beforehand, and ask you to bring in what you have that vitally affects your industry relative to that problem. We will try to make it so you will bring us your honest opinion as to what you think.

One other thing that comes to mind is this: What is the reaction of you men toward asking the National Safety Council to place a physician in their board of advisers? Would you like to see that done? I don't say they will do it. Would you agree with me if I make a motion that it is our feeling that the work of the Council would be helped if there was a physician in the staff at headquarters?

DR. S. R. BENEDICT (Alabama Power Company, Birmingham, Ala.): Mr. Chairman, I will be glad to make that motion.

CHAIRMAN SHOUDY: It has been moved and seconded that we believe the work of the National Safety Council could be aided if there were a physician on the staff at headquarters, in charge of all conditions relative to medicine, hygiene and allied subjects. (The motion was unanimously carried.)

ADJOURNMENT.

Tuesday Afternoon, September 27, 1927

The session of the Health Service Division was called to order at two-twenty o'clock by the chairman, Loyal A. Shoudy, Vice-President for Health, National Safety Council, chief surgeon, Bethlehem Steel Company, Bethlehem, Pennsylvania.

CHAIRMAN SHOUDY: It happens to have been my pleasure to be with the Health Service Division for the last 13 years. There are some others who have been in for 14 or 15 or 16 years. During this time we physicians, doctors, if you please, who have been present at these congresses, and who have worked with the Council on the problems of health and safety in so far as the doctor was related to the plan, have seen this work grow from a small beginning; we have seen the developments which we fostered grow. We have seen some of them drop by the wayside. We have seen others carried to a fulfillment, and we constantly have put up to us new problems which affect the worker in industry. We men who have been in industry during this time as doctors have tried earnestly to work with the other organizations of the National Safety Council to bring about better conditions for the man working in the plant.

This afternoon we present to you our program, and we ask you to discuss the paper. In discussing the papers, please be brief and do not recall too many personal things about "what we do in our plant," but bring out the points that you want some information on, or bring out the points by which you can give us information, and be short and snappy.

First, we will have a report of a committee from the meeting held this morning, outlining what we thought should be the aim or the work of the physician in industry. I will ask Dr. Stewart to give you the report of that committee.

Resolution on Preventive Medicine is Endorsed

DR. L. F. STEWART (Consulting Surgeon, Pennsylvania Casualty Company, Clearfield, Pa.): Your committee appointed at the morning session of the Health Service Division presents the following for action:

1. That this body believes that it is proper and right that industry, through its medical department, should take all steps possible along the lines of preventive medicine so far as the employee and his family are concerned. Sanitation, examination of the employee, and the general prevention of disease along the lines of health education and the general employee's welfare are not only proper but essential.
2. That it is the opinion of that conference that all accident cases occurring to the employee of a company in the course of his employment should receive proper surgical attention without limit under company supervision in an effort to promptly restore him to his usefulness.
3. That it is the consensus of opinion of this conference that so far as medical attention to the employee is concerned the policy of many corporations wherein they give diagnostic aid in cooperation with the families be endorsed, and that the company lend every assistance to the family physician in returning this employee again to his work.
4. That it is the consensus of opinion of this conference, except in isolated points, wherein it is impossible for the employee to obtain proper medical and surgical attention, that it is not advisable for the family to receive medical attention either at a stipulated stipend or at the expense of the corporation.

(Signed) S. R. BENEDICT.
W. A. SAWYER.
F. E. CLOUGH.
L. F. STEWART.

DR. MCKITTRIDGE (Indianapolis): I move that the resolution be adopted as read.

DR. HOURIGAN (Larkin Company, Buffalo, New York): I second the motion.

(The motion was carried.)

CHAIRMAN SHOUDY: The first paper on this afternoon's program, "What Does the Health of Workers Have to Do With Industry?" will be presented to you by one of the (I was going to say oldest, not in years but in point of service), men in the industrial medical field, and I assure you that it is with a great deal of pleasure I present Dr. Otto P. Geier of the Cincinnati Milling Machine Company, Cincinnati, Ohio.

DR. OTTO P. GEIER: Having attended a number of the sessions in the last few days, I feel very much inclined to cast aside the paper which I have prepared, because so many things have crowded into my mind as possibly more interesting than the thing I had prepared. One cannot, for instance, attend the Benefit Association group without realizing the tremendous necessity that faces industry in carrying that work forward, if for no other reason than to keep away that menace, compulsory sickness insurance, which faces this country as it has faced every other country abroad; and undoubtedly industry will take that dose unless America finds a better method than compulsory sickness insurance of meeting the problems of sickness and invalidism and death that come in connection with the care of disease.

If there were any arguments needed for the spread of industrial medicine, the care of the worker and the extension of Mutual Benefit Associations, certainly the problem of life extension to be substituted for one merely of cash benefits, as prevails under compulsory sickness insurance plan, would be sufficient reason. However, in order not to extend myself into the indefinite field, let me suggest before starting the reading of this paper, that I have tried here to suggest to you a new method, not a new method but a definite method of measuring your results in industry in the care of the industrial worker, rather by the death rates than by the reduction of illness or the morbidity rate; and that it would be possible (at least I suggest the possibility), of our finding new arguments to present to industry and society at large, for the earlier adoption of a more complete health service in industry.

We paid a good deal of attention to the matter of prevention of accidents but little attention to the prevention of death from illness, and yet the curve is eight or ten times that of the lost time from accidents. So merely suggesting this as a beginning, let me go to the paper.

What Has the Health of the Worker to Do With Industry?

Dr. Otto P. Geier, The Cincinnati Milling Machine Company, Cincinnati, O.

It would take the wisdom of a Socrates to answer that question in the brief period allowed here today. Economists the world over, health experts, actuaries of insurance companies, students in sociology, commissions of various types of international scope, along with scores of medical and health organizations, have tried to evaluate health as a factor in production. Industry, through the National Industrial Conference Board, made some notable contributions to the discussion.

In 1911, three years before I became associated with industry, I first became conscious of the problem in writing an article entitled "Shop Sanitation as a Factor in the Workman's Efficiency." In the 1914 Safety Congress a group of us physicians raised the question with the officials as to whether that organization should not be promoting sanitation in its broadest sense. By the next year the Health Service Division of this organization had its first meeting. Being then secretary of the section of Preventive Medicine of the American Medical Association, it was possible to introduce the subject of industrial medicine into the program of that section. The

following year the American Association of Industrial Physicians and Surgeons was organized. In 1919, through the courtesy of Dr. Wm. Mayo, industrial medicine was presented before the American College of Physicians and Surgeons. Directly after that, the American Medical Association took recognition of the importance of this subject and changed the name of its section on Preventive Health to that of "Preventive Medicine and Industrial Medicine."

In the meantime the problem had been presented by many speakers to engineering societies, trade associations and the like. Many controversies had been fought out between the industrial physicians and the representatives of the American Federation of Labor on the subject of physical examinations and the consequent "human scrap heap." But the World War and the pressing necessity for output brought labor and capital in harmony about the conservation of human energy through health work.

Throughout these years there was a gradually accumulating body of information on the subject coming through the medical and lay press. *The Nation's Health* was established for the purpose of promoting an interest in industrial health. The *Journal of Industrial Hygiene* began its appearance to meet the need for more exact scientific data on industrial hygiene. The books by Dr. Irving Clark, Dr. Harry Mock, Dr. Hayhurst, and other leaders in this line, contributed greatly to the appreciation of the fact that the health of the worker has much to do with industry.

However, when one views the zeal with which this new potential in industry was first presented to the business world, when the indisputable facts of lowered cost of production, less turn-over, less illness, fewer injuries, greater interest in the work, the better citizenship that comes with health supervision of the worker are recognized, it is disappointing to know that American industry has been all too slow in taking advantage of these new possibilities in social economic betterment.

Losses From Ill Health Greater Than From Accidents

My only explanation of this tardiness of action comes with the feeling that there has been no organized selfish interest to promote the wider introduction of health supervision in industry. Here we, apparently, have a potential agency far wider in extent than the safety movement in its possibilities of saving which, however, has lacked the energetic sales organization methods inherent in the National Safety Council. In the safety movement it has been somebody's explicit business to promote the spread of the safety habit and today we see perhaps more than four million workers benefiting from that scheme.

In the case of ill-health, where the losses to industry are eight to ten times as great as from accident, we have no agency like the National Safety Council to command the attention of management in its propaganda; to induce the habits of health with its life-saving and misery-saving results.

What organization, if not this one, shall take up this greater task, more extensive in its life-saving ability, more far-reaching in its saving of misery and poverty, more effective in adding profit to the manufacturer, and dollars to the pockets of the nearly 60,000,000 producers of the country whose aggregate purchasing power finally determines the nation's health and prosperity?

In no country of the world has management a higher standard of industrial thinking, better appreciation of good social economics. Certainly among the successful managements there is a feeling of civic responsibility, a consciousness that industry is vitally interested in what the State provides in the way of health work, in the full knowledge that good community health is basic to sane thinking and efficient work in his plant.

It is because of this high standard of management in so many plants of the country that industrial unrest is at so low ebb here as compared with countries abroad. It is because of the higher ethics in methods of employment, personnel work and safety work that so many contacts between management and men have been afforded

and a better understanding of their mutual relations and their mutual dependencies effected.

An opportunity to study these tremendous variances between the industrial conditions here and abroad was afforded me two years ago when, as a member of a commission of medical men representing nine countries, we made studies of industrial living and working conditions abroad under the auspices of the League of Nations. There I saw at first hand what enormous economic and social advantages the American workman enjoys over his European brethren in the matter of hygienic plants, the working hours and living conditions, the safety surrounding the job, but above all the relationship between management and men. After such a study one can readily understand why communism and socialism find so fertile a field abroad and so little opportunity to grow here. The great gulf between the executives and the men at the bench, the man in his frock coat in the front office and the man in blue jeans in the ill-lighted, unsafe shop. It is easy to understand the animosity, the ill-will, the lack of cooperative effort to produce. It was not surprising to learn that the Socialists were in the majority in the Belgium Parliament. It was equally consistent to see a shaggy-bearded, highly opinionated but ignorant Socialist at the head of some large medical institute and presumptuously supervising the work of trained professional workers.

Industry Needs to Be Sold the Preventive Medicine Idea

The American business man is generously purchasing today that which is sold him for the benefit of his organization, but managements at large are still all too frequently failing to understand the relative values of those purchasable factors which have to do with the health and well-being of their workers. He has bought safety service from the National Safety Council because it was sold to him by an organization which was of his own making; it was working without profit, but its employees have shown the same zeal as if it was their business. He has bought group life insurance because the insurance companies have forcefully urged the purchase of that commodity. But unfortunately the insurance companies have not been so industrious in the sale of group sickness insurance, nor have we had any agency that was energetically promoting the introduction of mutual benefit organizations within industry. Last of all, but perhaps most important, there has been no agency that has urged upon industry the employment of full time physicians as a part and parcel of a good productive scheme. With no one to sell it to him, the executive naturally did not buy a complete health service for himself and his employees.

American industry in 1926 paid to the life insurance companies more than 55 million dollars in premiums for group life insurance. Only one-eighth of the men covered by this five billions or more of life insurance were also fortunate enough to have provided for them insurance protection against sickness. In only a small section of this one-eighth was there any relationship between the life insurance and the sickness insurance plan. The plans were not tied together as a part of a scheme for protecting the worker against sickness, ill-health and death. There was no effort to unify the thinking of the worker and management upon the subject of conserving life and prolonging years of efficiency of those in the plant. Too large a percentage of the insurance referred to was of the non-contributory type and therefore little valued by the recipient. In my humble opinion the purchasers of this five billions of insurance protection may have pleased their inner consciences somewhat by having supplied about \$1,200 to the families of their deceased workers, but they received a much smaller return on their investment for the employee than they might have secured had they spent an equal sum of money in a broadly considered plan of health supervision with sickness and life insurance on a contributory basis.

Out of a plan of intensive medical supervision, tied up with dentistry and a sick-

ness benefit plan, the life of the average worker in their plants might easily, according to authorities, have been extended five years. When you extend the life of the worker for five years you place in his family's hands the equal of six or eight times the amount of money that the life insurance benefit usually provides. You have kept alive and at work the bread-winner and permitted him to enjoy his family for five years more. You retain a skilled worker for that many years more. You reduce the cost of turn-over and accidents. Incidentally you have saved to the community a producer as well as a consumer of world's goods for another five years in place of a family in need of charity.

You are all familiar with the simple experiment of the Metropolitan in giving 6,000 workers physical examinations over a period of six years at a cost of \$49,000. The actuarial figures prove that they sufficiently extended life to have made a profit of approximately 157 per cent on the moneys invested in these physical examinations. That is, they put off the day of dying, and widowhood, and collected sufficient additional premiums to show that profit.

The Immense Value of the Country's Male Workers

How insignificant are the results attained by physical examinations compared to the life extension values that come out of intelligent medical supervision in industry when it is closely tied up to a well administered sickness benefit plan including dental attention and diagnostic facilities!

I do not deny the great value of group life insurance, but I do hold that it is insignificant in value although it costs the same money as a plan of contributory sickness insurance, medical supervision and dental care. One induces the health habit and preserves the man for society and for his family. The other merely helps to bury him and provides a small balance, all too quickly consumed by his widow and children.

An article by the well-known actuary, Dr. Louis I. Dublin, in the November, 1926, *Harper's Magazine*, entitled "Life versus Death Values" is a challenge to the business man who supposedly understands life economics, to permit the present death rate of his fellow workers to continue. Productive life values are too frequently first recognized when ill-health interrupts the capacity to earn; when the costs of being sick mount high above the ordinary living costs, and most fully when death ensues and permanently interrupts productive value. We should contrast the high cost of living with the much higher cost of dying, especially if that dying be slow, or a lingering illness or invalidism. Dr. Dublin claims that, figured on an actuarial basis, the average person at 18 has a future earning capacity over expenditure of some \$29,000; that at 25 years his future net earnings are \$32,000; that at 50 they are \$17,000, and at 60, \$8,000. He makes the striking computation that the sixty million males in the United States are worth a thousand billion dollars as against our total national wealth of one-third that much. He estimates that illness, even on the low two per cent basis or seven days per year, costs the nation two and a half billion dollars annually. He further claims that one-third of the annual deaths are preventable, and that the capital annual preventable loss is six billion dollars.

In the past half century life has been extended for individuals on the average 15 years (from 40 to 56). Dr. Dublin states that the elimination of all deaths from accident would add one year on the average to the life of every individual; that the elimination of deaths from tuberculosis would add two and one-half years. It is his further belief that the universal expenditure of \$2.50 per capita per year for preventive health work would reduce the general death rate two points per thousand, and that this reduction would increase life expectancy from five to seven years.

Those who know Dr. Dublin have reason to have faith in his forecasts. I believe he can forecast reduction in death rates quite as positively as the business man is able to forecast the future profits in his business. It may be interesting, as partial

support of Dr. Dublin's statement, to add that according to published statistics insurance companies in 1926 collected \$55,000,000 from the employers for group life insurance, that they paid back to the families of the deceased about 74 per cent of that \$55,000,000. Roughly calculated, this means that out of every 1,000 employees having policies of \$1,000 apiece, that seven and one-half of those employees died during the year. Now since these figures are average, there must have been plants where the health conditions were not so good and where 10 workers died for every 1,000 insured; whereas in the plants where medical supervision, sickness insurance and dental attention prevailed, but five instead of seven and one-half men passed away. Now the plant with the complete health service can maintain this low average mortality rate and show a differential of two and one-half deaths per thousand per year. According to Dublin's above quoted statement, from five to seven years of life are added to the individuals of such a group. Therefore, I say to you that we are no longer dealing in problematical hypotheses, but we are dealing in facts. It is possible. It has been done. This reduction in mortality has occurred in plants where intelligent preventive medical health work has existed over a period of years. Such a plant may proudly adopt the slogan, "Work Here and Live Longer."

And now I come to you finally with this question: Can you imagine anywhere in this country any intelligent manager who would deny to his workers the right to live five years beyond their expectancy, assuming it was economically possible for him to provide that opportunity for prolonging life, increasing purchasing power and skill and therefore productive power? Do you believe that when management and the workers together recognize the opportunity to purchase this longer life at a very reasonable cost that they will deny it to themselves? But who is there who will make it his business to sell them this idea?

Life is the Nation's Great Natural Resource

Life is our greatest natural resource. To my mind its prolongation will provide the next great economic advance by America. Our restricted immigration laws will force society to conserve our man-power. Failure to anticipate and provide this economic asset may precipitate compulsory sickness insurance which is being offered so insistently as a means to combat some of the evils resulting from an absence of any plan to provide for the sick. The great opportunity is offered America to adopt a wide-angled sickness prevention plan rather than have forced upon it a compulsory sickness cash benefit plan in force abroad.

The problem that has been proposed today should be carefully studied from an actuarial basis so that the results in definite, easily understandable form may soon be brought to the attention of every thinking executive and every intelligent employee. The unnecessary shortening of life by five years or more is our greatest economic waste today. It is the most valued recoverable waste. There remains merely the task of so gathering the facts that they are indisputable. Then some forceful agency must take upon itself the task of selling the health habit from a dollars and cents program, just as the National Safety Council has sold the safety habit.

Health is a purchasable commodity. It can be secured to executive and employee alike. A voluntary health system can be instituted to the great economic advantage of employer and employee. It ought to be placed on a contributory basis to be most effective. It will eliminate one of the greatest wastes in our industrial life. It will pay big dividends in its longer life, the greater enjoyment thereof, the greater effectiveness, the larger consuming power. Compared to other plans of the financial wizards for economic profit to society, the results are staggering. It would spell a more permanent prosperity for all concerned.

CHAIRMAN SHOUDY: Dr. Geier, we thank you.

If there is no discussion of Dr. Geier's paper, we will take up the next which is

beginning at the beginning, and Dr. Sawyer of the Eastman Kodak Company will present to you "The Health of Executives."

Health of Executives

William Alfred Sawyer, M.D., Medical Director, Eastman Kodak Company,
Rochester, N. Y.

"Jonathan Jones, President of the G. & O. Corporation, aged 55, died suddenly yesterday afternoon at his home, 124 Chesterton Drive. He went to his office yesterday morning in apparently robust health. After a committee luncheon meeting at the City Club, he felt somewhat indisposed and instead of returning to his office went to his home. About four o'clock he was found in an unconscious condition in his bed room by one of the servants. The family physician was called immediately. All efforts to revive him were of no avail and he died at 4:45 p. m. His death was due to a heart condition of which neither he nor his family were aware. Mrs. Jones and sons are vacationing, etc."

I am sure you have all recognized the familiar sound of the foregoing. If you watch the press, you will see how often this sort of thing occurs. Fifty—fifty-five—sixty years of age—the prime of life—and their experience, training and wisdom are lost to the community.

An upstanding Scotchman, an executive in one of our larger industries, was evidently aware of this community loss. He died recently at 57 and during the year or so prior to his death, while he was somewhat incapacitated because of the condition of his circulatory system, several times he spoke as follows: "Why is it that just after I have reached a position where my experience and judgment can be of some real use to my organization and the community, I have to halt and think only of my health?" I did not then answer the question as I felt facts indicated it should be answered. It would have been too harsh to say that the habits of his earlier years and the ignorance of their results (as he, like most people, neglected any regular checking up of his physical machine), were undoubtedly responsible for his unfortunate state. Waiting till the damage is obvious, surely lessens the ability to recover and often eliminates even holding the malady in abeyance.

Here was a man 57 years of age, thoroughly able, beloved by his fellow men, desiring life, and needed, conscious that he was too soon to be cut off. He was stricken one evening at the table and a few days later died; he and the world deprived of perhaps 20 years of what should have been the best and most useful part of his life.

The business world is all too full of such pictures and I am convinced that it is well worth while for us to look into this subject and give it some earnest consideration. Executives, whether presidents, managers, superintendents or department heads, are all leaders in their respective groups. They are the key men, bearing large responsibilities in this ever increasingly intricate business life. Recognition of and consideration for, this fact is just beginning to be appreciated to the extent of doing something about it.

The dictionary says that an executive is one who is *active* or *efficient* in the management of an organization's affairs. Activity and efficiency are dependent upon the bodily energy. Energy, as pointed out by E. B. Gowin in his discussion of "The Executive and His Control of Men," is the true *basis* of leadership. Quoting him, "The body may be regarded as a chemical machine. Through the food which he eats—and digests, it must never be forgotten—the individual stores up within his body, for use when needed, quantities of highly complex compounds," which when acted upon by nervous stimuli are transformed into productivity or work. "The

ultimate source of executive ability is energy." It obviously follows then, that if much energy is required, plans must be made and carried out for its maintenance. An executive should give his body the same analytical attention and consideration that he gives his work and should follow the same methods of appraisal and control.

Executives are usually between 40 and 60 years of age, living a more or less sedentary life, without proper regular exercise or periods of relaxation; the usual result being overweight, constipation, headaches and undue fatigue. Such conditions lead to early incapacity following nerve exhaustion and the usual run of degenerative diseases.

As Dr. Loyal A. Shoudy points out in the August NATIONAL SAFETY NEWS, "The ailing executive may not be a direct hazard as is the crane operator with certain physical defects, yet the welfare of hundreds may rest upon his decisions. Poor judgment is often due to obscure physical ailments and its effects may be far reaching. Under pressure of business he postpones his visits to the doctor and dentist."

It is no uncommon thing for a company to take out large insurance policies on executives from \$500,000 to a million. It is beyond the bounds of common sense to deny that the executive man power of an organization is one of its greatest assets. The policy of preventing unnecessary waste needs closer and more efficient application in this particular. There are men so impaired by functional and organic disorders that they are unable to give more than a part of themselves to their work—this is inefficiency. They break down and end their careers long before they should and usually because of the continued neglect of what was in the beginning a minor affair. This point cannot be over emphasized. They do not give the care to their health which their automobiles receive.

The Waste of Life is Unwarranted

Marvelous and wonderful advances have been made in science and mechanics. The business world moves forward by leaps and bounds, but we are not making the progress we should in the conservation of human life. The leader cut off at middle life is delivering only about one half of his effectiveness to the world's progress. That is an unwarranted waste. And it is not only a question of keeping a man *alive* until he is 80 or 90 years of age. For the mere fact that a man is alive is no proof that he is of real worth to the community. Rather the objective is to keep him fit and alert, and the life expectancy will automatically increase. If removal by sudden death were the only question involved, the subject would still be worth consideration, but just living is not all of "being alive." A person lives who is not dead, while being "alive" implies functioning to the full—a state of health which enables one to sit on top of life's problems with sound judgment; to possess a store of energy that can be drawn upon in time of need; to know when to let up and play; and to appreciate the value of interest in other things—to have a sane and reasonable hobby as safety valve; to no more think of abusing the human machine than he would abuse, or allow others to abuse purchased equipment.

We can safely say that the time a person runs the gamut of competition and achieves a position of management, he has already stood a great deal of wear and tear, and may even suspect that all may not be one hundred per cent normal with him. He knows in a general way that his success depends upon his health and may even have learned to exert some care regarding it. Unfortunately most people seem to learn altogether too little through the wisdom and the experience of those best fitted to advise them.

Executives of whatever station are very largely specialists—bent on one thing. Indeed to be an executive demands a wide thorough study of the facts and factors involved—an intense application. Much of the time away from business is too apt to be spent in intensive sedentary and indoor social functions which do not off-set

the intense sedentary business life, but add to its strain. Anything of a mechanical nature is tested and inspected at certain intervals of time to be sure that the wear and tear of use has not weakened it beyond the point of safety, so there should be the same sort of safeguard for the human machine in industry, if continuous efficient service is to be delivered. I am sure that most of you have heard of periodic health examinations. Judging by the results obtained through groups of such examinations, it might be conservatively estimated that such examinations will save 70 per cent of the waste to industry, resulting from neglect of the human body. No business man will ignore an opportunity to make such a saving, and no modern physician, whether in industry or in private practice can ignore the prevention phase of medical practice if he keeps pace with the times. However, a real health examination involves not only an accurate test of one's bodily machinery, but a careful and detailed analysis of habits, recreation, rest, exercise and the like.

We have all forms of insurance on property loss and a cash payment will very largely make up such loss because you can purchase new equipment. The life insurance, while it pays in cash does not enable you to restore life nor in itself does it restore health. The annual check up or health examination is a form of life insurance plus, and is the *best* guarantee of a long and useful life. Of course, just checking up is not in itself efficient and amounts to but little, except as records, if the one examined does not cooperate. To have an executive really desire an opportunity to early check up his life status, is by all odds the best guarantee that the results will be effective.

May Still Consider Health a Kind of Game

Quoting Eugene Lyman Fisk—"Health Building and Life Extension": "The increase in the death rate and the ratio of physical defects after age 18 is *not* the result of a fixed biological law, but of ignorance and neglect."

Even in this enlightened day one finds many people who consciously or unconsciously regard health as a sort of game of "button, button—whose got the button"—a mysterious dispensation of providence neither to be added to nor taken away from. I cannot conceive that we will ever get to a point where individuals will look after themselves one hundred per cent. There will certainly need to be much more education on health than at present exists and to this end perhaps our greatest energy at present must be spent.

Through the printed page acquaint your executives with facts regarding the value of periodic health examinations. Reprints of well-written and authoritative articles are procurable and most convincing. See that these are distributed. Talk to them personally or in groups. Send out personal letters calling their attention to certain health facts. It is particularly convincing to send out a letter to the managerial group just after some important man has suddenly died. Capitalize such events. Use the sort of salesmanship that is in practice in other lines of endeavor. If you can't appeal to their reason, then even their fears may offer an opening.

I think it is better to propose that a routine periodic examination be made by the plant medical department in the beginning. It gives a true estimate of the physical status of the group and enables the physician in charge to know where his efforts should be directed. Perhaps it may be best to even insist that *all* such examinations be done by the plant physician. That will depend upon the type of organization. We started to enlist interest by offering a physical inventory to everyone in three of our plants, the aim being to secure the cooperation of the rank and file by the examination of the executives and the executives' willingness to submit to such examinations was obtained on the basis that he must set the example to secure the cooperation of the rank and file. In this way, each group, stimulated the other. In one of the plants, 50 to 75 of the employees were called together at a time, girls

and men in separate groups, and talked to by one of the executives and by the physician as to the value of periodic examinations. They were all asked to sign a slip indicating their willingness to submit to such examinations. This took a number of days. Ninety-eight per cent of the group of about 2,000 accepted it. In another plant, the proposition was first presented to the executives in assembly and sold to them and they in turn went back to their respective departments and through an employees' representative system, obtained the approval of the entire force. This went over 100 per cent. And the same was true of a third plant in which the executives handled the matter, convinced the employees under them that it was desirable and secured their approval. As a result over 3,000 examinations were done.

There were many interesting phases to this experience. I am convinced that there need be little difficulty in such a proposition if it is approached in an intelligent and sympathetic way. Anything so worthy can be convincingly presented, particularly if the man at the very top gives his hearty approval. This should always be sought first. We have not repeated such a performance yearly because we have been entirely too busy to handle it. Therefore, not so much because of a plan as a circumstance, we have followed up and re-examined only those whose status at the time indicated the need for further attention. To the remainder we urged that they seek a yearly examination elsewhere. We have never refused a request for such an examination and are continually taking care of such cases.

Executives Are Paying More Attention to Their Health

It seems to us that it is far better to have executives want such examination than it is to thrust it at them and insist that they accept it. We have shown them how and why.

What is the result among the executive group? Just this. They pay more attention to their health than ever before. They are taking more exercise, proper recreation is really playing an important part in their living. Vacations are more regular and of a better quality. A given number are going to their doctors regularly for a thorough overhauling and a number come to us and ask for check-ups. In some of the executives we discovered organic defects of which they were entirely unaware. We cannot yet show tables proving that mortality has been reduced, or that morbidity is less, but we do know that the executive force is "on guard," and much good has already resulted.

We are just now issuing a letter to the executives (from the foremen up) calling their attention to the examinations previously done and again pointing out their value, with the hope that they have carried on by having their own family physician repeat them. If not, it is time that they again took stock, and if the birthday is not a good time to have an annual check-up, then perhaps it is wise to start each year off fresh and fit, having their examination sometimes in January: or perhaps the beginning of the fall after vacation time, or in the spring when tired and frazzled after a hard winter.

We are urging them to go to their own doctor and have not only their vital structure studied, but their habits as well. They must not forget that habits are of the utmost importance for if they are what they should be, then they need have little fear of the machinery doing its part. With the fast and furious pace of modern days and the very best and utmost being demanded of us, man can only meet the challenge fully if he knows how to live and properly protect himself against the onslaught of the business world pace. We are offering our assistance in anything that we can do, such as X-rays, laboratory examinations, etc., and if they choose we shall be glad to do the whole examination. In a few months this letter will be followed by a similar one again pointing out some of the specific reasons for closer attention to one's health.

This plan may not be the ideal plan, but it is a plan and, as we believe, helping

to keep the subject to the fore and after all, that is what is desired. Any reasonable plan if intelligently carried out and fully explained to the executive will eventually do great good. In every industrial medical department where there is friendly contact between the executive and the physician, there is a great deal of supervision and watchfulness going on even without a preventative plan. And it is safe to say that many useful years of service are added to the organization. Executives often fail to achieve eminently because, although wise in the world of finance, production and distribution, they are either grossly ignorant of the needs of health or stupidly careless of its fundamentals. Many a promising man is "licked" before he gets a decent start because of wrong food habits, insufficient elimination, too little exercise, too much weight, or infection from within or poisons from without. The accumulation of these conditions over a period of years is the handicap which eventually downs him.

Quoting Clarence W. Lieb—*Hygia*—"Eating Hazards After Fifty." "Objectives are accelerating to achievement in health as well as in war or in business. Every man of 50 should have 100 years as his life span objective."

Essential Health Rules for the Executive

If I were asked what were some of the things to which an executive should pay attention to maintain his health and efficiency, I should give the following:

1. Yearly analysis and rating of his body. This it seems to be the first objective and the basis from which he can act to keep his health what it is, or even make it better.

2. Proper, regular exercise and recreation, preferably out of doors, is to my mind the second essential.

While there is a tremendous increase in the play spirit of Americans, yet men in big positions loaded with responsibilities, time filled to capacity, are often neglecting after forty years of age this most important of requirements. To quote Harry A. Scott on "Physical Recreation and Exercise for Business Men": "It is a well known fact that many men cease practically all physical activity once they enter upon the serious business of earning a living. This may be due in part to the lack of recreative opportunities in the community, but more often it is due to the "too busy" complex of the American business and professional man, and the universal habit of procrastination. In an attempt to determine the real status of the recreational life of business and professional men, a questionnaire was sent to approximately one thousand business and professional men. While the data is insufficient to be conclusive, it is at least indicative of certain definite existing conditions among those answering the questionnaire, as follows:

- (a). Approximately 50 per cent follow a regular program of physical activities.

- (b). The period of greatest participation is between the ages of 26 to 50 years."

3. Adequate vacations.

In some cases one period a year is sufficient, in other instances which, of course, depends entirely upon the nervous mechanism of the individual, two periods of vacation are essential. There seems to be a precedent and a custom in industry generally that two weeks' vacation is adequate and for certain types of workers it may be so, but I am of the opinion that many of our leaders would be greatly benefited, would be more efficient, have better judgment; and do much straighter thinking, if a more adequate and proper vacation were taken each year. The essential thing in any vacation is to make it of the sort which will give relaxation, quiet, fresh air and proper exercise, these things which recharge the reserve force and give buoyancy. It goes without saying that the change of scene and absence from routine will be included.

4. Avoidance of over-eating.

We know all too well that Americans all too generally are digging their graves with their teeth. Better head work results on the proper caloric intake.

5. Enough sleep must be had.

Too much night life, too many vicarious amusements, too much radio, too many parties, too much taking of the man out of his home by community activities and organizations, have reduced his supply of sleep beyond the limit of safety. No man can sit on top of his position and be in full command of his faculties who does not give nature a chance to restore through restful sleep the spent energy of the day.

6. All work and no play makes any executive an exceedingly dull individual. A hobby or an interest of some kind other than just work is highly essential. One of the saddest spectacles of advancing years is the individual ready to let down in his work but with nothing to which to turn to occupy his attention.

7. Last, but by no means least, a spirit of good cheer and an ability to smile. A sense of humor, being humble and natural amid all the conventions and exactions of life.

To be sure there are some difficulties in any program of health supervision and we must not fail to consider them with reference to executives. First of all, you will have many refusals or postponements in reporting for examinations. Numerous appointments and phone calls will be necessary.

Second. Undue anxiety must not be aroused over the little impairments and defects found. So often a physician alarms the individual unduly because of a haphazard statement and a failure to carefully consider the type of individual to whom he is talking. With a little care all of this can be avoided.

Third. Many of the executives will fail or delay in doing the things they are advised to do. Here it is a question of repeated warnings and reminders, but after all that is a part of the industrial medical work.

Fourth. In some industries the medical department will lack the standing and authority and this will greatly minimize its effectiveness in this sort of work. If it has the support and backing of the man at the top, if it is work of the highest quality, which naturally commands respect, and if the dealings with the men are handled in a tactful, sincere and straightforward manner, there need be little concern as to its success.

A Few Industries are Helping Their Executives

A limited number of industries are making a distinct effort to aid the health of their executives. Insurance companies holding large policies on executives are becoming thoroughly alive to the possibilities of health maintenance and urge and offer annual examinations to their policy holders. Through their experience we are convinced of its value. They have records which show that it reduces mortality. Organizations like the Life Extension Institute are doing much to provide the facilities for periodic check-ups. The machinery is at hand. That which is most needed now is the implanting of a determination on the part of the man himself to make use of these facilities which are at hand.

In the 1926 report of the National Industrial Conference Board, entitled "Medical Care of Industrial Workers," it states that. "In the Conference Board's study of 255 plants, it was found that in 49 cases executives were examined at regular intervals."

"Executives have been found who were on the border of protracted disability, if not a complete nervous breakdown. Others were discovered suffering from unsuspected but serious disease, such as diabetes, Bright's Disease, high blood pressure, and cardiac troubles, the nature of which is progressive and increasingly disabling.

In an effort to locate those organizations which are making some effort in this respect, I find that a good many are doing nothing, some are carrying out a small program, others are doing a very thorough-going job.

In those in which I was able to secure replies to the questionnaire sent out by the American Association of Industrial Physicians and Surgeons, the answers to the question, "What results have been obtained from these examinations that can be passed on to other physicians in industry," were of most interest.

In many instances, the results were not known. In some cases the examination blank is given to the executive named and it becomes his property. No records are kept in the medical department files of such examinations. In one industry this was used as a sales argument in putting over executive examinations. In some cases executives are given periodic medical attention by each one's private physician. The reply did not state whether it was an iron-clad rule that they go to their own doctor periodically for an examination but such a rule might be possible.

What Some of the Examination Records Show

No. 6 says: "Every year we find cases of diabetes, pulmonary tuberculosis, kidney trouble, high blood pressure, etc., that are giving no symptoms and measures are instituted to cure and check the disease.

No. 9 states that "A very decided influence in health and personal hygiene through advice as to diet, better type of care of teeth by showing results of X-ray studies of crowns, etc. The educational side is of decided advantage. Arnold's Bennett's 'Human Machine' is recommended for its psychological effect."

No. 19 replies that "Defects are found and called to a man's attention, and if they are capable of correction this is urged and followed up, or if defect is not corrected, our main office may be informed." Here we see evidence of the compulsory examination. In many types of industries such a method is doubtless justifiable. In others it would not be possible.

No. 13 does not speak of any results but reports that "in all periodic physical examinations we do complete blood count, Wassermann, twenty-four hour specimen urine and X-ray all the teeth. Also we X-ray any other part indicated and upon further individuals do blood chemistry, basal metabolism, etc., in our laboratories."

No. 3 begs to be excused for his delay in replying because the company was holding a conference of salesmen and it is the medical department's duty to examine each one annually before he returns to his territory again. Such work is excellent. I know of no group which need such examinations more. This company stresses examinations of their executives strongly, doing them every six months and going to great lengths to get them well, if found in need of medical attention. In their recent examination of one hundred four executives, defective vision, infection of the teeth, marked rise in blood pressure, acute kidney disease and diabetes all of which cases found existed without any accompanying symptoms and these conditions did not exist six months previously. Hence the value of a semi-annual check-up. Their average age was 43½ years. One out of every three wore glasses. Eleven of them had sixteen abscessed teeth (complete X-rays were taken) two had organic heart conditions, two had irregular hearts, four had high blood pressure, two had kidney complications, one had diabetes and four were ruptured. I think this doctor had done an excellent piece of work and gives ample proof of the need for it.

No. 11 states that X-ray of the teeth of ten shows up foci of infection. Blood pressure readings, urinary examinations and consideration of eyesight frequently show that advice as to diet, exercise, mental activity is needed. Letters are sent out each year urging that they avail themselves of certain examinations offered

by the Medical Department. The examination is entirely voluntary. Between 60 and 75 per cent avail themselves of it. A copy of the recent letter reads as follows:

"The Medical Department wishes to offer the following:

1. Urine Examination
2. Blood Pressure Reading
3. X-Ray of Teeth
4. X-ray of Chest.

It is very much desired that all take advantage of this opportunity. In order to facilitate this work appointment may be made at your convenience by calling 3829, shop phone.

Signed by the Medical Director."

Such a plan seems to me to have excellent possibilities—perhaps the offering of specific tests is a much better way to induce the man to come in than to call it a health examination or periodic examination.

A Very Comprehensive Plan of Examinations

No 5 replies that "My method of procedure is to make a health examination at stated intervals. The examination is made oftener than once a year, depending on the need of the individual. Each examination is followed up and in this way I am able to keep the needs of each individual before him so that the results are much more satisfactory than they were when this form of checking up was made only at the time of examination.

"At times it has been necessary to check some cases as often as once a month.

"The cooperation on the part of the group has been excellent. It has often been difficult to know just how much to ask of each one but in the series of examinations lasting over eight years, it has rarely been necessary to frighten anyone. It has helped greatly by being able to advise regarding the working hours and the vacations of this group. Each man knows he will get what he needs to keep him fit provided he gives reasonable cooperation. These examinations are voluntary." He continues, "The health of one group of ninety-one men made up of foremen, department heads, staff men and chief clerks is examined once a year and when necessary twice a year. A group of fifty major executives including the directors of the company is examined at least twice a year, sometimes oftener. It has been my experience that if I could get the men to correct one bad living habit or correct one defect during each year, progress had been made. Every three months this year we have been sending some health articles to each of these men examined so as to keep their attention more or less on the subject of personal hygiene and physical fitness."

In this same organization in 1926, a group of 91 minor executives on an average, lost a little less than two days each. (The lost time in this group has shown a decrease from 1924 to 1926.) The doctor in this plant has found also that these executives who have had the largest number of yearly examinations lose the least time. Altho there are fewer correctable defects than when the examinations were started.

May I add that in my own organization a group of department heads lost on an average, in 1925, of 3.27 days and in 1926 2.37 days each. How much health supervision has to do with it I am unable to say.

Dr. A. W. Colcord before the Western Pennsylvania Division of the National Safety Council says: "The examination of executives under 40, yearly, and of those over 40, twice a year, stressing, in the latter group habits of living, blood pressure, urinalysis, heart and blood vessel conditions with functional tests, eye and ear conditions, nerve reflexes, conditions of teeth, tonsils, gall-bladder, appendix, rectum, prostate, and, if possible, Wasserman's in all cases."

Dr. Colcord dismisses the cost of physical examinations for applicants and em-

ployees with the remark: "I merely say that if carried on in the right spirit they will always be worth many times their cost in increased efficiency, in decreased loss of time from sickness, in more years of working time and increased loyalty of the workers."

Dr. V. S. Cheney describes in the *Journal of Industrial Hygiene* the character of examinations for executives at Armour & Company. All executives under forty are examined once a year and all over 40 twice a year. The examination is made by the family doctor on a blank furnished by the company. This is sent to the medical department after it is complete where it is analyzed, and proper follow-up instituted. Dr. Cheney says, "Without good health a man cannot perform his duties efficiently. Good health is therefore his chief asset; it is the commodity that he is selling to the industry and it is up to him and not up to the industry to maintain the quality of that commodity. You see that he rates the periodic examination as a test to see whether the executive is doing what he should to maintain his health."

The Responsibility of Every Executive

Thus you will see the methods may consist of either a rigid compulsion regarding such examinations such as exist in the army or some of the railroads, or it is a voluntary affair entirely. Both are good. The response and effect depends on the spirit which pervades the organization and the manner in which individuals are handled. It is the responsibility of every executive to maintain good health. Industry has a right to expect it but in turn industry must exert supervision and see to it that he has adequate vacations and at times when they will be most helpful. Furthermore, I want to again stress my belief in the supreme importance of health habits for I believe a check on these in every so-called health examination is of chiefest importance. No value can come in telling a man he has this or that, if the things which are causing it, are neglected.

And lastly may I plead for more education among our key men of the business and commercial world regarding health. If industry cannot carry on routine periodic examinations, it can at least put into the hands of its most valuable group, literature bearing on the necessity of attention to health. Ponce DeLeon once looked to this country for the fountain of youth, but found it not. Were he here today we could direct him to it for at last through periodic health examinations we have that long elusive fountain.

CHAIRMAN SHOUDY: You men who are not executives, you men who are interested in the executives and interested in the problem of the health of the man, can take home with you the thoughts Dr. Sawyer has given you in that paper. You can sell the idea of health to the chief executives of your company, to sell the health to the men who work in your company. I will not ask for discussion on Dr. Sawyer's paper. There is very little to discuss about it, until after we get through with the other papers.

The other paper, "Some Observations on Industrial Silicosis," by Dr. Sayers, Chief Surgeon of the Bureau of Mines, will be read by Mr. Daniel H. Harrington, chief engineer of the Safety Division of the U. S. Bureau of Mines.

MR. HARRINGTON: The subject of silicosis as applicable to mines is one of the most important that can be considered. The general public has a feeling or horror as to explosions in coal mines, and it would probably be very much surprised to know (and it is a fact), that there are more miners dying every year from silicosis than are killed by explosions in coal mines; and this, in the face of the fact that there are about 600,000 involved in coal mines, and hence are subjected to possible explosions, while, on the other hand, there are only about 125,000 involved in metal mines who are likely to be the most involved in silicosis.

Some Observations on Industrial Silicosis

R. R. Sayers, A. M., M. D., Surgeon, U. S. Public Health Service, Chief Surgeon,
U. S. Bureau of Mines

Silicosis is a chronic disease, usually industrial, caused by breathing rock-dust containing silica or quartz. It is characterized clinically by shortness of breath, cough, and decreased expansion, which result in a lessened capacity for work; anatomically by increased amounts of fibrous tissue in the lungs. The harmful effects of breathing silica dust have been recognized from the time of Hippocrates. The disease exists among workers in the abrasive industry, pottery, tool grinding, sand blasting, brick making, quarrying and mining industries.

Etiology

It has been found in practically all the hard rock mining districts of the world that no nationality is exempt, and that all races are susceptible is indicated by the above statement as to distribution. The incidence of the disease is higher among the younger miners in districts where the rock contains a high percentage of free silica, and among the older miners where the percentage of silica is low. This is due probably to the fact that the rock containing a high percentage of silica produces the disease in a comparatively short time. The ages of the man in itself probably is no great factor. Previous occupation of the man may have a definite influence in predisposing to silicosis if he has been exposed to dust or to other respiratory irritants. Men who have worked in certain coal mines for several years seems to be less susceptible to silicosis than the average man. According to some investigators, animal experiments indicate that coal dust has this effect. Three groups of animals were exposed for a definite time as follows:

- Group 1. To free silica dust.
- Group 2. To mixture of coal dust and silica dust.
- Group 3. To coal dust and then to silica dust.

They were examined several months after exposure. Groups 1 and 2 had more silica dust remaining in the lungs than Group 3, although silica dust could be demonstrated in all groups.

Men who have had respiratory diseases, especially tuberculosis, are apparently more readily affected by silica dust. Men who have organic diseases of the heart, including the asthenic heart, are also apparently more readily affected by silica dust. In the gold mines of South Africa, where the conditions are good, the average time of exposure of men before simple silicosis can be diagnosed is seven and one-half years. The shortest period of exposure is reported to be two and one-half years. In other industries as well as other mining districts, the length of exposure to silica dust necessary to produce silicosis varies from a few months to several years.

Dr. Watkins-Pitchford emphasizes the importance of tuberculosis and the importance of detecting and isolating bacillus carriers from the mine at the earliest possible time. If this is as important as Doctor Pitchford indicates, it is interesting to note this fact as additional evidence of adult infection with tuberculosis.

Prevalence of Silicosis

The disease is known to exist in a great part of the hard-rock mining districts of the world. It was studied in Western Australia by Dr. J. H. L. Cumpston, who reported in 1910. He found that the death rate from respiratory diseases

among all male non-miners over 15 years of age was 167 per 100,000, whereas the rate among miners was 539 per 100,000. The death rate due to tuberculosis among males over 15 years of age was 6, whereas among miners it was 192 per 100,000.

In 1921, among 6,538 miners at Broken Hill, New South Wales, 373 were found to have some incapacity due to effects of dust on the lungs.

In 1922, in New Zealand 2,012 men were employed in gold mines, of whom 1,438 worked in quartz gold mines. During that same period 506 former gold miners received an annual compensation for incapacity due to effects of silica dust.

More work has been done in South Africa than in any other country on the study of silicosis, as a far greater number of men, from 12,000 to 15,000 whites and about 180,000 blacks, in a limited region are exposed to rock dust containing a high percentage of silica. For the years 1908-1909 the Miners' Phthisis Commission of South Africa considered that out of a mining population of 12,000, approximately 1,000 men in any one year would reach the stage of definite incapacitation.

On account of the heavy morbidity from miners' phthisis, a Miners' Phthisis Medical Bureau was established in Johannesburg in 1916 under Government auspices. By periodical examinations of the miners actually employed, 738 were found to be suffering from simple silicosis in the year 1916-17, 700 in the year 1917-18, 704 in the year 1918-19, 1,572 in 1919-20 (this year the antiprimary stage was included), 448 in the year 1920-21, and 434 in the year 1921-22.

The Situation As Studied in Great Britain

In Great Britain the subject has been studied thoroughly by Doctor Haldane, Doctor Collis, and others. The statistics collected by Doctor Collis for all occupational groups show that the death rate for tin miners from phthisis is greater than in any other industry in any period given. In 1910-1912 the rate of death from phthisis was 75 among coal miners, as against 678 among tin miners; so phthisis presumably is closely related to tin mining.

In another paper Doctor Collis states that the incidence of phthisis among coal miners, although low, and that of other respiratory diseases which is often high, are probably influenced by exposure to dust. He further states that tin and lead miners suffer from typical silicosis, the results of which are associated with the high mortality of other respiratory diseases and Bright's disease.

Investigations have shown that silicosis is present in many of the mining districts of the United States. In Missouri, in the Joplin district, Doctor Lanza found that 433 miners out of 720 examined had silicosis. He also found that 432 out of 1,018 examined in Butte were so affected. The disease has been found in Nevada, Idaho, Arizona and California. Jarvis and Hoffman and others have shown the mortality from this disease to be very high among granite workers in Vermont.

Table 1 gives the average death rates per 100,000 in certain states for silicosis, tuberculosis, influenza, pneumonia, and other respiratory diseases, as well as for all diseases among coal miners, metal miners, and the general population for a four-year period. The rate for tuberculosis among granite workers of the United States and Canada is also given for comparison, as this occupation is known to predispose to this disease. This table shows that the death rate due to silicosis and tuberculosis, among metal miners of the states given, is much higher than the death rate due to these diseases among coal miners or among the general population. The rates for these two diseases can be combined, as they are usually associated in this industry.

TABLE I

Average Death Rate Per 100,000 of Miners and of the General Population for the Four-Year Period 1917-1920, and of Granite Cutters of the United States and Canada for the Four-Year Period 1915-1918¹

Diseases	California			Colorado			Illinois ²			U. S. and Canada		
	Coal Miners	Metal Miners	Gen. Pop.	Coal Miners	Metal Miners	Gen. Pop.	Coal Miners	Metal Miners	Gen. Pop.	Granite Cutters		
Silicosis		34.66	.....	66.17	609.32	.....	0.55 ³	.....	.....	.....	.....	
Tuberculosis		684.45	155.7	76.12	154.40	205.60	109.21	.....	.....	104.30	1,044.3 ¹	
Influenza		162.56	124.6	110.97	644.72	177.85	128.02	.....	.....	143.96	.....	
Pneumonia		521.70	133.5	420.40	2,182.09	184.87	151.12	.....	.....	162.66	.....	
Other Resp. Dis.		127.86	.....	39.19	137.97	.....	33.51	.....	.....	.....	.....	
All Diseases		3,564.47	1,457.50	2,045.00	6,167.25	1,715.00	1,300.41	.....	.....	1,360.00	.....	

Diseases	Indiana			Missouri			Nevada ²		
	Coal Miners	Metal Miners	Gen. Pop.	Coal Miners	Metal Miners	Gen. Pop.	Coal Miners	Metal Miners	Gen. Pop.
Silicosis	.....	.....	.....	.....	.....	.....	.....	95.22	.....
Tuberculosis	88.63	.....	105.75	91.09	1,946.70 ⁴	117.3	.....	298.06	.....
Influenza	173.42	.....	100.20	214.98	602.24	102.5	.....	149.23	.....
Pneumonia	96.25	.....	144.72	92.60	338.10	178.8	.....	656.98	.....
Other Resp. Dis.	94.24	.....	.....	16.49	39.41	.....	.....	51.91	.....
All Diseases	1,372.78	.....	1,397.50	971.00	4,317.04	1,342.5	.....	2,635.62	847.85

¹Exclusive of the last three months of 1918.

²Data for Illinois are for 1916-1919.

³Nevada is not in the registration area and the population has been estimated.

⁴No figures are given for 1917 by Census Bureau, as Illinois was not in registration area at that time.

⁵Anthraxosis.

⁶The high death rate per 100,000 for metal miners in Missouri may be fallacious. Many of the miners still residing in Jasper County (where the rate was much higher than in the eastern part of the State) are using the electric cars to get to their work in new developments in Oklahoma, consequently if any of them die, the record of death gives their place of residence and not their place of work.

⁷These figures are taken from Bulletin No. 203 of the Bureau of Labor Statistics, Department of Labor, by Frederick L. Hoffman, 1922.

Theory of Action of Silica

A number of theories are given as to why silica or quartz dust is the most harmful of those classed as non-toxic. The one to be given first and still accepted by many is the physical characteristics of the particles of dust, their sharp knife-like and needle-like form, and their insolubility. But it has been pointed out that some dusts having these physical characteristics, as carborundum, do not readily produce fibrosis. Furthermore, if the harmful effects are due to the ability of the particles to penetrate tissues, they should penetrate all soft body tissue, and this has not been found true. Doctor Haldane notes all silica dust without sharp and pointed particles, as precipitated silica, heated enough to dehydrate, if inhaled will cause changes similar to those produced by quartz dust.

Some investigators think that silica exerts a toxic action upon the tissue cells. In support of this, Myers found that silica dust collected in the mines of the Joplin-Picher district is soluble in water. Doctor Mavrogordato reports that silica is soluble in weak alkaline solutions similar to body fluids. He concludes that the solubility and chemical activity of silica are of great importance, and that hardness and sharpness are of but little importance in causing silicosis, also that ultramicroscopic particles or chemically inert dusts are not dangerous. Doctor Mavrogordato reports that possibly silica dust exerts preservative action upon the cells which take it up, that is not exerted by inert dust. Doctor Gye and Doctor Kettle found that colloidal silica, when injected into animals, is poisonous. Doctor Gye is of the opinion that the toxicity varies directly with the solubility of silica. Doctor Collis, in reviewing the subject states that when soluble silica is introduced into the blood stream, it reacts with liver cells causing fibrosis there, and also with kidney cells (by which its excretion is attempted) causing fibrosis there. In work done at the Bureau of Mines Experiment Station at Pittsburgh, suspensions of dust high in free silica, when injected into the abdominal cavity of guinea pigs, produced marked fibrosis. Doctor Haldane thinks that the most probable theory is "that dust produces phthisis in proportion as they are physiologically inert." He thinks that they act by being in the way, and when enough particles are in the cells the life processes of the cells are slowed. In 1924, Doctor Gardner stated the lymph stasis theory. This theory, which is very much in line with the opinion expressed by Doctor Haldane above, is as follows:

"By a study of inhalation experiments the primary lesion caused by dusts which migrate readily is established in the tracheobronchial lymph nodes. Sufficient accumulation of such dusts in these organs is followed by an obstructive fibrosis in the sinuses, which in turn leads to a stasis in the afferent lymphatic vessels. The pressure of the distended lymphatic vessels promotes an inflammatory response in the areolar tissues about them. Such changes are first observed within the sinuses of the lymph nodes, then in their immediate vicinity and gradually they extend toward the periphery of the lung. Such perilymphatic inflammation finally assumes the characteristics of scar tissue in the location of first appearance of such reaction in human pneumokoniosis. That it is not due to the direct action of the dust may be inferred from the relatively small amount present in these locations."

Doctor Sleeswijk states that certain sandstone, which contains 70-72 per cent SiO_2 and 13-20 per cent CaO , is found to be only slightly dangerous. Absence of lime, according to him, is more important than presence of silica.

With the object of answering the question whether colloidal solution of SiO_2 is really a "cell poison" as indicated by experimental data of Gye and Kettle,

Scheinin made experiments on the growth of tissue culture, according to Carrel, in the presence of a colloidal solution of SiO_2 . He found that such a solution exerts no retarding action on the growth of tissue culture; an emulsion of tubercle bacilli added to a nutrient liquid stops growth and also possibly may cause death. In the presence of SiO_2 and tubercle bacilli emulsion, however, the tissue grows, although less intensively. The author draws from this the conclusion that colloidal solution of silica cannot be said to be a "cell poison" in all cases.

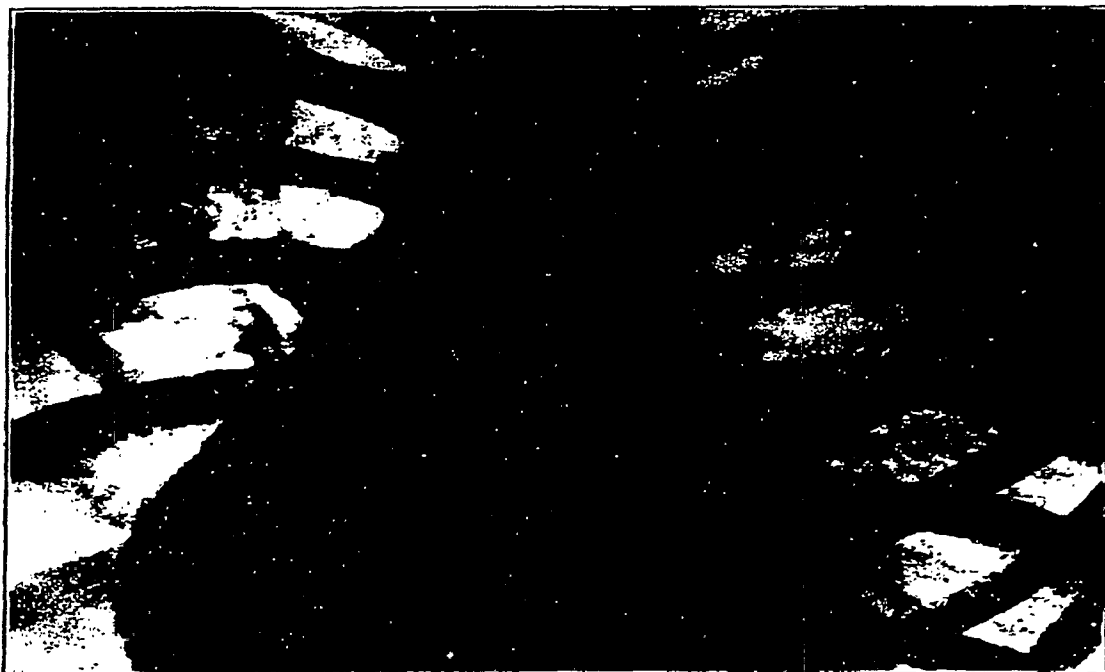


Figure 1. X-Ray photograph showing a normal lung.

Although more investigation is needed to determine the facts, nevertheless there is good empirical evidence that dust containing a high percentage of free silica is most dangerous; furthermore, that only the very fine particles reach the lung tissue and remain there. The particles found by Doctor Watkins-Pitchford and Doctor Moir in the lungs of miners on the Rand were mostly less than 5 microns (1 micron = $1/25,000$ of an inch) long; only 1 particle in 2,000 was over 8 microns, and only 1 in 1,000,000 was as much as 14 microns long. When it is remembered that the cells, which take up the particles of dust, usually measure about 10 microns in diameter, larger particles evidently can not be ingested.

Reaction of the Lungs to Dust Particles

Much of the dust breathed, especially the larger particles, is deposited in the upper air passage of the respiratory system. Doctor Gardner and Doctor Mavrogordato have published the results of the findings after exposure of guinea pigs to dust for a period of time. Doctor Gardner found that, after exposure

of animals to Barrie granite dust (about 69 per cent total silica), no macroscopic lesions could be detected until about the seventh month. If at that time the unfixed lung tissues were carefully examined immediately after opening the thorax, a delicate green-brown tracery of dust deposit could be detected on the subpleural surface along the antero-inferior borders of the cephalic lobes. A few similar deposits occur on the vertebral borders of the caudal lobes. This coloration quickly disappears on exposure to the air, probably because of coagulation changes in the tissue which render them opaque. Zenker fixation, of course, obscures this pigmentation. Doctor Gardner states that microscopic



Figure 2. X-Ray photograph showing early silicosis.

lesions are of more interest; but to appreciate their significance it is necessary to compare them with control animals, one series made to inhale dust alone and another, tubercle bacilli alone. These lesions are therefore summarized under the following heads:

1. Pure dust changes. After about three weeks' exposure small amounts of dust may be found, enclosed in mononuclear intraalveolar cells, which often show mitotic figures. These cells are scattered everywhere in the alveoli from the pleura to the hilum. A very small amount of dust is caught in ciliated epithelium of the trachea and bronchi. At about two months some of these intraalveolar dust cells have begun to mobilize and have formed considerable collections, often so closely packed as to simulate giant cells. These cell masses lie in the alveoli along the course of the ductuli alveolares

and about and within the small lymphoid collections occurring in the periphery of the lung. Dust has already passed through the lung and lodged in small amounts in the tracheo-bronchial lymph nodes.

From 3 to 7 months the same process continues with a steady increase in the amount of dust deposit. The invasion of lymphoid tissue of the lung is more extensive and the larger nodules located at the bifurcation of the bronchioles and bronchi become involved. No dust has ever been found in the liver or spleen. Occasional small deposits occur in the intestinal content, but none has been seen in the mesenteric lymph nodes.

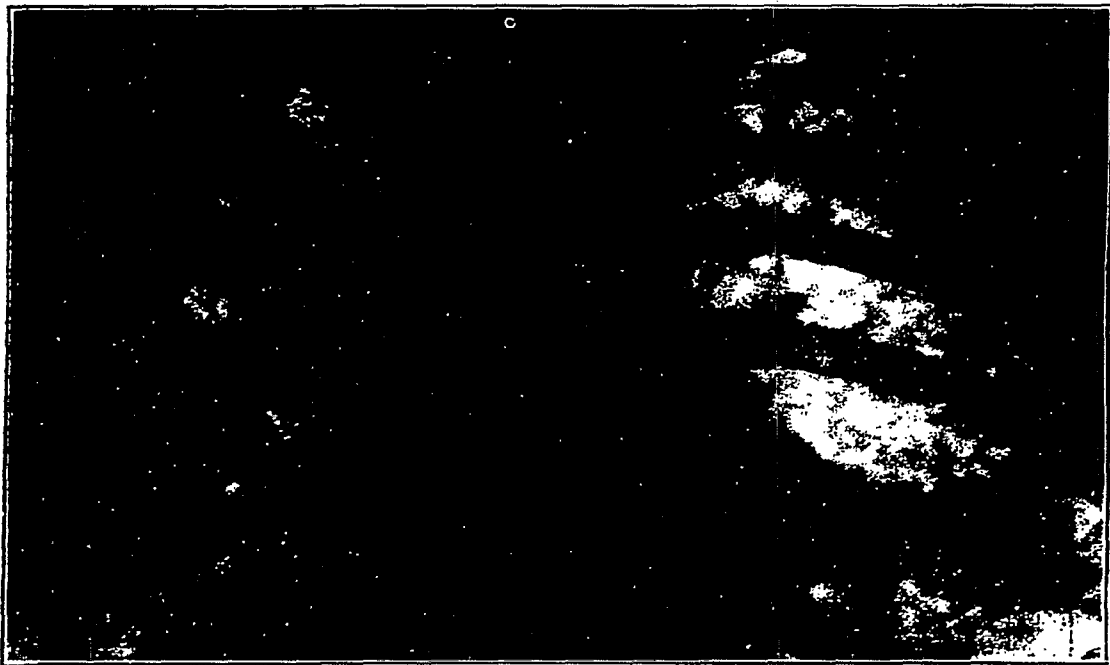


Figure 3. X-Ray showing advanced stage of silicosis.

If the animal be set aside after dust exposure the lung makes rapid and effective efforts to rid itself of the irritant. The clearing process has been observed only up to three months in animals dusted for seven months previously; at that time practically all the dust is collected within large aggregations of round or oval mononuclear cells which lie in the immediate vicinity of much enlarged lymph nodules. Heavy deposits occur within such nodules and within the tracheobronchial lymph nodes. Some dust still remains within the alveoli along the ductuli alveolares.

Doctor Mavrogordato states that when any dust gets into the lungs a large number of cells ("dust cells") are produced which take up the particles of dust. Many of the dust-laden cells escape into the air passages and are coughed up and expectorated. Those which remain in the lungs become fixed and may be

dangerous. The life of "dust cells" is normally brief. They may be carried off by the lymphatics or may die and be digested or dissolved by the body fluids and leave any dust, previously ingested, on the adjacent tissues. When coal dust is breathed and ingested by "dust cells," after a few weeks the dust particles can be found outside these cells on the outer surface of the blood vessels of the lungs at points where the cells on the outer surface of the blood dissolved. Much of this dust can and does escape into the air passages to be coughed up. Doctor Mavrogordato concludes that "it is the dust which can not escape from the tissues which is a source of danger and as long as elimination follows fairly closely upon the heels of ingestion not much harm is done. Coal seems to set up a sort of aseptic 'catarrh' in which there is a steady exodus of particles from the lungs."

When dust of free silica is breathed, the particles ingested by the "dust cells," unlike coal dust, remain within the cells. The cells become clumped together to form a mass similar to the masses of cells (tubercle) found in tuberculosis. These masses of cells, pseudo (false) tubercles, are first found near the surface of the lungs. At first they are separate, later they join together, become confluent, and assist in causing a uniform thickening of the pleura. As stated above, the cells containing silica particles do not die and are not digested or dissolved by the body fluids as is the case with those ingesting coal dust. When "dust cells" reach the lymphatics, they are not all carried off but accumulate and block the lymphatics. The cells gradually merge into fibrous tissue. The blood vessels may be surrounded by the fibrous tissue but may remain open or become plugged with the cells and finally filled with fibrous tissue. The earliest changes due to breathing silica dust in sufficient quantities are:

1. The accumulation of "dust cells" in masses or pseudo tubercles immediately under the pleura.
2. The formation of free pseudo tubercles.
3. The blockage of the lymphatics.

In well marked cases of simple silicosis, fibrosis has taken place in the pseudo tubercles and in the blocked lymphatics and blood vessels of the lungs, together with a thickening of the pleura.

Laboratory Studies

In the animal studies, the various investigators have tried to determine the effect of many kinds of dust. Gardner, in addition to the granite dust mentioned above, exposed guinea pigs to marble dust and another group to carborundum. He concluded that, under the conditions of the experiment, the greater portion of marble dust is soluble in the lung tissues; that the inhalation of this dust during the progress of a preexisting tuberculosis will be followed by the calcification of a certain number of the pulmonary and tracheobronchial lymph node tubercles; that the insoluble silicious matter (from 1 to 1.9 per cent) found in the dust will produce a moderate degree of silicosis after prolonged exposure; that this silicosis will in turn render the pulmonary tissues in some unexplained manner more susceptible to infection with the tubercle bacillus; and that the tubercles produced by the low virulent R1 strain of bacilli will, as a result of this silicosis, pursue a chronic course manifesting a definite delay in the resolution process. When carborundum dust was inhaled, the reaction of normal lung, as stated earlier, was surprisingly insignificant. A true fibrosis in the parenchyma of the lung has never been observed. In the lymph nodes, on the other hand, a definite fibrosis was frequently encountered. In the lung, in which carborundum inhalation is continued during the course of development

of an inhalation tuberculosis, *extensive fibrosis is common*. The most remarkable result in this experiment has been the alteration in the course of the tuberculous process induced by the inhalation of this low virulent tubercle bacillus. from a self-limited process, which usually heals by resolution, it has been transformed into a progressive tuberculous bronchopneumonia.

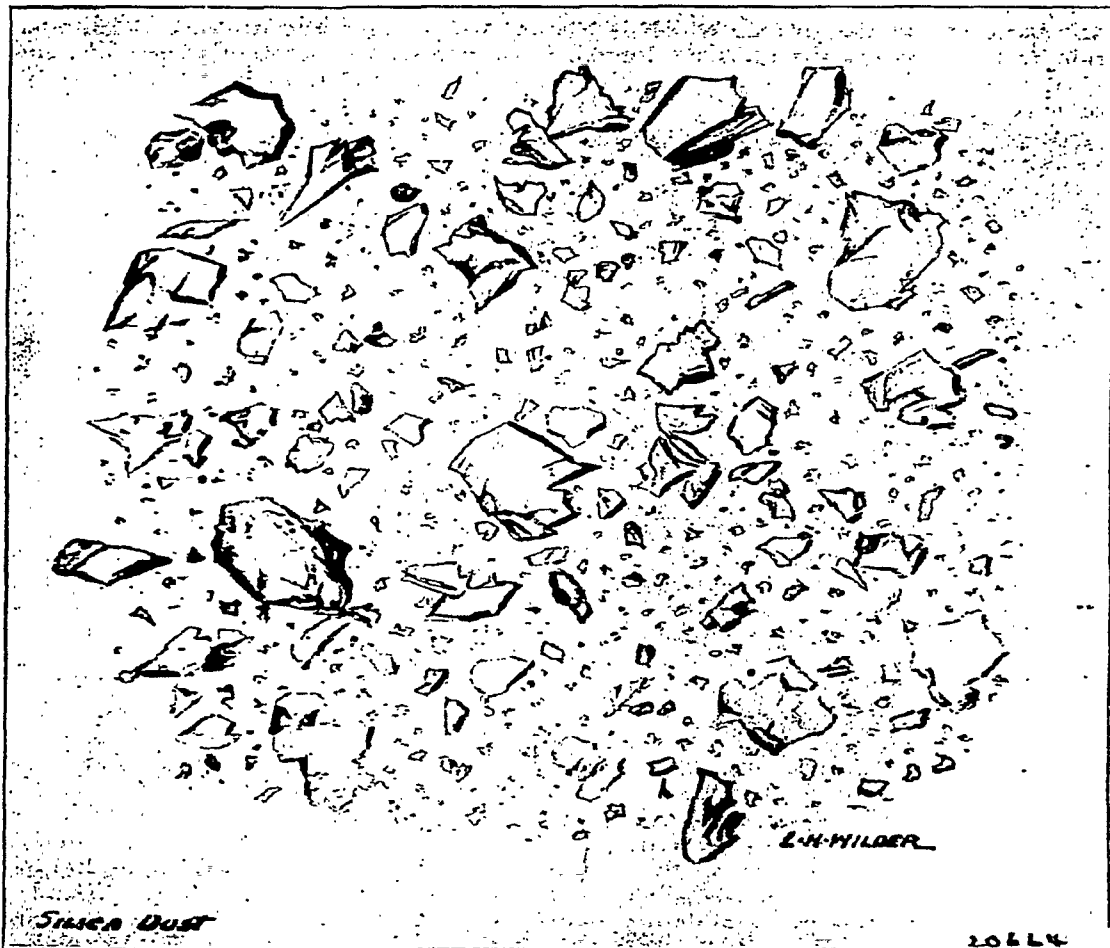


Figure 4. Silica dust particles greatly enlarged.

Mavrogordato reported that dust from hard rock, containing no free silica but entirely of fine spicular hard minerals, in which 89 per cent was estimated as feldspar, and the rest pyroxene and other dense minerals, when breathed by guinea pigs remained within the cells. The dust particles seem to have exerted some protective influence over the cells containing them, preventing the death and autolysis of the cells.

Technical drawing of a glass container (likely a beaker or test tube) used for holding granulated sugar. The container is shown in cross-section, revealing its internal structure and dimensions.

Dimensions:

- Top width: $2\frac{1}{2}$ "
- Internal width of the sugar layer: $5\frac{1}{8}$ "
- Height of the sugar layer: $2\frac{3}{4}$ "
- Height of the container body: $4\frac{15}{16}$ "
- Width of the base: $1\frac{5}{16}$ "
- Height of the base: $1\frac{1}{16}$ "
- Angle of the base: 30°
- Radius of the base: $\frac{1}{4}$ "
- Radius of the top opening: $\frac{1}{8}$ "
- Radius of the base: $\frac{1}{4}$ "

Materials and Components:

- 20 mesh monel metal screen
- 70 mesh monel metal screen
- 100 grams of granulated sugar
- Minimum thickness of glass, 2 mm.
- Least possible radius

Figure 5. Sugar tube; U. S. Bureau of Mines type.

In order to determine the suitability of different kinds of dust for rock dusting in mines, in addition to chemical and petrographical examination of dust, studies are being carried out on animals at the Pittsburgh experiment station. Animals



Figure 6. The Impinger.

are exposed in chambers to a known concentration of dust. The dusts used as basic types are coal dust, as the type to which men will necessarily be exposed, and quartz dust, as the most dangerous type of dust that might be added for

the prevention of explosions. Limestone dust, shale, and kaolin dust (practically a pure silicate) are also being tested. From these studies, it is found that the limestone dust has no more effect than coal dust in the production of fibrous tissues but the silicate dust has an effect similar to that caused by quartz dust. Shale dust, which contains varying quantities of silica with kaolin, limestone and other minerals, has varying effects. Some shales produce no fibrous tissue, others produce little, and still others produce a great amount.

Stages of Silicosis

Silicosis has been arbitrarily divided into different stages in various countries. In the United States the stages are called first, second, and third; in South Africa they are defined by law as antepimary, primary, and secondary. The earliest stage means that definite physical signs of damage to the lungs have been found, and that such damage has occurred during and in consequence of exposure to dust. The second stage means that definite and specific physical signs of silicosis are or have been present and that the capacity for work has been seriously and permanently impaired by the disease.

The symptoms of uncomplicated early silicosis are few and often indefinite. Slight shortness of breath on exertion, often with recurrent colds, is the most constant symptom. The general health is good. The patient may apparently be quite well and his working capacity not noticeably impaired. He may have a little less ability to expand his chest than formerly and the elasticity of the chest may be slightly impaired. This stage may exist for a long time.

As the disease progresses the symptoms increase in severity. No sharp dividing line exists between any of the stages. The second stage is indicated by a definite shortness of breath on exertion and perhaps flitting pains which attract the attention of the patient; also often by a morning cough, with little or no expectoration, and by more frequent recurrence of colds. Even then the patient's health may not be noticeably affected. He may not lose flesh and may appear quite robust. But his "wind is bad," he cannot work as well as formerly, and his chest expansion is noticeably decreased. In well-developed cases of this stage the chest is held in a state of partial inspiration.

In the advanced, or third stage, the shortness of breath is marked and even distressing; the patient coughs more often; the expectoration is in most cases slight but may be more copious. The patient becomes unable to work, loses flesh, his expansion is greatly decreased even with a forced inspiration, his pulse rate is increased, and his heart may become dilated.

The cardinal symptom, it will be noticed, is shortness of breath, especially on exertion. The cardinal sign is diminished expansion of the chest. These symptoms are slight in the early stages. The cough is that of irritation and may be brought on by having the man take a deep breath; it cannot, however, be considered as a cardinal symptom. Recurrent colds and pains in the chest are also important symptoms. The symptoms characteristic of tuberculosis—loss of appetite and strength, rise in body temperature, night sweats, and hemoptysis (spitting of blood)—are not found unless infection is present. Other symptoms and signs, especially the X-ray findings, are of great aid in diagnosing silicosis.

The X-ray of a normal chest shows the heart shadow about the center of the picture, merging with the shadow of the diaphragm below and the big blood vessels and spinal column above. On each side of these are parallel shadows cast by the ribs. Between the shadows the picture is clear except for the shadows cast by the lung structures. The hilum, or root, of the lung is composed of the large blood vessels and bronchi; the shadows cast by these are on

either side of the upper part of the heart shadow and are irregular in shape, with the shadows of the larger blood vessels radiating from them.

Dr. H. K. Pancoast and Dr. S. B. Childs, in this country, and Dr. W. Steuart, of South Africa, have had extensive experience in interpreting X-ray pictures of the chest of cases of silicosis. The writings of these men have been carefully consulted and, although they describe the various stages in somewhat different language, the findings of all are about as follows:

The first change noted in the X-ray of a man who is developing silicosis is enlarged hilum shadows; that is, the shadows become denser and more extensive, gradually involving the smaller bronchi and in time forming a generalized linear network indicative of perivascular and peribronchial fibrosis. In simple silicosis these changes are almost symmetrical throughout both lungs, except that the shadows are usually more marked toward the right base. All agree that these findings may be due to other causes and a definite diagnosis of silicosis in an individual case cannot be made at this time on signs on the X-ray negative without clinical findings or without X-ray negatives of the same case taken some months previous for comparison. For a group investigation, however, as that made in Broken Hill, diagnosis of pneumoconiosis in men who complained of no symptoms of ill health of any kind was made on the X-ray findings alone.

In the second stage, the hilum or root structure shadows are much denser and larger, the finer shadows found in early silicosis have increased in number and density, are less regular, and look beaded. Sometimes the effect is described as a generalized mottling.

In the third stage the entire area of both lungs is covered by many discrete well-defined rounded shadows.

Methods of Determining Amount of Dust in Air

The weight of the dust and the number of particles are usually considered in determining the extent of the hazard of breathing silica dust in air. Many instruments have been devised for making these determinations, among which are the Palmer apparatus, electric dust collector by Philip Drinker, the Owen dust counter, the Read water-spray dust collector, the Kotze hydrokonimeter, the sugar tube, the impinger, and the konimeter. The sugar tube method is used almost exclusively for weight determination in mining in South Africa. In the United States it has also been used for dust counts and in mineralogical determinations. Sugar tubes range from $\frac{3}{4}$ to $2\frac{1}{2}$ inches in diameter. The Bureau of Mines Type B is made of molded glass $2\frac{3}{8}$ inches inside diameter. One hundred grams of sugar are used. This must pass through a 14-mesh but not a 65-mesh screen. During the past three years the impinger, developed by Greenburg and Smith, has been used in air-dust investigations in the mines of the United States. In this instrument, as the air is drawn through a liquid-alcohol or distilled water—it impinges in a smooth surface. (Illustration of impinger and konimeter.) A half-inch tube, gradually reduced at the tip from 0.5 to 0.11 inch is inserted through a hole in a rubber stopper which fits a 500 c.c wide-mouthed bottle containing 100 c.c of liquid. A circular impinging plate is attached by three legs 5 millimeters from the end of the tip of the tube. The impinger has the advantage in that the errors due to impurities in the material are low and unimportant so that low concentrations of dust may be determined with comparative accuracy. Laboratory analyses may be made more rapidly. The disadvantage of this method is that some dusts are soluble in water or affected by water; other suitable liquids as alcohol, ether, etc., can be used to overcome this difficulty. By the use of the Kotze konimeter, a rapid

determination of the number of particles of dust in the air may be made. By this instrument, a small measured quantity of air is forced at high velocity upon a greased slide. Spots of dust adhering to slide are examined under the microscope. The size and number of particles may thus be estimated. At least two modifications have been made of this instrument, one in Australia and one in South Africa, in which a microscope is attached. This allows of making examination and count of dust immediately after sampling.

A tentative standard of dustiness of air in mines has been set at 5 milligrams per cubic meter of air, or 300 particles per cubic centimeter. In the latest reports from South Africa, the samples averaged 1.1 milligrams per cubic meter of air.

Methods for the Prevention of Silicosis

In preventing silicosis, it is obvious that men will be protected (1) if no dust is formed, (2) if when formed the dust is prevented from getting into the air (3) if once in the air the dust is removed from the air, and (4) if the dusty air is rapidly replaced by clean air.

Wet methods of operating have been recommended since 1713 when a British patent was granted for grinding flint by wet methods. Wet methods have been found to be of special value in the mining industry. In this industry water should be used to wet down the sides of the working place. It should be used in drilling from the time the hole is started, as collaring the hole at the start of drilling may be an important source of dust. The full bore of the hose should be used in supplying water to the collar. Drills with outside water jets cause somewhat less dust than dry drills. Axial-feed water drills of the Leyner type and wet-head axial-feed water stopers have been introduced into the hard rock mines of many countries. A typical Leyner drill allows some air to pass down the axial drill with the water to the bottom of the hole. This air and water mixture as it comes from the drill hole has been found to contain rock-dust. Rock-dust, of course, is just as dangerous to breathe when wet as when dry. Experiments carried out in South Africa have shown that sludging with water alone could be effective, provided the hole in the steel is large enough and the water pressure sufficiently high. On the basis of these to avoid the air-blow system of sludging as in the Leyner drill, the "long piston drill" has been developed in which water alone is used.

For some years wet grinding of tools was considered to be the best and is used in many of the edge-tool factories together with exhaust systems. A number of methods have been devised to prevent the dust from entering the air when formed. Winslow and Greenburg found in an ax factory that air with wet grinding contained far more dust particles than with dry grinding (15,800,000 and 154,500, respectively, or about 100 to 1, per one-fourth unit standard particles per cubic foot) where a similar exhaust system was used.

In the mining industry devices have been developed to prevent the dust from getting into the air. In Australia the Clifton Dust Collector was developed and for a time appeared to be successful. However, it proved too cumbersome and is not now in use. More recently Prof. P. H. Hay, of the University of Sheffield, England, described a method of trapping dust which he thinks will greatly improve the working conditions in stone drifts and increase the comfort of men employed as well as prove a great step in the elimination of miners' phthisis. Professor Hay's apparatus uses a rubber dish like that used on the Australian collector. However, instead of using water he filters the dust out by passing it through closely woven flannel or chamois skins contained in a bag. Exhaust air from the drill is used to draw the dusty air into the filter. Before any final

statement can be made in regard to the apparatus, careful studies will need to be made. In the opinion of many mining men any such apparatus will not be practicable in most metal mines.

As indicated from many statements in the above, wet methods alone and methods of preventing the dust from entering the air, while valuable, have not been able to keep the air free from dust. Ventilation is probably as important, if not more important, as a preventive measure. Mechanical ventilation in mining and many other industries must be used. Sufficient air, taken from a clean source, must be supplied to replace the dusty air at frequent enough intervals. In this way the silicosis incidence can be greatly decreased. In mining the general ventilation by the large surface fan must be controlled by special air shafts and air doors to carry the clean air up to the working face. Auxiliary fans in some cases are necessary.

While all mechanical means for eliminating dust materially lessen the amount of dust in the air and at the same time lessen silicosis and tuberculosis, they do not eliminate these diseases. As stated early in the paper, respiratory diseases predispose to silicosis. Physical examination of all workers is required by law in some industries prior to employment in Australia, South Africa, and Great Britain. In Great Britain and South Africa, periodical examination after employment is also required. The initial examination is made to determine whether the applicant has any disease, especially of a respiratory nature, which would make him susceptible to silicosis or tuberculosis. Persons suffering with silicosis should not be employed where they will have to breathe dust, especially silica dust; if they are, they should not be employed underground at all in the mining industry. Men having silicosis are very susceptible to tuberculosis. It is, therefore, of greatest importance that they come in contact as little as possible with people having tuberculosis. Tuberculosis progresses much more rapidly when an individual is exposed to silica dust. At the periodical examination silicosis can usually be recognized at a very early stage. Any man found with silicosis should be notified in order that he may seek other employment if he so desires. Any man found having tuberculosis should not be allowed to return to work in a dusty trade for his own protection and as a protection to those with whom he is associated. In some countries compensation has been provided for those having either silicosis or tuberculosis or both.

Physical examination is believed to be a very important preventive measure for silicosis as well as for tuberculosis. It must be remembered, however, that no one measure will be successful in preventing silicosis in these trades. All measures—physical examination of employees, good ventilation, and wet methods at least in some industries—must be made continuously effective.

Summary

1. Silicosis is due to breathing very fine rock-dust. Rock-dust high in free silica is found to be most injurious.
2. Silicosis is known to occur among workers in the abrasive, pottery, tool grinding, sand blasting and mining industries.
3. Silicosis is found among metal miners in New Zealand, Australia, South Africa, Great Britain, and in many of the states of the United States.
4. Silica dust is somewhat soluble in water and in weakly alkaline liquids similar to body fluids.
5. Some physicians have thought that silica dust by its sharp-edged and needlelike particles injures the lung tissue mechanically. Another belief is that the silica, being soluble in water and weakly alkaline liquids, injures lung tissue by its poisonous action.

6. The rate of development of silicosis depends upon the character of the dust, the amount breathed, length of exposure, past illness (especially tuberculosis), and physical fitness of the men.

7. Among gold miners in South Africa the average length of exposure to silica dust before silicosis develops is 7½ years, the shortest period of exposure for like results is 2½ years.

8. Silicosis is usually divided into three stages: The first shows symptoms and physical signs of damage to lung tissue caused by exposure to dust, but capacity for work is not impaired. The second stage shows definite signs of silicosis and capacity for work is impaired, although not seriously or permanently. The third stage shows that specific signs of silicosis are or have been present and the capacity for work has been seriously and permanently impaired by the disease.

9. The cardinal symptom of silicosis is shortness of breath, especially on exertion. The cardinal sign is diminished expansion of the chest. Both are slight in the early stages and increase gradually with the development of the disease. Other symptoms and signs, as coughing, frequent colds, pains in the chest, and X-ray findings, are very important in making a diagnosis.

10. Men having silicosis are more susceptible to tuberculosis than normal men.

11. Men with silicosis can improve in suitable surroundings to recovery in the first stage, can improve materially in the second stage, and somewhat in the third stage.

12. Many methods for determining the amount of dust in the air are available. The sugar tube method, the konimeter, and the impinger are chiefly used in the mining industry in the United States.

13. The elimination of silicosis among miners depends on preventing the formation of dust by wet mining methods—wet drilling and wetting sides, roof and bottom, muck, and rock piles; the use of sprays and water blasts to lay the dust after blasting; good mechanical ventilation to replace dusty air with clean air; and physical examination of all miners before employment and periodically thereafter.

14. All of these means of prevention must be practiced to insure success.

CHAIRMAN SHOUDY: Gentlemen, I am sure we are indebted to Mr. Harrington for reading this paper, and we are more than indebted to Dr. Sayers for preparing it. I know that some of you men (if you are not now), will be interested in the question of silicosis, and it is real information which Dr. Sayers gives us in this paper; it is a real contribution to the work that has been done by the Health Division of the Congress.

The last concluding paper of our program this afternoon is to be given by one of the allied medical (can I say) groups of the Health Service Division, and that is, by the nurse. It is a pleasure to present to you Miss Edna L. Foley, Superintendent of the Visiting Nurse Association of Chicago.

The Place of the Visiting Nurse in Industry

Edna L. Foley, R. N., Superintendent, Visiting Nurse Association of Chicago

To everyone who knows anything about the different phases of public health work, the "Visiting Nurse" is a well-prepared graduate nurse who goes into the patients' homes to give nursing care when it is indicated, to help the convalescent patient by instruction and advice or to put the patient in touch with other agencies when that is necessary. Naturally, her advice has to include the welfare of the family, for possibly the patient's condition has been caused

by a general disregard of rules of hygiene or is something that can be transmitted to others, unless the patient and relatives understand the necessary precautions that must be followed.

The advantage of employing only well-prepared and experienced visiting nurses is obvious to people who want experts in other special departments. Socialized medicine has made great progress during the past few years, and socialized nursing has more than kept pace with it. A good visiting nurse is a graduate, registered nurse plus many other things. She may be asked to give the most delicate kind of nursing treatment or she may be selected as an arbitrator between two types of investment. She may have to help find work for the children, because the father, her first patient and her real reason for going into the home, will be incapacitated indefinitely. She must know the resources of a community, its play-grounds, its public schools, special schools, hospitals, dispensaries, employment agencies and institutions. Last, and by no means least, she must know good nursing, for whether she actually gives care to a patient or teaches somebody else to give that care, she must know how it should be given. She must recognize symptoms and be able to make adequate reports to people most interested.

The Nurse Does Not Give Specific Medical Advice

No visiting nurse gives actual care or specific advice regarding treatment to patients who are not in charge of a physician. Anyone who stops to think understands that doctors are licensed to practice medicine; registered nurses are licensed to practice nursing; and the use of a specific drug or solution or even a treatment, except once as an emergency measure, is not tolerated by good nurses.

This is one of the big problems facing an industrial nurse; for the only distinction between an industrial visiting nurse and any other kind of visiting nurse is that the first works exclusively in the homes of the employees of the firm or firms contracting for her service. Years ago it used to be considered good business to hire a nurse. She was cheaper than a doctor and, in the minds of many people, just as good. A good nurse may be better than a poor doctor, but the better the nurse, the less willing is she to undertake responsibilities which the State does not recognize as coming within her province.

Therefore the industrial visiting nurse must have a physician's orders before she can care for his patients. Perhaps the patient has a private physician who will leave orders in the home or with whom the nurse can get in touch. The firm may employ a full-time physician who gives special orders for each individual needing the nurse's service. Sometimes a physician on part-time service leaves standing orders for simple conditions. The Visiting Nurse Association of Chicago has had standing orders sanctioned and approved by the Chicago Medical Society since 1913. It is taken for granted that these orders will not be used unless our work is known to the physician in attendance and that they will only be used on the first visit in order that the nurse may make the patient comfortable.

Such standing orders for industrial nurses should not include too many "p. r. n." (or "when necessary") orders for drugs, headache tablets, cathartic pills, etc. Most of us know, if we will but admit it, that a headache is but a symptom of something far more serious and while a tablet may be given once, in an emergency, it is a poor method to give the same worker tablets too often for the same thing. After the emergency is past, the worker should be got to the clinic or to the doctor's office or to the office of his own physician, the cause of the headache searched for and treated.

Many visiting nurses hold office hours in the plants by which they are employed, or maintain small first aid stations. In addition to giving first aid (and

here again it should be quite generally understood that first aid given regularly, daily, by an industrial visiting nurse is not an emergency), there should be standing orders if the physician himself is not present most of the time. By interviews, the visiting nurse, if she has had some training in social work, can be a very helpful interpreter to any employee who, without realizing it, is in pretty deep water.

Not long ago we were asked if we could not straighten out a misunderstanding between a firm and an employee who had been sick six months following an accident. The physician thought him able to work; the man insisted that he could not and threatened suit, for his arm had been badly injured. Visits to the home had elicited nothing but the sullen response that the man had not been helped by his firm.

As a last resort, the visiting nurse was sent out. It may have been her uniform, it may have been her personality, it may have been the sympathetic, business-like way in which she approached the man's need, but she had not been there long before she got his story. His arm had been badly injured; he had required hospital care and he had been on part-pay throughout the entire six months. All of his expenses—physicians, hospital, etc., had been paid, but until he refused to go back to work, no one from the firm had visited him and then the representative who came, scolded him. When the nurse reminded him that the firm had been most uncommonly generous and had done more than the law required, the man said scornfully that the firm had done nothing but send him a check once a week.

The Check Once a Week Was Not Appreciated

It took a long time to explain to this man that a check once a week was a pretty generous contribution and that if the firm had not done it, he would have been on the books of a public relief agency, after his first period of sick leave had expired. To the nurse the man admitted that he could use his arm some, but not as easily nor as readily as he had used it before the accident. In fact, he had not had ambition enough to try to use it and it was hard to say whether the arm was weak from lack of use or as a result of the accident. However, the man agreed to go back to work, but as a parting shot, he said, "If my boss had been half as much interested as you, a stranger, my arm would have got well faster." Almost any employer interested in human beings recognizes what most people would call the psychology of this remark.

That is only a sample of the attitude taken by a good many people of simple minds. They want understanding and sympathy just as much as they want bread and butter and a pay check, although without the check, neither sympathy nor understanding gets very far. We, unfortunately, are apt to put the worst interpretation upon anybody's actions, and we do not realize that folks are folks, whether they sit in the president's office or hold a laborer's job on the grounds.

A good nurse who is not an inspector for the firm nor too wholly in sympathy with the vagaries of the employees, can serve as a neutral go-between. She can explain the policies of the firm to the employee and at the same time bring back his re-action to the employer in such a way that the fair play, which both of them really want and need, is practiced. Everybody knows that contented workmen turn out a better product than discontented ones. Most of us admit that we can all stand big things, but the little things cause many human shipwrecks. The product of friction is usually more friction, just as the badly infected finger or arm may have begun as a simple prick overlooked and neglected.

The visiting nurse working in industry must understand other things besides

people. She has to understand how much the firm is willing or permitted to do for its employees. She has to understand workmen's compensation, firm insurance and other forms of benefits.

Fortunate, indeed, is the firm that can afford to employ a nurse to care for the families of its employees, for the gratitude of a worried workman is frequently greater when his wife or child has received care than when he, himself, has got it.

Statistics of all large visiting nurse associations show that women and children make up more than two-thirds of their patients. It has been asserted that the reason for this is that men, who are the natural wage-earners, do not give up until they drop and then they are so sick that hospital care is necessary; or that many sick men are sent to hospitals because their accidents make them fairly serious compensation cases.

This reason may be true, but I also believe that most men prefer to have their wives, mothers or daughters care for them. They do not like care unless they are seriously ill—typhoid or pneumonia, or have had a surgical dressing that must be done regularly. They and their women folks resent what they call the interference of an outsider. A visiting nurse frequently teaches a wife how to care for her husband and then apparently drops the case, although by going to the home occasionally to inquire for the patient or for the children or because she was passing by, she keeps very closely in touch with the patient's condition.

Experiences of the Visiting Nurse

The Visiting Nurse Association of Chicago has several visiting nurses who devote all of their time to home care of employees and employees' families. The entire expense of this is borne by the firms contracting for the service. It is given without profit by our organization for we realize we are in the field only to help people who need us, and we have but one grade of service to offer and that is our best. The chief advantages of such an affiliation are the supervision of nurses so placed, opportunities given them for contact with other public health nurses, substitutes are secured more easily and the nurses understand their work. Without exception, their services are more than welcome. The relatives of the dying wife of an employee of a very large firm never got over the fact that the firm cared enough for her husband to send a nurse twice a day to give care to his wife whom his employers had never even seen.

In another home where a visiting nurse was giving care to a patient, she heard the crying of a new-born baby. Surprised, she asked if there were a baby in the house and learned that it had arrived that morning and discovered that both mother and baby were sadly in need of care. While giving it (for the new patient proved to be the daughter and first grand-child of the pneumonia patient), a man with a badly infected arm came in and asked her to look at his hand. The visiting nurse discovered that he was employed by the very factory that sent her out to work among its families. When she asked him about his injury, she found that it was of forty-eight hours standing; the first dressing had been done in the doctor's office, he had been told to return, but he had been feeling badly, and his wife's condition and the condition of the home made it easy enough for him to put off a necessary trip. By getting a neighbor to stay in the home until the man returned, the nurse got the man back to the physician's office, where his hand received prompt and much-needed attention. Very likely the hand, neglected another twenty-four hours, would have caused a serious infection and what proved to be a compensation case of three weeks' standing might have dragged on for months.

The man was an ambitious young fellow, not ignorant of things belonging

to his trade, but in spite of the pain that he was suffering, he could not see that a day more or less made much difference with his hand; whereas a day might have meant that he would have lost the use of it. No amount of compensation could have made up to him for that.

The advice of the nurse, especially when it follows that of the physician but is given in sympathetic, more leisurely fashion and in more detail, is usually followed. Occasionally, however, we are surprised to see that without constant instruction and some assistance in getting the necessary treatment, perfectly good advice is not carried out because people cannot afford the treatment or really do not understand the value of it.

Not long ago, ten applicants applying for work were found by a certain dispensary to have 27 serious physical defects. In age, they ranged from 16 to 22; in education from eighth grade to college graduates. Their defects were listed as follows:

Ten Applicants With 27 Serious Defects

Eyes	5
Tonsils	7
Teeth	3
Heart	6
High blood pressure.....	2
Thyroid	1
Diabetes	2
Bright's Disease	1

One young boy did not know that he had diabetes. The other nine patients admitted that they had been told repeatedly of their conditions. A few had neglected to take the advice. The others really meant to take it as soon as they got to work and could afford to pay for the necessary treatment.

A good school nurse or visiting nurse following these patients would have helped them with the re-adjustment. Very often patients can afford to take the treatment if they realize the seriousness of the need. Other patients can be helped to get it, for it may be years before they can afford exactly what they require.

The treatment of a few of these patients would have cost nothing if they had been given instruction about right living. It is hard to wait until a boy or girl is ready to go to work before defects that will always interfere with their working efficiently are treated, and it is an unfortunate commentary on our school inspection and on the intelligence of the parents, that very serious conditions stand between the boy and his job.

Of course it is impossible to make any one individual—especially if he is of the type that knows more than the expert talking with him—understand that he should take care of his health. But if we could have more physical examinations of well people and more sympathetic, thoughtful follow-up of people who are not well but who can become so if they will carry out necessary treatment or instruction or both, we will reduce the daily tragedies that face the visiting nurses in their daily rounds. We know the treatment for tuberculosis; we know that diabetes can be helped; we know that early diagnosis and surgical treatment almost always help the patient who faces a tragic death from cancer. We know that a great many incurable heart conditions begin as very simple heart lesions following the infectious diseases of childhood.

By teaching this from the platform and in the home, we can get workers to assume some responsibility for their own health. Health, as a small boy once remarked, is something that you are fond of when you haven't got it. Health is a big asset to the average working man. There are very few people in the

universe like Steinmetz, who can do a tremendous piece of work in spite of bad health and poor physique, rather than because of it. If Steinmetz had not been an extraordinarily well-educated man, he probably would never have secured the opportunity to demonstrate his ability.

The visiting nurse in industry may not discover any potential Steinmetz, but she can prevent many of the hopeless tragedies that swell the pension lists of large firms and the charity lists of philanthropic agencies. She can help restore the worker to his job more promptly; she can also prove to the worker and his family that the firm is not a huge, impersonal creation, interested in the individual only when he is able to deliver 100 per cent of his energy, but that she, as one of its representatives, is the substitute for that old intimacy which existed in the little plant when the employer knew all of his employees and most of their families.

In some plants nurses are asked about conditions under which employees work and the lunch rooms, the rest rooms, particularly for women and girls, come under their supervision. If these are actually a part of the nurse's work, she should know something about food values, in order that the employees may be tempted to eat some of the things that are good for them as well as some of the things that they like. If the amount of dust in the work room, the amount of sunshine and of fresh air that are to be admitted are left to her, she ought to be able to deal with such problems. For the most part, however, safety engineers and frequently personnel managers handle these internal problems and the visiting nurse is exactly what her title pronounces her to be: a nurse who goes from the firm to the home of the employee, rendering whatever service the sick person needs—nursing care, instruction and advice, a friendly interpreter of the policies of the firm to the patient. She should not neglect to carry back to the firm a sympathetic explanation of what the patient's real needs and conditions are. In one sense the home conditions of an employee or his family are no concern of the firm. On the other hand, no good firm likes to be known as lacking in interest when the welfare of its employees is concerned and it uses whatever information the nurse may take back, solely for the benefit and welfare of this employee and possibly of others.

Whether the visiting nurse in the industrial plant works out from the staff of a local association of public health nurses or is employed by the firm, she should be well qualified to hold a difficult important post, for which she must be equipped by education, technical training and previous public health nursing experience.

General Discussion Upon the Papers

CHAIRMAN SHOUDY: Miss Foley, we thank you, but that is all too short.

The papers of Dr. Sawyer, Dr. Sayers and Miss Foley are now open for discussion.

DR. OTTO P. GEIER (Employees' Service Department, Cincinnati Milling Machine Co., Cincinnati, Ohio): Since Dr. Sawyer was good enough to say a gracious word about my paper when he started his, I can't help but rub his back as he has rubbed mine, pat it, anyway. I think it has really made, however, an interesting contribution to the problem that has been bothering all of us since industrial medicine has been established.

I hope that in succeeding years some way may be found of stimulating much greater activity and interest on the part of the managements in the furtherance of this conservation of power and life, so that we may succeed better than we have in prolonging life. Surely any of us who are working in industrial clinics, thinking of Dr. Sawyer's paper, may associate with that paper the necessity of selling the

daily service of the medical department to the executives. You as physicians want to popularize your medical departments and get your president and vice-presidents and chief engineer to use it, because if it is good enough for them, the employees will think it is good also for them.

In the group conference yesterday one man mentioned that his president came around to the medical department with a little rheumatism and within an hour and a half someone had examined the urine and found it all full of pus; and within an hour after that three teeth had been extracted and with no treatment those kidneys cleared up in ten days. So you might go on indefinitely. Some one else mentioned a case of a designing engineer who just at that time had an enormous problem because he was also involved in a patent suit; and he came to the medical department all in, saying, "Send me to some neurologist, I am going crazy; I can't sleep or eat." The man in charge had the good sense to take hold of the case and becalm him, particularly, and keep him out of the neurotic class and treat him as if he were a human being, and within a few weeks restored him.

Medical Advice That Had Great Value

The interesting part of that story is, done; but the comment of this particular engineer, after the end of the third week when the doctor said to him, "I suppose the medical department has justified the expense for at least one week by what they have done for you in this particular situation." He said: "Don't be silly. I don't want to be egotistical, but what the medical department did in that case would pay for the medical department's continuous service for six months at least, because the whole progress of the machine was unfortunately on me, and I was slowed up to a point where I couldn't think."

It has been to me and to Shoudy and all the rest of us who have been trying to think of this problem in the last 12 or 13 years, most difficult to know how we can gather the attention of worker and employer upon this subject, and I hope you may carry home with you at least that message that Dr. Sawyer gave you, one of the measures of efficiency is told by the mortality report. Then let me suggest one other, and that is the percentage of attendance in your industrial clinic, as a measure of the efficiency of the medical service in selling itself to the employees. I think it is a fair statement of fact that an inquisitor coming from one medical department to another, where he finds an attendance of half of one per cent of the total employees here today, he can say, "Here is an epsom salts man and an I. D. man," and the employee thinks nothing of it. Whereas, if the attendance works up to six, seven or eight per cent, you may know that the employees have profound faith in the nurse and the physician in that department. I think you will find it interesting, when you go back, to check your daily attendance upon the medical department. Then if you think it is too big, just stand and watch the procession for a couple of hours and see whether you would dare send any of them back on the jobs without giving them the necessary attention.

J. F. WULF (Western Electric Company): Dr. Sawyer's paper on medical examination for executives does not say what the family physician can do for us. That is to say, I do not believe that the family physician is always in position to give the complete examination that is possible in a company hospital, or an industrial hospital, and I am wondering whether he doesn't have to do that job in its final analysis.

CHAIRMAN SHOUDY: He possibly does. I can say, you are not all equipped as the Western Electric and the A. T. & T. is to do some of this diagnostic work. I happen to know what we do here in Chicago and also in New York and other offices where they have the facilities for diagnostic work. I think I can say for Dr. Sawyer and the rest of us who do not have all the facilities, that if we ask the executive to be examined by his family physician, we ask for a check on

what he does, to work with the family physician in checking over the men as they go for their physical examination, and if the facilities are needed, they go to the hospital and get them. But I can tell you frankly that all the industrial concerns do not possess the means for diagnostic purposes that you have out there, or that Dr. Watson has in New York City.

MR. WULF: I find he doesn't have the inclination to give you a thorough examination.

CHAIRMAN SHOUDY: We are trying to stir him up. I know from my own case, and I know from what the men said this morning, if he doesn't give us what we want, we will call him up and point out these things to him and say, "We would like to have you check on this, and if you can't get it, we will help you get it." If we have facilities that the family doctor doesn't have, we will ask him to let us submit these reports to him and interpret them with us. It is a question of education both from the standpoint of the doctor in industry as well as the family doctor in checking on the health of his patients.

What Is An Ideal Plan of Health Service?

DR. A. C. SELMAN (Kellogg Company, Battle Creek, Mich.): These papers we have listened to this afternoon have been very informative. I would like to ask a question of the doctor here. He states that the Health Service should be on a contributory basis, which I firmly believe. We are more apt to follow advice that we pay for than advice that is handed out on all sides. We can write to one of the daily papers, lay our case before it and they will tell us all about how to get well, without any cost to them outside of the postage stamp.

I would like to ask Dr. Geier if, in his experience or the experience of others, he has any sort of an ideal plan where this contributory basis is carried out—how it is worked, for example, roughly—how much do the employees contribute, because I am wrestling with that problem, and possibly others are. I think it is a very important thing, and I would like to ask Dr. Geier that question.

DR. GEIER: I hesitate to take any more time of the convention.

I have found in visiting plants that a very ideal plan which appeals to the average American workman, with his independent spirit (and that is the way we want to keep him) is for them to come in on a fifty-fifty basis on the whole plan of medical procedure as it holds for diagnosis through dentistry. In our plant I know we have helped sell the idea of health by having the employees include their costs of mutual aid. They have hired a professional man for the first time in their lives and they think well of their dentist, and, believe me, they use it and they use him. It was very interesting during the war when prices went up and salaries went up, how they finally boosted his salary. That was an experience with them; the cost to be shared on about a fifty-fifty basis as to all the work that is done in the plant on health except that which the industry should support of itself, the first aid, medical attention, diagnostic facilities and so on. That seems to be a comparable thing and easily comprehensible thing, the spread there of the cost between life insurance and sickness insurance and dentistry, say, as a base line, being the thing they should share on a fifty-fifty basis.

To those of you who are now on a contributory basis, I think this offers a wonderful opportunity for extending these finer facilities to your employees by selling them the idea of greater service in which they shall share. I wish I were in position to offer our men extension of our service, and the offer that they could help pay for that extension.

On the benefit plan, this little idea has helped us enormously in getting our reports back from those sick, since we give a man who sees his physician the first day, on the outside, when he is ill, an extra two dollars or an extra day's allowance of sick benefits. That has helped us not only in getting our reports in but

in getting the doctor on the job. We want early attention to disease. On the other hand, an inflexible rule which they have made themselves (and, believe me, if you don't let them help make the rules, they don't follow them) is if the man delays beyond the third day the report as to why he is away from the plant, every day that he goes beyond that and delays sending in his report as to why he is absent costs him an extra day of allowance of sick benefits, so that he is two dollars out every day he delays sending the doctor of the plant the report. That thing balances very well, and the two ideas are compensating. He could get something by doing it mighty well, by having the doctor the first day, and he would lose out a day or a week or two weeks by failing to get the report in.

E. E. BOSLEY (Goodyear Relief Association, Akron, Ohio): I would like to ask how many nurses you think would be necessary for 1,000 employees, and if 10 or 12 calls per day is a good average for a nurse to make?

MISS EDNA L. FOLEY (The Visiting Nurse Association, Chicago, Ill.): If 10 or 12 people are off every day and they are really actually ill, and your territory is scattered, you would need at least two nurses, and they would do better work if they each had cars. We have one plant in Chicago that employs three visiting nurses. It covers at least a third of the South Side of Chicago; in prosperous season it employs from 8,000 to 9,000 people. Each one of those nurses has a car; each one averages about 70 patients a month—about 30 to 325 calls a month—and the firm has often told us that the nurses more than paid for their own work because of the satisfaction in the homes, the speed with which really sick people were followed up promptly, and the speed with which some people who were acutely ill were encouraged to get well and get back on the job.

The Case of the Supposed Malingerer

Not so very long ago we were asked to see a man who had been off for six months with a badly injured arm. The doctor said he was stalling and could go back to work. The man said he couldn't go back. The visiting nurse, in talking with him, discovered that the arm was weak, but by no means helpless. It took her an hour to get him to go back to work, and she told him the firm had been uncommonly generous and decent. Just as she was leaving he said, "If my boss had been half as interested as you, a perfect stranger, have been in me, I would have been back at work three months ago."

I am not so sure he would have, because his arm was in bad shape. He received good hospital care, good dispensary care, but he didn't get the necessary exercises that he needed after he went home, and when he was able to begin to return to work, he wouldn't go because his feelings had been hurt because the firm hadn't once sent a representative to inquire for him. He said it didn't take very much brains or effort to send a check once a week. He thought the firm had been unusually generous and kind, and it took us an hour to make that boy see that a check once a week was more than a signature and putting a postage stamp on a letter.

I think you all realize that the number of nurses required for a plant depends upon the way in which you use them. If you use a good nurse to follow up absent people who are not sick, you can't keep her and neither can you keep your employees. If you use a nurse to follow up people who are reported ill, and who probably are ill, some slightly and some seriously, I think it depends upon your territory and the number of absentees you have.

In a very small congested territory one nurse can easily manage eight or ten absent employees a day, even if there is illness in two or three of the homes; but you can't possibly handle in a large territory eight or ten calls well without a car. You can't do eight or ten daily calls well even with a car if every one of those

patients requires a lot of nursing care. It all simmers down to just when you send the nurse: after the first day's absence or the second day's absence, or the third day's absence, or if you send her only when you have received a reliable report from the home as to the kind of illness or the reason for absence. We have found sometimes that one visiting nurse for a very large plant could do a good home service adequate at all times, except in epidemics, by not sending her before the third day of absence unless the illness was known at the plant or reported from a reliable source.

ADJOURNMENT

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



A. B. C. Sessions

Wednesday, September 28, 1927

C. L. PEAKE, Chairman

Director, Industrial Relations, American Radiator Company, Buffalo, N. Y.

The first meeting of the A B C Session of the Sixteenth Annual Safety Congress was called to order at three o'clock by the chairman, C. L. Peake, Director, Relations, American Radiator Company, Buffalo, New York.

CHAIRMAN PEAKE: Without any preliminary, as the hour is late, I shall call upon the first speaker of the afternoon, Mr. H. F. Webb, safety director, West Penn System, Pittsburgh, Pennsylvania.

Making Safety an Operating Problem—Not a Specialty

H. F. Webb, Safety Director, West Penn System, Pittsburgh, Pa.

It is recorded that one hundred and twenty-five years ago President Thomas Jefferson, being a gentleman of strong democratic principles, frequently laid aside state affairs and hied forth into field and forest in quest of whatever game might be flushed before his rifle. Further delving into the archives would probably discover records describing Jefferson's dissatisfaction with the quality of available gunpowder which had the peculiar habit of causing the leaden pellet to curve around the object at which his aim was directed, or failing altogether to explode. Anyhow, whatever the story, it is held a fact that Jefferson successfully persuaded his friend, E. I. du Pont, then living in France, to emigrate to America and manufacture a black sporting powder which would guarantee results and tend to preserve equanimity of disposition in the nimrod.

It is further recorded that during the year 1802 Mr. du Pont built his first powder mill on the bank of the Brandywine River, a few miles outside of Wilmington, Delaware, where it stands to this day. A peculiar building, this first powder mill, built of stone, with three walls, the open side facing the river, and a lightly fastened roof. The reason for this peculiarly constructed building is obvious, for although successive explosions may have removed the equipment and roof which required replacement, the walls were not only left standing, but acted as a guide that caused the debris to take an upward flight and into the river.

The moral of this story has suggested the subject for this paper—"Making Safety an Operating Problem—Not a Specialty." Were an open vote taken at this meeting on the question as to whether "Safety is an operating problem or a specialty," there could be but one response, since we of the safety guild know that the principles of this great humanitarian endeavor could in no way

be furthered by treatment of the problem as a "specialty." Therefore since there could be no survival of this world-wide enterprise were it considered a "specialty," we may wet sponge this phrase and deal strictly with the ways and means of weaving the safety threads into the industrial fabric.

Providing safe and healthful conditions in our industries should no longer be looked upon as simply welfare work, it should be a cardinal principle in every industrial operating program.

The manufacture of explosives, steel and other commodities, the generation and distribution of electric energy, the mining of coal, the operation of electric railways systems, and in fact the operation of all industries are fraught with dangers, and the exposure to hazards of each respective industry is such that every day risks of employment present a problem with which we must reckon.

Safety Work Calls For a Permanent Campaign

Some one has said, "Accident prevention is not a campaign; it is a permanent occupation of the enemy's territory." The truth of this statement has long been established, and now the safety engineer seeking success must know that a continual boring-in process, gradually gaining a permanent foothold here and there, counts much for progress. Perhaps a dangerous machine or a machine point of operation guarded today, a safety convert, either executive or rank and file tomorrow, and a slight change in operating method the next day, may be the net gain, yet such gain is permanent. Brief period campaigns, spasmodic efforts may accomplish an intended purpose, but the gain usually shrinks upon let-up much like a cheap suit of clothes exposed to the rain. Carelessness and other accident causes must be fought as a farmer fights weeds—with every available weapon *all the time*.

A measure of the success in accident prevention work depends largely on the amount of cooperation, goodwill, etc., that may be attained through the efforts of the safety engineer and his associates. It is necessary to popularize the movement to the extent of causing the safety idea to permeate throughout the whole organization, and to enlist this much needed cooperation from all departments and employees. Meeting and rubbing elbows with all employees on the job, at business and social functions, is of great value in building up a good company safety spirit.

Mechanical safeguards are both helpful and needful in the prevention of accidents, but are not entirely sufficient, for, while they reduce or eliminate the exposure to mechanical and physical hazards, they prevent only a fraction of the preventable accidents.

Accident prevention is more than an idea; it is something that must be learned, taught and persistently followed, if it is desired to establish a firm basis of economics in safety. Therefore education is the only practical means of bringing the individual to a realization of what an accident would mean to himself and his family—of his duty and responsibility with reference to the safety of himself and others, and to the protection of his employer's properties. The education must be continuous, constructive and interesting.

Several years ago I rounded out twelve years' service with the du Pont company, six years of which were spent in the study and application of safety methods to problems both common and special to this diversified industry. Being, as one might say, "an old-timer," during the period of incubation as a safety engineer, I must now confess that I overlooked many important safety measures which were a definite part of the operating code. But now just casual retrospect causes me to marvel at the way this company has, from the

building of the first powder mill, accepted and maintained safety as an operating problem. Several instances may be cited as noteworthy examples, viz.: barricading and physical separation of buildings, minimizing the number of persons in explosive buildings, safeguarding of all machinery and equipment, special clothing for workmen, operating safety rules, etc., etc.

To my mind this company stands out as a glowing example of one of the industries which has made "Safety an Operating Problem—Not a Specialty."

CHAIRMAN PEAKE: We shall take a few minutes after each paper to raise any questions and bring out any discussion that you have to offer on the subject covered by the speaker.

Some of you probably noticed in the *NATIONAL SAFETY NEWS* a number of months ago an article headed, I believe, "The Incidental Cost of Accidents," and in numerous sections it caused little short of a furor and we ought to have some discussion on that. Mr. Heinrich has arrived at some very startling conclusions on that subject.

We all have known for some time that there is a very decided incidental cost of accidents. I walked into a plant last week and some men rushed up to where I was for a stretcher. We went back and found that a crane, in backing out of the plant yard, had struck a high tension wire as it entered the power house, and they carried the crane operator out of his cab. When I got there the man was moving after artificial respiration had been used on him. In fact, the man reported to work the next day and would not be classed as losing time on account of that accident after spending the night in the hospital.

The significant thing was, when I walked down through that plant and out there in the yard, I didn't see a single man at work, although it was during working hours. Everybody had stopped work to ask somebody else why the stretcher was going through the plant. It was half an hour to an hour before work was resumed generally. There was also the time lost when the power was shut off throughout the entire mill.

The cost of that accident would probably run into the hundreds, or perhaps, with all the factors entering into it, thousands of dollars. It might have run even higher, and still there wasn't a single penny expended in that accident for compensation.

For that reason and on account of the fact that there have been a number of instances just like that, the paper which Mr. H. W. Heinrich is going to read will be of particular interest.

The Incidental Cost of Accidents to the Employer

H. W. Heinrich, Assistant Superintendent, The Travelers Insurance Company

When the fast-flying years have added another decade to the century in which we live and work, and when the existing nebulous practice of accident prevention has become a well-defined science, historians will record the conditions, acts and other factors that will be credited with having had major influence in the control of a most tragic waste in industry—preventable accidents.

Who shall now say what these factors are? We have the unselfish work of many individuals; we have national, state and municipal laws, regulations, codes and standards; we have the engineering staffs of great insurance companies; and we have the educational benefit of independent safety councils.

All these things now play a part. With the brilliant record of previous successful annual congresses, and the assurance that this sixteenth congress will surpass all others in real achievement, will anyone have the temerity to deny that a great measure of credit must be granted to an organization of nationwide scope, unselfish in its aims, efficient in its results, eager and enthusiastic,—

to the National Safety Council—and to you, its loyal members? But the National Safety Council and the engineers of insurance companies and other organizations that do not have legal authority must depend, to a great extent, upon *educational* methods. These methods are successful only in so far as they win the cooperation of the *employers*.

Compensation laws place the burden of accident responsibility upon the employer of labor. Educational methods reach the *employee* only through the *employer*. The guarding of machinery must be accomplished with the cooperation of the employer. The elimination of unsafe methods and processes is in the control of the employer. I assert that the *entire structure of accident prevention rests upon employer-executive participation and action*.

The prevention of injuries to employees is a most commendable humanitarian work. It is worthwhile for itself alone, and it will continue to progress on its own merits. We, however, are a nation of business men. Is it not logical, therefore, to assume that we shall reach our goal much more speedily if we add to the humanitarian basis of accident prevention a further foundation in the way of "business principle"—an incentive of a business or financial nature?

I maintain that *accident prevention is good business* and is entirely defensible even from a purely mercenary viewpoint. I hold also that this is *not universally recognized today* and that until it is accepted as a fact our progress is *bound to be retarded*.

The Accident Situation Calls For Emergency Action

American business executives have never failed to surmount obstacles in emergencies. During and shortly after the world war, when dyestuffs were unobtainable, immigration checked and labor scarce, and when wages were sky rocketing and delivery of raw materials uncertain, our executives made good. They did so because they wanted to and because they had to. The accident record of today constitutes another emergency *just as vital as many of the industrial problems that were brought on by the world war*.

I offer to these executives the "incidental" or, more correctly, the hidden or indirect, but none the less real, employer-cost of accidents as an incentive that should create the desire to take preventive action and the feeling that it *must* be done.

The many and varying estimates of the annual cost of industrial accidents are stated in terms of billions of dollars and are generally based on the lost TIME of the injured worker. This is largely an employer loss inasmuch as the employee is partially compensated, but it is not all of the cost to the employer. Travelers engineers estimate the remaining so-called "incidental" cost to be *four times* the compensation and medical payments. Expressed in another way, compensation payments constitute only one-fifth of the total employer accident-cost. This estimate is based upon careful research which now includes 10,000 specific cases taken at random from Travelers files. Its accuracy has been demonstrated by application to scores of specific plants.

I do not contend that it holds true with regard to any single industrial accident nor to any one individual plant, and I grant that in nation-wide application the ratio may vary; yet it has already been tested sufficiently to provide approximate confirmation of the facts.

This four-to-one ratio should prove to be a powerful stimulus to preventive action. It may come as a distinct shock, pleasant or otherwise—

To statisticians who will find by its use that cost generalities in billion-dollar terms are trebled or quadrupled;

To employers who complacently accept average losses as incidental to their operations;

To employers who do not worry about accident-cost because "they are compensated by insurance";

To employers who feel that "overhead-cost" is only slightly affected by accidents;
 To employers who consider accident prevention as something "for the other fellow to do";

To employers who are apathetic towards accident prevention or who are mildly interested only because of humanitarian reasons;

To employers who cannot "afford" to establish safety on an organized basis;

To safety engineers who wish to prove that their work has monetary value;

To insurance or other salesmen who will find that it enhances the value of the service that they sell.

The calculations from which this ratio was derived were based on the factors given here.

Factors in the Incidental Cost to Employer of Accidents to Employees

(Excluding compensation and liability claims.)

(Excluding medical and hospital cost.)

(Excluding insurance premiums.)

(Excluding cost of lost time, except when actually paid by the employer.)

1. Cost of lost time of injured employee.
2. Cost of time lost by other employees who stop work—
 - (a) out of curiosity,
 - (b) out of sympathy,
 - (c) to assist injured employee,
 - (d) for other reasons.
3. Cost of time lost by foremen, supervisors, or other executives as follows:
 - (a) assisting injured employee,
 - (b) investigating cause of accident,
 - (c) arranging for injured employee's production to be continued by some other employee,
 - (d) selecting, training, or breaking-in new employee to replace injured employee,
 - (e) preparing state accident reports, or attending hearings before Industrial Commissioner.
4. Cost of time spent on case by first-aid attendant and hospital department staff, when this time is not compensated by insurance.
5. Cost due to injury to the machine, tools, or other property, or to the spoilage of material.
6. Incidental cost due to interference with production, failure to fill orders on time, loss of bonuses, payment of forfeits, and other similar causes.
7. Cost to employer under employee welfare and benefit systems.
8. Cost to employer in continuing wages, in full, of the injured employee, whereas the services of the employee (who is not yet fully recovered) may be worth only about 50 per cent of their normal value.
9. Cost due to the loss of profit on injured employee's productivity and on idle machines.
10. Cost of subsequent injuries that occur because of the excitement or weakened morale due to the original accident.
11. Overhead cost per injured employee—the expense of light, heat, rent, etc., continues while injured employee is a non-producer.

This list obviously does not include all points that might well receive consideration, although it outlines the vicious and apparently endless cycle of events that follows in the train of accidents. The application of this set of factors to actual cases is illustrated by the following typical examples:

Example No. 1

Total cost of compensation and medical aid.....	\$209.00
Total additional <i>incidental</i> cost, paid directly by the employer.....	937.09

Note A: The following accidents occurred on a building erection job:

No. of Accidents	Type of Injury and Cause	Compensation and Medical Cost
3	Fractures and contusions, material hoist.....	\$106.00
18	Rivet burns, cuts, bruises, miscellaneous operations.....	76.00
21	Falling materials, miscellaneous operations.....	15.00
30	Slips and falls, miscellaneous operations.....	12.00

Note B: The incidental cost was computed as follows:

Time lost by injured employees, paid directly by the employer.....	\$116.00
Time lost by other employees in consequence of accidents.....	310.00
Time lost by foremen and superintendent as a result of the accidents	78.00
Property damage	158.00
Payment of forfeits (2 days) for failure to complete job on time	200.00
Portion of overhead cost loss during delay due to accidents.....	75.00

Note C: An interesting point developed by this analysis is indicated by the relatively high cost to the employer due to the lost time of employees *other than those who were injured*. This was due chiefly to one of the material hoist accidents. Shaftway enclosures were not maintained as good practice demanded and one employee, who was working in the vicinity of the hoist, was injured when he carelessly allowed a heavy plank to project into the path of the ascending car. The hoisting cables were torn from their fastenings, permitting the car to drop. Labor on the upper tiers was necessarily suspended pending completion of repairs.

Another feature worthy of note is the loss due to forfeits. The contractor himself estimates that delays caused by the accidents interfered with the completion of the job at the time agreed upon, thereby penalizing him to the extent of \$200.

Example No. 2

Total cost of compensation and medical aid.....\$ 66.00

Total additional *incidental* cost, paid directly by the employer..... 275.00

This example was obtained from the records of a hardware manufacturing plant and covers an experience of six months.

Note A: The following accidents occurred:

No. of Accidents	Type of Injury and Cause	Compensation and Medical Cost
1	Lost nail of index finger, punch press.....	\$61.50
1	Lacerated forearm, baling press.....	4.50
9	Cuts on hand, handling shered metal.....	0.00
10	Slips and falls, miscellaneous operations.....	0.00
	Dropping objects, miscellaneous operations.....	0.00

Note B: The incidental cost was computed as follows:

Value of labor and material in connection with canceled order.....	\$107.00
Time lost by injured employees (paid by employer).....	36.00
Time lost by other employees in consequence of the accidents.....	34.00
Cost of repairs to stamping dies.....	33.00
Unearned wages (employer paid slightly skilled employee ten days full wages—\$6:30 per day—receiving in return unskilled labor worth \$2.50 per day).....	38.00
Time lost by foremen and superintendent as a result of the accident	27.00

Note C: The *visible direct cost* in this example lies in the more serious but relatively infrequent accidents, while close analysis shows that a large part of the "incidental cost" is due to the trivial injuries.

One of the 32 injuries described on the employer's records as "slips and falls—dropping objects," occurred to a tool-maker, who, because of laxity of supervision, was indulging in a bit of gossip while operating an engine lathe. His attention being temporarily diverted from his work, he allowed the lathe tool to feed into a shoulder of a jig that was mounted on the face plate of the lathe, tearing the work loose from the face plate clamps and causing it to drop upon and jam his fingers between it and the lathe bed.

The jig (original value \$48.00) was ruined. I have not included the cost, however, inasmuch as it was merely being repaired for stock and the actual value at the time of the accident was difficult to ascertain.

What is of more interest, however, is that this skilled toolmaker was unable, because of his bruised and bandaged fingers, to undertake the building of a set of blanking dies that were ordered the same day that the accident occurred.

Another toolmaker was employed while the injured man was given work requiring less skill.

Thus, for a time, the employer paid the wages of two skilled men and received in return little more than the labor of one.

The punch press injury is also of interest from the viewpoint of incidental cost. Orders had been issued to the effect that the press room foreman must be called in the event that stock became jammed in the dies. These orders were not rigidly enforced and one of the press operators, observing that a blank had been pulled up by the punch and obstructed further feeding, attempted to remove it with a metal rod and accidentally stepped on the clutch pedal at the same time. The dies were thrown out of alignment and seriously sheared and at the same time the employee's finger was nipped under the spring stripper plate.

The delay incidental to repairs in this case was sufficient to cause cancellation of the order on which the operator was working, thus creating a labor and material loss of \$107, according to the manufacturer's statement.

Example No. 3

Total cost of compensation and medical aid.....\$ 0.00

Total additional *incidental* cost, paid directly by the employer..... 154.00

Note A: The incidental cost was computed as follows:

Cost of wasted materials\$ 93.00

Cost of time lost by injured employees..... 37.00

Cost of time lost by employees *other* than those injured..... 24.00

Note B: For a period of 60 days, following the inauguration of a no-accident campaign in this chemical plant, there was not a single compensable injury nor one that required professional medical treatment. There were, however, 66 *minor accidents*, chiefly acid burns, due to the carelessness of employees when handling caustic or corrosive materials.

Note C: One of the men, who, although not seriously injured, was nevertheless in no fit condition to carry on his work, was a skilled chemist and was being depended on to provide an analysis prior to the fulfillment of a large rush order. His absence forced the use of a less skilled employee, who bungled the job. Before discovering the error in the analysis the work of filling the order was begun, resulting in waste of materials, dissatisfaction on the part of the customer because of delay in the delivery of goods, and minor incidental cost.

Example No. 4

Total cost of compensation and medical aid.....\$ 59.00

Total additional incidental cost, paid directly by the employer..... 262.00

Here is the cost record of 36 injuries in an average woodworking plant manufacturing interior trim and doing some cabinet work.

Note A: The following accidents occurred:

No. of Accidents	Type of Injury and Cause	Compensation and Medical Cost
1	Hand severely cut, jointer.....	\$ 51.00
15	Cuts and bruises, handling material.....	5.00
10	Slips and falls and falling objects, miscellaneous operations.....	3.00
1	Finger slightly lacerated, band saw.....	0.00
1	Bruised forehead, struck against machine.....	0.00
8	Miscellaneous cuts and bruises, hand tools.....	0.00

Note B: The *incidental* cost was computed as follows:

Time lost by injured employees in consequence of accidents (paid by the employer).....	\$ 48.00
Cost of time lost by other employees.....	116.00
Time lost by foremen and superintendents, as a result of accidents.....	79.00
Spoilage of material.....	11.40
Broken and damaged tools.....	7.60

Note C: Here again a significant feature of the example is that the *incidental* cost due to the time lost by employees, other than those who were injured, was greater than the *incidental* cost of the time lost by the injured employees. A part of this cost occurred because fellow workers crowded about in sympathy or curiosity, or while giving assistance to the injured employees, but the major portion was due to the fact that a certain foreman, who for a period of one week was obliged to operate a production machine, was not readily available for consultation. This situation existed as a result of a preventable accident on the partially guarded jointer. This machine was being used at the time as a moulder and it was vital that production be continued. The foreman happened to be the only remaining available skilled operator. While engaged in operating the jointer considerable delay and confusion existed in his department. Employees in need of instruction and advice were obliged to wait. Loss of production is not included in my estimate of *incidental* cost, but the lost time of uninjured employees in itself constitutes an item worthy of consideration.

The Examples Are Confined to Incidental Costs

You will observe that these examples include no fatalities, dismemberments or permanent injuries. Such omission is deliberate and does not affect the ultimate ratio. To be sure, there are many fatalities resulting in a direct cost of thousands of dollars against a relatively small *incidental* cost. On the other hand, I can cite just as many or more cases where a minor accident costing but a few dollars in compensation or medical aid has caused an *incidental* loss of staggering proportions as illustrated by the following:

An employee of a steel-construction contractor who was tending the guide rope while a huge steel girder was being hoisted stumbled, bruised his shin, lost his grip on the rope, allowing the girder to swing and strike against a column. The jar displaced the clamps, causing the girder to tilt, slip and crash down upon a sidewalk shed, demolishing a section of scaffolding in his descent and damaging a hoisting engine seriously. The resultant property damage and delay cost the contractor several thousands of dollars over and above the medical cost of treating the employee's bruised leg.

*Accident-cost in the aggregate, as measured by compensation and medical payments,

is made up of the greater volume of low-cost minor injuries, rather than the lesser volume of high-cost fatalities and serious injuries.

Were it fair to do so I could build up an apparently stronger defense for this four-to-one ratio by citing cases such as the following:

1. A premature quarry blast, set off inadvertently by an employee who became startled because of a slight injury, resulted in serious damage to six drill rigs and a steam shovel. This equipment was buried under tons of rock and the total loss was over \$10,000.

2. Flooding of a tunnel occurred directly as the result of a minor accident. The loss amounted to over \$25,000.

3. A slight injury to a lineman caused him to drop a coil of wire, resulting in a short circuit. This led to claims against the power company and a loss of several thousand dollars.

4. An injury to an engineer, who was adjusting the stuffing box of a large steam engine while it was in operation, caused him to drop a wrench into the path of the moving crosshead. The cylinder head was broken, the engine was thrown out of alignment and badly wrecked.

5. An explosion of a japanning oven (loss \$17,000) was the result of an error on the part of a workman whose attention was diverted by a minor accident.

The original estimate of incidental cost was published in 1926. I refer you to *The Travelers Standard*, December, 1926, issue, to the proceedings of the Tenth Annual Industrial Congress, New York State Department of Labor, page 244 to 257 inclusive and to *Manufacturing Industries*, January, 1927, number.

A Tendency Toward a Higher Rate of Incidental Cost

From further research we draw the following conclusions:

1. There is a tendency towards a still higher ratio of incidental cost to direct cost.

2. For every accident involving compensation or professional medical cost there are approximately thirty minor accidents that receive merely first-aid treatment.

3. The cause of fatalities is the same cause that predominates in the minor injuries, from which we conclude that if we prevent minor accidents the fatalities will take care of themselves.

4. The "incidental" cost of non-compensable accidents is equal to the total direct cost of all compensable accidents. On the basis of "incidental" versus "direct" cost these non-compensable accidents in themselves establish a one-to-one loss ratio. These are the type of accidents that are not usually reported either to State Compensation Boards or to insurance companies. Example No. 3 in this paper well illustrates this point.

5. For every actual injury that occurs there are several "near" accidents resulting in property damage, spoilage, lost time, and other cost difficult to calculate with exactness.

6. Physical hazards are playing an ever decreasing part in the occurrence of accidents. This is well demonstrated by the many cases where plants with unguarded machines but with careful workers have fewer accidents than well guarded plants with careless employees.

Although my subject is not that of how to prevent accidents, it may not be out of place to say that prevention depends upon two essential elements:

First: An analysis by a trained safety engineer.

Second: The will to take action on the part of the employer.

The first of these conditions exists today; the second is in vital need of additional strength.

The employer must be awakened. He must realize that the prevention of accidents is good business. He must so endorse it, give it his backing, and must place

it in his plant on a par with production and sales. To do this he needs a newer and stronger incentive than he has heretofore had.

Let us continue our educational activities, let us continue our work on safety codes, bulletins, and safety literature, let us continue to work with the children at school and the workers in the plants; but above all let us recognize that this problem of ours can be best and most speedily solved through and only through the active and enthusiastic cooperation of the employer-executive.

Believing that it will assist in the attainment of such cooperation, I respectfully submit the "Incidental Cost of Accidents" for your consideration.

CHAIRMAN PEAK: We will take a few minutes now for discussion on this important paper rather than wait until the end.

At the time this study was originally published in the NATIONAL SAFETY NEWS the interests which I represent sent out to all of the managers of the various units and asked for reflections from them as to what they thought of the findings on the incidental cost of accidents, and I was much interested in the replies.

They ranged all the way from statements that they were way out of line to the assertion that they were not nearly enough. That perhaps is a reflection of the opinions that are going on inside the various heads in this room this afternoon. Let's quiz Mr. Heinrich on some of his findings, because we are all practically agreed that there are such costs. I know there will be plenty of discussion of this question when you get out in the corridor, but the best place to discuss it is right here.

Not Less Than Eleven Factors Are Counted

MR. HEINRICH: You have a list of factors, as I say, eleven of them. Sometimes you will have one hundred if you go into the fine points. I will be glad to give you a copy of the form used by the foreman in setting down the data. It is pretty hard to get on that card the whole number of men who stop work at the same time.

If somebody starts to ask questions at the time of the accident you will find that two, three, four or five men looking over the jig found it was smashed to pieces. As soon as that man went to the first aid station, two or three men gathered around the lathe to view the wreckage. They wanted to see what happened, and another man made a sign to take it off the machine and throw it into the scrap heap. Another man went to look up the old pattern to see if they could get another casting made. All these things should be set down on paper.

You will know the value of the jig that was ruined. Set that down. You know the property damage. Ask all those questions when the accident happens. Set them down on a form and then compute the total cost. This cost and the compensation and medical costs should be compared to get the incidental cost of accidents.

There is in every plant an item of expenditure that is called overhead cost. It includes light and rent and heat and other things like taxes and incidentals. These are made for the purpose of permitting men to earn money for the employer. If that light and rent and heat expense continues while the employee is not there you have a partial man-hour overhead cost that is lost, that is not productive, it being an expense without a commensurate return. Whenever a minute or an hour or a day is lost which is due to an employee's injury, a certain percentage of overhead cost must be charged to the accident. That applies to the man-hour profit as well as to overhead cost.

If your concern makes ten thousand or a million dollars a year and you have some thousands of man-hours working in that plant, then the total number of man-hours divided into the total profit indicates a man-hour profit; and if any, one man, whether he is a piece worker or a day worker or a salaried man, is not producing because of an accident, you are not earning that man-hour profit, and that is also a logical and reasonable charge to the accident itself.

The question that might arise as to cost due to refusal of a machine operator to let some other workman use his machine, due to labor differences, may be a bit away from this particular subject. Such difficulties will not arise if the plant is run properly by supervisors who know what proper supervision is. The supervisors in a properly run plant are men who know how to convey orders to the employees in such fashion that they will get results. The question of skilled and unskilled labor, which will not permit of rebuke or reprimand or discipline, enters into the question. The point can be made and the results can be secured if proper understanding of supervisory duties exists in the personnel. You might find it necessary to grab a man by the shoulder. You can do that in some cases. You can't do it in others. You may have to persuade a man. You may have to reason with him and explain how the profits of the company are neglected, but however you go about it, there is a method in any kind of a plant and in any kind of a situation to convince a man why he must follow the orders of his plant superintendent or foreman.

CHAIRMAN PEAKE: We are very much indebted to Mr. Heinrich for presenting this subject and also for his added remarks.

Three times within the last twenty-four hours I have participated in a very lively discussion on the question raised in connection with discipline and accident prevention.

The next speaker is going to speak on the subject of discipline. He is Mr. G. H. McClain, safety engineer, Jones & Laughlin Steel Corporation, Pittsburgh, Pennsylvania. I have great pleasure in introducing Mr. McClain.

How Should Men Responsible for Accidents Be Disciplined?

**G. H. McClain, Safety Engineer, Jones & Laughlin Steel Company,
Pittsburgh, Pa.**

My subject framed as a question infers that discipline would naturally follow when responsibility had been determined, yet we find after making some investigation that the application of discipline for accident responsibility is not as general as it might be, or ought to be, in industry at large.

Discipline, within itself, is a fundamental social necessity. Most of us can remember our childhood days and the occasional proverbial trips to the woodshed with father. At the time this discipline was applied we were not wholly in sympathy with it, but as time goes on and our judgment becomes more mature, we are more or less convinced that father was right. These stringent methods of discipline not only applied to our home life but to our school life, as well.

Perhaps one of the best illustrations of the application of discipline is found in any well organized army. Those of us who had occasion to serve in any military capacity during the late unpleasantness, can vouch for the truth of this statement. Any well trained, well organized army will soon degenerate into an ungovernable mass, without respect for rules, orders or officers, if discipline is relaxed or removed.

Another example of applied discipline is in our well organized railroads. Employees know that infraction of certain rules carries with it certain measures of discipline. In fact, our whole social structure is founded upon discipline. Every law in our city, state and federal codes pertaining to the protection of the rights and properties of the people carries with it certain penalties or disciplinary measures. We believe you will agree with us that it is absolutely essential and necessary to have discipline in any industry or business organization. If a man does not properly use his time for the benefit of his employer he may rightfully expect discipline. If he persists in reporting late to work or

violates any one of many other well established rules he knows that he may expect to be punished for it in some way.

The subject of the application of discipline for accident responsibility has many angles. For instance, the determination of this responsibility, the application of discipline when the man responsible for the accident has been injured or when through his negligence someone else has been injured, and so on.

It is the hope and dream of every safety engineer to be able continually to reduce the number and severity of accidents to the men for whom he is responsible. To gain this end he uses various plans and methods. He strives to improve working conditions, to reduce or eliminate mechanical hazards and so to educate the men that they will know the right way and do the right way. But no safety engineer can truthfully say that all of his men do the right thing or the right way all the time. It so happens that human nature has many variations. Men differ as to temperament, intelligence, ambition, etc., all of which complicates the situation. It would seem that a man would always think enough of his own physical welfare and those depending upon him not to take the chances that lead to accidents, or not to do something through his own negligence and carelessness, or fail to do something, which would contribute injury to his fellow workmen. Yet this is not the case. The accident records are full of cases in which men have done things or failed to do things which directly resulted in injury to themselves or to their fellow workmen. It is principally on this phase of the situation that discipline plays its part.

Industry Progresses by Definite Rules and Regulations

It is needless to say that no industry can get very far without a definite set of rules and regulations. This pertains to accident prevention as well as production, conduct and other things. It is fortunate that a large majority of men do things the right way and it is not necessary to discipline them. It is fortunate for all of us that an extremely small percentage of people ever attempt murder. This also applies to our highways. A vast majority of drivers of automobiles recognize the necessity of carefulness and observe traffic rules and laws and are repaid by keeping their names in the city directory and off of the tombstone. Yet there is enough violation of rules and laws by a very small percentage of wrong doers that it is necessary to maintain a vast organization of peace officers, judges, etc. The same applies to the violators of safety rules and regulations in industry.

Before discipline can be applied, in event of an accident or a near accident, it is necessary to determine the responsibility. In some cases this is apparent and easily determined and in others it becomes more complex and difficult. Extreme care must be used when placing responsibility, or discipline is likely to do more harm than good. I recall an instance where a fatal accident occurred in a large industry employing several thousand men. The department in which this man worked held an investigation and fixed the responsibility on his foreman. The safety engineer did not agree with this. He wrote his report on the accident, took certain correspondence with him and went into the office of the superintendent. In his report he placed the responsibility upon the superintendent. Naturally when he read this report, to use a trite expression, he hit the ceiling and demanded immediate explanation. The safety engineer then placed in front of him certain correspondence, including recommendations for mechanical improvements, dated about two years previously which would have prevented the fatal accident. Of course this is an extreme case and it is a long way in responsibility from the superintendent to the fore-

man, but it is no uncommon thing to encounter an attempt to throw a smoke screen by placing responsibility on some subordinate or some workman.

In most cases, however, we find that the responsibility for an accident can be placed upon the foreman, the injured man himself or a fellow workman. The foreman sometimes allows working conditions to exist which he knows are unsafe but under the pressure of getting his work done he lets it go by. Again we find that a foreman is compelled to accept the responsibility of an accident due to the fact that he has not properly instructed or trained his men. I am sure you will agree with me that one of the most important, if not the most important thing, that a foreman can do to prevent accidents in his department is to give specific instructions as to the way the work shall be done in order that it may be done safely, as well as to point out to them in a definite way the hazards that they may encounter which are not directly connected with their work. It is indeed difficult to place the responsibility of an accident upon a workman or fellow workman when he has not been specifically instructed as to the right and wrong way to do work.

Carelessness Is a General Characteristic

Then again we frequently encounter the man who is inherently careless and does not take the trouble or the time to do his work safely. We believe that is largely a characteristic of the human race. We are prone to follow the course of least resistance. We may walk within ten feet of a nail sticking up in a board and because it requires a few steps out of our way, we are inclined to pass it up. We may observe an unsafe condition but because it requires a little time and effort to have it corrected, we may pass it up and say or do nothing about it. We may be working with a hammer or chisel that has a burred end, but since it requires us to walk to the blacksmith shop and back, we may continue to use it, even though we know it is unsafe. Therefore, we say that there are, without doubt, a number of men who know the right way and yet fail to put into practice what they know. Thus, as we have said before, the placing of the responsibility for an accident is an important and at times a very difficult proposition. But when the responsibility has been placed, we are confronted with the necessity of applying the proper discipline.

In the dictionary we find the word "Discipline" defined as follows: Chastisement: to train to obedience or efficiency; to regulate; to chastise.

As applied to the discussion in hand, we would say that the prime function of discipline is to train to obedience and efficiency with reference to doing work safely. We do not believe that the idea of chastisement enters into this to any great extent. Discipline by its very nature inflicts some sort of unpleasantness upon the one being disciplined. If it did not do this it would not be discipline. To the most of us, three or four months of confinement in the county workhouse would be rather severe discipline, yet we all know it to be a fact that a certain class of men commit crimes in the early part of winter in order that they may be certain of food and shelter during the rigorous winter months. To these men confinement in the workhouse or jail is not physical or mental hardship at all. What may be discipline to one, may not be to another.

Industrial discipline may range all the way from a reprimand to discharge from the company's employ. The man responsible for the accident may be a foreman or a workman who has spent many years in the service of his company and in most respects has been entirely satisfactory. His knowledge of his work is an asset to his employer and discharge in his case might be unwise. He may be of such intelligence and temperament that a reprimand from the proper person would be most effective. And again it might be wise not

only to reprimand him but to suspend him from employment for some time. The suspension of employment is a thing that must be considered in the life of a man's dependents. If he has a large family and he finds difficulty in keeping abreast with his rent, grocer's bills, etc., a few days would be sufficient. We have known instances where a department head, after thoroughly informing a man as to why he was being disciplined and his relation to the accident or near accident, sent the man away with instructions that he was to go home and stay there until he was sent for. The uncertainty of this proposition makes the discipline more effective.

Again it may be that the man responsible for the accident is what we usually speak of as a "floater" and his services can be dispensed with without much difficulty. In a case of this kind it is sometimes a practice to suspend the man for a week. The idea in this procedure is that if he were discharged immediately he would have a right to expect his money and would probably go on his merry careless way to be injured or cause injury some place else.

Should the Injured Man Be Further Disciplined?

The question arises as to whether or not a man who has received an injury which was caused by his own carelessness, has been sufficiently disciplined by the injury itself. In some cases this may be true and in some cases it may not. A case recently came to our attention of a man who, in a fit of temper, dropped a plank from his shoulder to the ground without any attempt to let it down in a safe manner. The plank rebounded, striking him on the foot and causing a slight fracture of one of the instep bones. The man's conduct previous to this accident had not been satisfactory and it was the opinion of those interested that the injury itself was not sufficient discipline. When the man was discharged from the medical department and reported for work he was then sent home by his foreman for two weeks longer. The man was an old employee and had begun to act as though the foreman's orders and instructions were not for him. However, since this occurrence his attitude has changed and he is a much better employee in every respect.

Another phase of the application of discipline is, what should be done with the man who is directly responsible for the injury of another? A method that we have tried out and find to be quite effective is to suspend the responsible party from employment as long as the injury prevents the other man from returning to work. Of course there are occasional exceptions to this method, but in a general way it is quite effective.

In concluding, let me again point out what we consider the essentials of applying discipline. First, that great care be exercised in determining the responsibility for an accident; and second, that equally great care be used in applying discipline. It must be done only after the man himself understands clearly and thoroughly why he is being disciplined and then not in any heated or argumentative way, but it should carry a certain amount of dignity and finality that will impress the man that there is a law and a justice that is greater and more powerful than he and that it will operate at all times for the benefit of the largest number of men.

CHAIRMAN PEAKE: If the discussion and questions that have been raised at previous sessions are any indication, we have some strong comebacks to the previous speaker.

MR. McCLAIN: I should like to ask some of these fellows how they would discipline that foreman who failed to protect his track? There was no accident. How would they do it? I would send him home for a couple of weeks and somebody else would do something else with him.

EDWARD A. WORD (National Carbon Company, Fremont, Ohio) : Discipline applied to a man for disobeying the safety rule could not get as good results as by educating the man to work safely. New York City has been called the melting pot, and I want to cite one instance that I have dealt with personally.

Three years ago one of our departments, the tamping department, similar to a punch-press department, had an abnormal amount of lost-time accidents. It was one of the worst departments in the service of some fourteen plants belonging to the National Carbon Company.

In an endeavor to clear up and correct the lost-time accidents, we started by firing the men who received these injuries. We fired six men, but we didn't stop the accidents until the foreman himself was sold to safety. Now, it is over two years since we have had a loss in that department and I want to state that about 90 per cent are of foreign extraction in that department and about 70 per cent are foreign born. Some of them speak very little English.

A foreman must talk plainly to his men in dealing with anything that has to do with safety and I believe by this method we can get across the message of playing and working in a safe America.

R. S. BONSB (Standard Oil Company of New Jersey, New York, N. Y.) : I should like to know who is to determine whether the man was neglectful or responsible for the accident? Should a group of foremen pass on it or should the safety committee pass on it or should the man injured pass on it? In your opinion, which is the most efficient and definite means of determining the man's neglectfulness or his responsibility?

Determining the Man's Responsibility

MR. McCLAINS : There is more than one way to do it. I may practice one method and I don't necessarily recommend that it be used. I think if it was up to me I would have a little case in court perhaps, down in the superintendent's office. I wouldn't pass up the department heads where that man was working, because according to the organization blueprints, that superintendent is the boss, and I would go down to him and say, "Harry, you know what happened last night. Are you going to pass it up?" I have asked that man to stay over and investigate it. We hear everybody's side of the story. It is probably the safety engineer's job to ask suggestive questions that will lead on to the probable cause without showing his hand or anything of that kind.

I don't mean to try to evade your answer. I have gotten our department heads where they want me in on it, but I wouldn't do it without them. It is primarily their job. I am apparently unconcerned about the whole thing and try to act like I am over in the corner. I ask them how they are going to discipline him and they can't pass it up that way.

MR. BONSB : It is a tender subject, but you can't be tender. What is the best way to determine whether that man is responsible? Who is in the best position? That is what I am trying to find out. Who is in the best position to determine whether that man is responsible? And if he is responsible, it is very easy for the man to whom that man is directly responsible to apply the disciplinary measures. Have I made my question clear? It is a question of fixing the responsibility, because the responsibility must be fixed before the effective disciplinary measures can be applied.

E. F. BLANK (Jones & Laughlin Steel Corporation, Pittsburgh Pennsylvania) : I think probably Mr. McClain's modesty prevents him from explaining it any more fully. He explained that when a serious accident occurred they would hold the little courts of inquiry, at which all the witnesses are present and the man who is responsible for the accident. The safety engineer in that case, more or less, cross-examines the witnesses to the accident and the matter is probably brought up in the talk with

the injured party. After the questions have all been answered it is pretty clear in the mind of the superintendent or the safety engineer where the responsibility lies. Mr. McClain leaves that up to the department heads and the thing is probably decided by the department heads, but cooperating with the safety engineer on the job. Does that answer the question?

MR. BONSB: Yes, sir.

CHAIRMAN PEAKE: I would like to ask Mr. McClain what particular benefit is derived in applying a penalty in case of a fellow who is given six or eight days' lay-off, the purpose being to dismiss him when he returns. It is taking an unfair advantage of a man. Why not do it right away and get over with?

MR. MCCLAIN: In the steel industry we have all grades of men. I don't know that it is any different from anything else, but it is not uncommon for a man who is wanting to get out and start on his way, to go slamming away without a pair of goggles on because he knows he will be fired. Just to fool him, we don't fire him, see?

There is a certain amount of unfairness about that, as I said in my paper, but if this bird says to the other in danger, "I want to leave this place and I am going to take a slam at somebody," he starts a fight and he will be discharged. You know how that is. Many times during the war fellows would start smoking in powder plants to get discharged. Lots of time they did get discharged too. We have the system; if you violate the rules you will not be fired, but you will be laid off. You are not fired; you are suspended. It is 100 per cent right. We don't discharge a man out-and-out unless his conduct has been something that we can't stand for, or if we find him in the dressing station time after time and I think he is going to land finally in the morgue. I will begin to think about his wife and baby and he will be sent out because he wants to be killed. If that is so, I would rather have him outside the company's property.

CHAIRMAN PEAKE: We have for this afternoon a playlet entitled "The New Way" which is staged by the employees of the American Car & Foundry Company, of Chicago. I am told the play will occupy about 20 minutes. I would suggest to those who expect to leave before the 20 minutes are up that they go now, but I would rather have you all stay as this is well worth staying for.

The New Way

A Safety First Playlet in One Act

Given by Employees of the American Car Foundry Company, Chicago

CAST OF CHARACTERS

Superintendent	Mr. Franklin
Michael Kiley, Foreman Lumber Yard	
Chief Clerk	Willie McGee
William Chyla, Wheel Foundry	
General Foreman	Mr. Bill Speeder
(Whose motto is "Hurry Up")	
J. F. Considine, Jr., Asst. Foreman Wood Erect.	
Jack Jones	Alias "The Creeper"
(Too lazy to keep out of danger)	
Thos. Smith	Alias "Crabby"
(Always complaining)	
Manuel Camden, Asst. Foreman Wood Erect.	
Joe Poleski	Alias "Hunky Joe"
(Hard worker, but careless)	
Harry Johnson, Gang Leader Steel Erect.	

Charley Pepper....."The Boss"
 (Who carries out Mr. Speeder's Orders)
 F. M. Robinson, Safety Inspector

Pete Martini.....Alias "Red Eye Pete"
 (Always half soused, maker of "Moon")
 Anton Spano, Punch, Shear & Press Dept.

George Brown.....Alias "Doc"
 (The Plant Eye Doctor)

Alex Swanson.....Called "Honest Aleck"
 (Always on the job)
 Paul Robinson, Wood Mill

Frank White.....Alias "Joblots"
 (Maintenance and General Safety Man)
 Walter Spangler, Asst. Foreman Wood Erection

TIME

Anytime, 1927

SCENE

Superintendent's Office and General Foreman's Office,
 Anybody's Factory, Inc.

Willie enters and sitting down at his desk starts to work on his typewriter.

MR. FRANKLIN (*enters his office with a cheery*): "Good morning, Willie."

WILLIE: "Good morning, Mr. Franklin."

(*Mr. Franklin sits down at his desk and looks over papers on his desk.*)

SUPT.: Willie.

WILLIE: Yes, Mr. Franklin.

SUPT.: I have been looking over our business report for last year and I find that we show a decrease in profits over the previous year; why is this, when our volume of business was as large?

WILLIE: Well, Mr. Franklin, you know that while we were running that Mud & Co. job, Speeder had two men hurt and had to fill their places with new and inexperienced men, and before these new men were broken in considerable material was spoiled, all of which, of course, was charged against the job, so that we were unable to show any profit on that job. Then, on the Haymarker job the same thing happened when those men were hurt in Department "E". Of course you have seen our accident report for last year and know that we paid out over \$8,000 for compensation, which is also deducted from the profits of the year.

SUPT.: No, I haven't seen it; where is that report? (*Willie brings report.*) (*Supt. glances over report.*)

SUPT.: Well, this is something that must be looked into at once. Call Bill Speeder. (*Willie goes to door and calls, "Oh Speeder; come in here; Mr. Franklin wants to see you." Speeder enters from his office.*)

SUPT.: Bill, sit down there, I want to talk over this matter of accidents with you. Do you know how much we paid out for compensation last year?

BILL: No.

SUPT.: Well, it amounted to over \$8,000.

BILL: That is impossible, Mr. Franklin; we did not have many accidents last year.

SUPT.: Here is a list of the men injured and the amount paid to each. (*Bill takes report and looks it over.*)

BILL: I had no idea that it amounted to that much.

SUPT.: Now, Bill, something must be done to stop this right away, and I want you to go out in the plant and look over the situation, then report to me as soon as possible. (*Bill goes out, enters Charley "The Boss" from Speeder's office.*)

CHARLEY: Oh, I thought Bill was in here; I wanted him in a hurry.

SUPT.: What is the matter, Charley? You look like you were out of breath.

CHARLEY: We had another bad accident just now, Mr. Franklin. Jack Jones got his leg broken, and you know he has a wife and five children and I wanted to know whether to send him home or to a hospital.

SUPT.: What! another bad accident! Send him to the hospital, Charley, and then come back in here. *(Charley sends Jack to the hospital and then returns.)*

SUPT.: Charley, how did the accident happen just now?

CHARLEY: Well, I don't know yet, Mr. Franklin, all I know is that Jones and several others were piling some material and the pile tipped over, and the others got out of the way, but Jones was too slow and got caught.

SUPT.: Charley, you go out and get the men that were working with Jones and bring them in here. I am going to find out about this. *(The boss leaves and returns with the gang.)*

CHARLEY: Mr. Franklin, these are the men that were working with "The Creeper."

SUPT.: What are their names, and how long have they worked here?

CHARLEY: Well, here's Crabby Smith; he has been here about two years, ain't it, Crabby?

SMITH: Yes, two years next month.

CHARLEY: And, Hunky Joe; how long you been here, Joe?

JOE: Twelve years, Mr. Boss.

CHARLEY: And Red Eye Pete; how long for you, Red Eye?

MARTINI: About a year, two months, Meester Bossa.

SUPT.: Smith, how did Jones get hurt?

SMITH: Aw, you know in that darn shop anyone would get hurt.

SUPT.: Yes, yes; now tell me how Jones got hurt.

SMITH: Well, you see, Superintendent, I got something in my eye and had Doc Brown take it out and he hurt my eye something fierce and I couldn't—*(Hunky Joe interrupts)*

HUNKY JOE: I me tell you, Mister Boss, "The Creeper" no good; he too slow me good workman; me work fast; you know me work here twelve years; me good workman; me hurry up good; me no give damn for anybody; me hurry all the time—*(“Red Eye” interrupts)*

RED EYE: Aw, shut up; you don't know nothing; me tella da boss; me see pretta good; Crabby he gotta bada eye from Doc. Doc taka piece a sawdust out Crabby's eye with a file, so I gotta bottle gooda moon and I give Crabby gooda drinka, and Creeper take gooda drink too; everybody worka like hell.

CRABBY *(Aside to Hunky)*: He is a darn fool; the boss will can us now for drinking.

HUNKY JOE: Mister Boss: I me workum good fast; Creeper too much lazy, no pilem fast enough; me pilem high, my pile: Creeper pilem slow little pile, my pile fall down so, I don't know maybe no good floor, maybe no enough cross piece. I don't know.

SUPT.: Is that right, Smith?

SMITH: Aw, I don't think so, that stuff ain't made right you see, every other one must be turned around end for end to pile them so they will lay even, and we didn't do that and I guess that is what made it fall.

SUPT.: You men wait here until I go to see that pile that fell. *(Exit Superintendent.)*

CHARLEY: Pete, you shouldn't tell Mr. Franklin that you had moonshine.

RED EYE: I no gotta much, Mr. Boss, littla bit no hurt.

HUNKY JOE: Me no need moon; me workem alright every time. (*Enter Supt. as Crabby starts, "You're a damn fool."*)

SUPT.: Charley, who is the man who is re-piling the material that fell on Jones?

CHARLEY: Oh, that is Swanson; Honest Aleck they call him.

SUPT.: Did he ever get hurt?

CHARLEY: No, sir; Mr. Franklin, he is always on the job.

SUPT.: I thought so, as I watched him work; that is the kind of men we want on the job. I also noticed that the floor is bad where this pile is. Don't White take care of such conditions?

CHARLEY: Yes, sir, Mr. Franklin, most places he does when we tell him.

SUPT.: You men can go back to work now and Charley I want to see White in my office here. (*Charley, seeing White pass the door, calls, "Oh Joblots, Mr. Franklin wants you."*) (*Bill returns as Joblots enters.*)

SUPT.: Bill, you have had another bad accident this morning.

BILL: Yes, sir, Mr. Franklin; but I don't see how we can avoid it if men will not try to be careful themselves.

SUPT.: Now, Bill, after looking around through the plant, what do you think we should do to stop these accidents? You know this is an awful hardship on the families of these injured men: they say Jones has a wife and five children. Now, who will care for them while he is in the hospital?

BILL: I don't know, Mr. Franklin; I don't see what we can do; all our machines are guarded.

SUPT.: Bill, I have been doing a lot of thinking while you were gone and I agree that all our machines are guarded; but that is as nothing compared to the work we are going to do to make this plant safe; nor will it cost us anywhere near as much as guards have. Our next step is to educate our men to work safe. This can be done by you and your assistants constantly preaching safety to your men. It may be necessary to remove one or two men from the service, if you cannot educate them; and I think I saw a couple this morning that will be damn hard to educate. About Mr. White here, I believe he should be relieved on the job of safety man, taking care of maintenance only, and a new one appointed as Safety Man; and that White be instructed that safety comes first; and that Doc Brown's files for removing particles from men's eyes be taken away from him, so that he may spend all his time working at his trade of machinist hereafter. Do you understand that, Mr. White?

WHITE: Yes, sir.

BILL: All right, Mr. Franklin; who do you want for Safety Man?

SUPT.: How about Swanson?

BILL: That's fine; I will tell him. Aleck is so careful in everything he does that I am sure he can handle our Safety Work for us and get results.

SUPT.: Very likely he can, Bill, but let us go farther. I think Swanson will need some help, so I suggest that you form a safety committee among the workmen, the members of which, along with their other duties, will be constantly on the lookout for unsafe conditions and especially careless and unsafe workmen. You and Charley had better get in on the selection of that committee with Swanson and get the thing started right away, and remember your biggest job is to teach the men the safe way to work.

BILL: All right, Mr. Franklin, may I pick whom I wish on this committee?

SUPT.: Certainly, Bill; that's up to you. (*Bill leaves and enters his own office where he finds Charley waiting.*)

BILL: Gee, Charley, I thought we were both through when Jones broke his leg, but the Old Man just said we must work a new way; we must educate our men to work safe by teaching them, and I think he is right. We are to have Swanson for Safety Man and we are also to pick a safety committee

from our force to help Swanson by always talking safety among the men as well as reporting unsafe conditions and practices.

CHARLEY: That's fine. I feel better now because I know that with Aleck on the job as Safety Man and a committee working we will have a much safer shop; then, too, we have the backing of Mr. Franklin, which is going to be a big help. When do we start with this new arrangement?

BILL: Right now! First get Swanson in here.

CHARLEY: All right, sir. *(Charley leaves.)*

SUPT.: Willie, where is this morning's mail? *(Willie hands mail to Mr. Franklin, who looks over it.) (Charley returns to Speeder's office with Aleck.)*

BILL: Alex, do you know what a Safety Man should do in this plant?

ALEX: Yes, sir, Mr. Speeder, I think I do.

BILL: Well, we are going to make you Safety Man and your duties now will be to find unsafe conditions and practices around the plant and have them corrected; also help to educate the men how to work safe. In this latter part, you will have the help of a safety committee, whom we shall select, as well as Charley and myself.

ALEX: All of this is agreeable to me, Mr. Speeder; whom do you think you will select on the safety committee?

BILL: I haven't decided as yet.

CHARLEY: Often the worst offenders make the best boosters, Mr. Speeder. Why not take the three men we had in Mr. Franklin's office this morning? If we make them work safe, it surely will be an object lesson for the others.

BILL: Alex, do you know who Charley is referring to?

ALEX: No, I do not, Mr. Speeder.

BILL: Well, it is the three men that were working with the Creeper this morning: Crabby, Hunky Joe and Red Eye Pete. What do you think of them?

ALEX: They are all right. I am sure I can get them to work safe. Will you tell them about their appointment on the committee?

BILL: Certainly, and the sooner the better. Suppose we get that matter settled right now. I would like to talk to those men about their duties as Safety Committee Men.

CHARLEY: Shall I bring them in here, Mr. Speeder?

BILL: Yes, Charley; and you stay here, Alex, until we get this committee arranged. *(Charley leaves.)*

BILL: Alex, here is a sample safety badge. We will get some more of them and have the committee wear them.

ALEX: That is very good Mr. Speeder. *(Charley returns with the three men.)*

CHARLEY: Here are the men, Mr. Speeder.

BILL: Pete, you saw the Creeper get hurt this morning, didn't you?

PETE: Yes, sir, Mr. Speeder; I see him.

BILL: Suppose you had broken your leg instead of the Creeper and had to go to the hospital, what would you think of that?

PETE: I donta know, Meester Boss. I gota biga family, wife and six kids, pretty bad, big rent, I musta work, Mr. Boss; hospital no gooda for me.

BILL: Yes, Pete, I know that, but if you was over there in the hospital in place of Jones now, what would your family do?

PETE: I donta know, Meester Boss; maybe kids get nothing to eat.

BILL: That's right, Pete, maybe the kids get nothing to eat. Now, Pete, don't you think you and your family would be much better off if you would leave the moon alone and try to work in such a manner that neither you nor your partners would get hurt?

PETE: You mean I work gooda safety first, Meester Boss, then I never go to hospital?

- BILL: That's it, Pete.
- PETE: All right, Meester Boss. I worka safe alla time now; never hurta anybody; maybe Creeper come back, he no hurta anybody either.
- BILL: That's very good, Pete; I think you will be of some help to us in the future. Crabby, what would you think if you were in Jones' place now?
- CRABBY: Aw, I don't know, Bill. I never get hurt. Why don't everybody look out for themselves like I do; then they wouldn't get hurt either.
- BILL: Would you like to spend a month or six weeks in a hospital while your family were at home with no one to provide for them?
- CRABBY: I don't think I will ever get hurt, Mr. Speeder.
- BILL: You're almost hopeless, Crabby. Now, Joe, you have heard all this talk, what do you think about it?
- HUNKY JOE: Boss, I me no wanta go to hospital, me got pretty good family. Me like plenty work so kids go to good American school. Me feel pretty bad for Jones; me work safe every time now.
- BILL: That's good, Joe.
- CRABBY: Mr. Speeder, I guess I was wrong about getting hurt; maybe I would get it some day and I would like to go along with the rest of the boys, play the game as they do, if I can, and you say it will keep me and my buddies out of the hospital.
- BILL: It surely will do that, Crabby, and I am glad to hear you say that you want to go along with the rest of the boys. Alex has been made Safety man and I want you three men to assist him by reporting unsafe conditions around the plant that you may see in your regular course of work, also careless men, to either Alex or Charley or myself. You will also warn men when they are working in an unsafe way. Understand that you are to continue with your work as before but always keep in mind that you are a safety man now and must help the other men to work safe. Alex will give you all the help in this that he can.
- HUNKY JOE: Boss, you mean we must tell everybody the right way how to work safe?
- BILL: Yes, Joe. When you see someone who is not working safe you stop them and show them how to do their work in a safe manner.
- (The three in unison) All right, Mr. Speeder, we will.
- BILL: Alex, is this O. K. with you?
- ALEX: It certainly is, Mr. Speeder.
- (Mr. Franklin enters.)
- SUPT: Bill, oh, you have got these men up here again.
- BILL: Yes, Mr. Franklin, these men are on our safety committee.
- SUPT.: Fine, Bill. I am glad they are here as I just received a letter from New York announcing a Safety Trophy to be awarded to the plant showing the best safety record for the year 1927, to be known as the "Dickerman Safety Trophy," and I wish you boys would make every effort to bring that Trophy to this plant.
- CRABBY (getting very excited and throwing his hat on the floor yells): Come on, boys; let's go! We are going to get a great big medal or trophy or whatever they calls it now for just working safe.
- CHARLEY (to Bill, as they go out together): Bill, I think we got a good start for safety.
- BILL: I do, too.

EPILOGUE

A word to you of the Chicago Works,
Who have sought aid for your various hurts,
Who have gone to see our good Doc. Powell,
With an ache and a pain and a great big howl;

Sixteenth Safety Congress

To those of you who have been careless men,
And have not cared who got hurt or when,
We wish you to know that this big shop,
Is playing safe and accidents must stop;
Our little playlet shown you here tonight,
Is just a lesson and we hope it might
Be the cause of turning some careless man,
From his unsafe ways to the Safety First plan;
If our message to you here tonight has been
Of any benefit or help at all, why then
We will feel well paid, if we can see
All you men working with us in Safety.

THANK YOU!

ADJOURNMENT

Friday Afternoon, September 30, 1927

W. H. WINANS, Chairman
Industrial Relations Department, Union Carbide and Carbon Corporation,
New York City

The second meeting of the A B C Session was called to order at two-ten o'clock by the chairman, W. H. Winans, Industrial Relations Department, Union Carbide and Carbon Corporation, New York City.

CHAIRMAN WINANS: You, of course, or many of you, have attended previous A B C sessions. You know what their general purpose is. I hope you are getting from them what you want and what you came for. The general idea back of it all is that very frequently by merely exchanging ideas and experiences on some of these problems of accident prevention which confront us, we find that all of us have a great deal in common.

You know the story of the man who upset his boat in the lake in the park quite a distance from shore, splashed around and floundered in the water, calling for help and yelling that he was drowning, that he could not swim. A park policeman who was standing on the shore watched him for a while, and finally yelled out to him, "Let your legs down." The man stood up in four feet of water.

Very frequently we find from these sessions that we are standing in four feet of water and don't realize it. I hope you get some suggestion this afternoon that will enable you to let down and put your feet on the ground.

Our first speaker is to discuss a problem which most, if not all, have found very perplexing at some time. I hope he will tell us whether we can let down or at least which direction we can swim in. Mr. Arkills comes from Seattle, Washington. He is Safety Engineer for the Waterfront Employers of Seattle, safety engineer for the Pacific Coast Steel Company at Seattle, and consulting safety engineer for the Manufacturers' Association of the State of Washington.

How to Secure the Confidence of the Operating Heads

M. E. Arkills, Safety Engineer, the Waterfront Employers of Seattle,
Seattle, Wash.

One of the natural desires of every safety man here is to secure the full cooperation of his management. One of the natural desires of every management is to have each department, including the department of safety, advance such a common-sense program that it can be subscribed to unreservedly.

Early in the title of this paper we find the word *how*. When we use the word *how* in this connection it implies a mode of operation or a process. The treatment here given will, however, be very elementary in its scope, and not a scientific treatise. We furnish no panacea for such minds as choose to worry about this subject. The powers thus wasted would be better directed toward the accomplishments that count for safety and production.

Secure: Se—means "without," cura—meaning "care," then secure means without care. If we secure a thing we may cease to worry about it. Or we are without care. Even if it were possible to furnish a complete solution to this problem we would prefer to leave a healthy incentive to good work.

Confidence: This word when dissected is found to be composed of 1—Faith; 2—Belief; 3—Assurance; 4—Certainty.

Faith: We as a people have been taught for many generations to take certain abstract things on faith, so this is not difficult.

Belief is a result of one's conscientiousness; the strongest impressions at the time in question. Beliefs are shifting things. They are capable of change from without.

Assurance is encouragement, declaration, promise.

Certainty: This can only be founded on fact.

How about a practical application of the foregoing?

Faith: The employer takes the new employee partly on faith. We all feel we would not have been given a chance in our present places had it not been for the element of faith. Faith is a splendid quality in man. We should guard against doing those things that tend to shake anyone's faith in ourselves or any worthy cause whether we are sponsoring it or not.

Belief: Since beliefs are a fertile field we should direct our efforts toward a common understanding of the helpful truths underlying our important work. If we find that one of the operating heads is not in full accord with what has been found to be effective safety engineering in other plants, then he is in need of a few new concepts that will balance his belief in favor of such engineering. Possibly the safety man should strengthen his own belief with the occasional addition of new and workable concepts. When the National Safety Council Congress is in session the golden harvest is on. We may all gather many sheaves of helpful concepts here. They will add to our enthusiasm, and enthusiasm is catching.

Points in Securing Confidence of Management

Assurance: The executive would always like plenty of assurance that what we are doing is sound, logical, workable and is a part of the general scheme for economic advancement. Late accomplishments in the employer's own plant are doubly assuring. The live executive will like to know that a plant similar to his own has made a saving in men and money. This spurs him on to make the same saving in his own plant.

Certainty: Concrete facts and figures as to the savings are always helpful in establishing with certainty the soundness of our safety work. Simple, well-checked, easily understood statistics in small amounts are greatly appreciated by the busy operator. Notice, please, we stress small amounts. Too many, or complicated, statistics defeat their own end.

In summing up hurriedly, let us see what thoughts are here advanced:

1. We have attempted to show *how* improvement may be had.
2. That it would be stultifying for us if too great a sense of security were obtainable.
3. That faith, our starting point in all new fields of endeavor, should be zealously guarded.
4. That beliefs may be improved by proper cultivation. That the concept may become the builder's brick of our building we call "Belief." We cannot give off that which we do not have ourselves.
5. That assurance is ministered to by previous records made by ourselves and others.
6. That the foregoing standing on the sure foundation of facts and figures will do much to secure the confidence of the operating heads.

CHAIRMAN WINANS: Before discussing the points presented to us by Mr. Arkills, it might be well to have a letter which has come to our attention, indicating what happens when the confidence has been secured, as Mr. Arkills has referred to it. I am not going to mention the name of the company with which the gentleman is connected who will present this letter. If he sees fit to mention it himself

later, well and good. I will call on Mr. R. E. Colville, who is assistant manager of the Plant Service Division of a large industrial concern, to present this letter and explain it to you.

R. E. COLVILLE, U. S. Gypsum Company, Chicago: I might supplement the chairman's remarks by saying that the company which I represent has rather extensive operations. We have mines and we have mills, we have railroads, and we operate steamships, so the thing I am putting before you will indicate that it comes from an experience which is rather broad and that this man is a man who can speak on the subject. Incidentally, there are twenty-seven plants which are affected.

The letter was written to all operating heads (plant managers and other operators), after an experience of several years of intensive safety work, that is, selling safety and trying to justify the reasons for our efforts along that line. The letter itself represents a culmination of an idea in this man's mind. His title is vice-president in charge of operations. The letter is dated September 27, 1927.

A Letter That Caused Much Discussion

"Since my letter of August 26 reviewing our safety record for the year, three other employees of the company have lost their lives and our record now stands:

"16 MEN KILLED IN 8 MONTHS"

"I have read the comments made by those who have replied to my letter, and have found them interesting and helpful; but most of the replies indicate the need of a definite program which promotes better things than the one we have been following. Mature consideration has brought the following conclusion:

"We have attempted to reach our men through rules, guards, signs, slogans, committees, safety talks, safety campaigns, competitive ratings, prizes, etc. All of these things, with the exception of safety rules and guards, savor of a sales campaign through which an attempt has been made to win the workmen to safety by selling them an idea. This plan has failed, as evidenced by our record of deaths, increased severity, and increased cost. Abuses of the system have crept in, an instance of which is the placing of men at work when they were but partially recovered, at a direct loss to the company, the aim being to maintain a good safety record in man-hours lost; the real objective, accident prevention, being entirely lost sight of in an attempt to make a mere record.

"We will now about-face. You will discontinue all of the things listed above except that you will maintain safety rules, guards, signs and ratings. From September 1 on, ratings will be on the following basis:

- (1) Deaths
- (2) Number of accidents
- (3) Severity
- (4) Costs"

(Incidentally, we are self-insured in about seventy per cent of our payroll, that is, our largest plants and those which can be are self-insured.)

"The October No-Accident Campaign offers us no more hope of progress than the former campaigns."

(We have had two campaigns each year.)

"We will have a good record and then begin to slide off in the months that follow. You will, therefore, hold no more safety campaigns and you will cancel forthwith all plans made for the October campaign.

"Effective at once, all formal safety talks and appeals are to be discontinued. From this time forward you will require that every employee at your plant be a safe worker. To make this plan effective you will call together your department heads and announce this change in policy. Place the responsibility of selecting and retaining efficient workers upon your managers.

"The subject of accident prevention has been best expressed in the following simple statements:

"The safe factory, in general, is the efficient factory; the efficient factory, in turn, is the safe factory."

"When accident losses have been eliminated or brought down to the irreducible minimum, then, and then only, will the highest production be realized.

"The dynamic force which can obtain this desirable objective has but one source: it resides in management."

"Accident prevention is a responsibility which cannot be evaded. It rests on the managers and executives of industry to make safety of major interest and a continuing care."

"This letter is addressed to all plant managers and will be received by a few who have splendid records. Let me repeat, there is no security in past immunity; therefore, it is my wish that those of you whose plants have a good record act in this matter exactly the same as though your record had been unsatisfactory.

The Keynote of the Plan Is Efficiency

"The keynote of this plan is efficiency. Efficiency comes as a result of good management. One of the tools of good management is discipline. During the past five years, when growth in plant and production required nearly all of our time, discipline was lost sight of to a degree. Many of our young managers know little about it, and I am under the impression that discipline has not been employed in connection with our safety work to any marked degree. When a man fails to give you quality or efficient production, you will quickly decide that he is not fitted for the task and you will either find something else which he can handle efficiently or you will dismiss him. If a man lacks interest in his work and you are unsuccessful in your attempt to make him efficient, then you dismiss him, because if you do not your quality and your cost record suffer. If you do not hesitate to handle men in this fashion when quality or production is at stake, why hesitate when it relates to safety? *Hesitate no longer, but warn your managers that they must be efficient in the selection, the direction, the discipline and the control of their men.* If they will not do this, they must be subject to the same penalty as the workman. Their future with the institution from this time on rests as definitely on their safety record as on their ability to get quality at low cost. This plan requires that when men violate safety rules or they are inefficient, they shall be disciplined in an appropriate fashion, the discipline ranging from a warning to dismissal.

"Your safety organization is to be cut down to a clerical force sufficient to handle the work remaining under this changed plan."

(It may be interesting to note right here that some of our plants have as few as twenty people, while we have other plants, one of which is as large as 1,700 men. Of course, this will be interpreted differently at the various-sized plants, but the large plant will not have even the safety supervisor who now is directly responsible for the carrying out of the safety and accident prevention; but the line of control will come directly down from the vice president to his production manager, to the works manager of the plant, and from the works manager directly to the workmen. In other words, you won't have a safety man who hasn't the authority to discipline the foreman, you won't have that safety man trying to direct. He will be a man who helps the Works Manager carry out his own plans.)

"I now charge you with the responsibility of selecting and maintaining in your organization only such men as are efficient and safe workers.

"Accidents must cease and you must do the things that are necessary to stop them.

"The accident prevention responsibility is now in your hands.

"I have often heard the comment that the men think we are not sincere in our interest in accident prevention, and that our only interest is to save money for the

"I want every manager in the company to become at once absolutely hard-boiled on the subject of accident prevention. We will not ask anybody to work safely any longer; safety is required of every man. It is a rule of the company and it is to be obeyed as all other rules of the company are to be obeyed. Let your treatment of safety offenders be even more severe than of offenders against quality or cost."

CHAIRMAN WINANS: Thank you, Mr. Colville; that is quite a story. I don't know how many of you have ever received a letter like that. I never did. I don't know what impression it would make on me at this moment if I did receive it. I imagine that has raised some questions in the minds of several of you. *En-... ..*

We have time for discussion. If you wish to discuss either phase of the matter, you may do so.

G. R. G. FISHER (Illinois Manufacturers' Association, Chicago): This letter is to me a surprise, and I am sure it is to many here, and yet in another sense I am not surprised. For ten years I have been going through factories and mills and shops talking on accident prevention and giving them lessons in first aid, and during the last four and a half years, directly under the auspices of the Illinois Manufacturers' Association and in conjunction with the Illinois Manufacturers' Mutual Casualty Division. I have this to report to you, and it will lend emphasis, if emphasis can be lent, to this letter. Wherever we get the cooperation of the executive body we get results. In other words, accidents come down following our appeals to the man as a matter of personal safety, and everything else, where we have the cooperation of the heads of departments and they interest themselves in helping us to put this thing over. But where we do not get that, we do not get results.

I tell people I get a better hearing from the preacher, and I do. Why? Because the man responds to what we say. He knows it is for his good, and the results are wonderful. I am a preacher, I know.

A. AMRAN (Hamlin & Co.): Perhaps I did not follow as closely as I should the letter this gentleman read. I should like to assure myself that I understood him correctly. Did the vice-president in charge of operations of this company express himself to the effect that he was not in favor of a safety organization in his plants?

I believe it said to eliminate all safety organization matters except the clerical part. It is so out of the ordinary and contrary to all we have heard that I cannot quite grasp it, and I want to know whether I am right or not.

MR. COLVILLE: I expected something of that character. It is true that our plan is to eliminate committees in the plants, committees made up of so many workmen and the foreman, and the joint committees. Instead of that we are placing the same amount of responsibility in the hands of the works manager.

Your safety supervisor can go along and say, "Here, fellows, let's make a committee inspection." Suppose he finds a lot of conditions that are not safe. What can he do? He cannot do anything. He has no power other than the ordinary department head. In this way the vice-president holds each works manager responsible for the safety of his plan, judging by the four things that I mention, the deaths, the number of accidents, the severity and the cost, and, of course, those are the things that count. These works managers at the end of the year have a reckoning day. They are given their quota bonus on the basis of good quality, good cost and good safety, and the thing that this does is take it out of the hands of the committee and place it right where the authority and responsibility are placed. I don't think that we have lost a thing; I think we have gained quite a lot.

Incidentally, we have a safety supervisor who travels from plant to plant, and it is his duty to carry down this same idea. He makes some contact which the vice-president alone could never expect to make.

"Run Your Plant Safely If You Want the Bonus"

E. D. CHAPMAN (R. R. Donnelly & Sons Co., Chicago): Wasn't this new rule put into effect because of the fact that the various plant managers were standing aside and allowing the safety committee to do their work? I should think that if the plant manager was an efficient one he wouldn't allow the responsibility of the accidents to go out of his hands. It would take the plant manager and the safety committee together to cooperate.

MR. COLVILLE: I agree with you, but you know and I know that we are always going to have men who don't take their jobs to heart as much as they should. But I will bet everybody here that we have as efficient works managers as the average, and a little better, maybe. Here is the thing that it does: instead of just saying to you "How run your plant safely"; we say to you as a works manager, "Run your plant safely if you expect to win your bonus at the end of the year"; and that goes right through his pocketbook, because that is what counts with these fellows. We may be humanitarian, but if we can add to it that other point, we have got him.

CHAIRMAN WINANS: You see, our subject is "Securing the Confidence of Operating Heads in Accident Prevention." We are trying to find a way to prevent accidents. It is assumed in the subject that the confidence of the operating heads is necessary. How are you going to get it? Those of us who heard that foreman talk at the Detroit Congress last year, heard him say that as a foreman in the shop he knew that the old slogan "Safety first" was bunk, that when it came up to the top and there was a question between production first or safety first, production came first and safety second. Until that situation was removed, so that the foreman and department heads knew that the manager in charge meant safety first, there was nothing to it.

It is the same proposition as an experience we had in one of our own plants where we have a grinding operation that is very hazardous because of flying chips. We struggled and struggled to get the men to wear their goggles. We continued to have eye accidents. The manager continually talked with the foreman, and the foreman continually talked with the men. One day we lost an eye. The manager said, "That is my fault." He went out into the shop, called the men together, along with the foreman, and said: "Your foreman here has talked with you fellows

and asked you to wear goggles. I have occasionally gone through here and I have seen some of you without them. I have asked you to wear them. From today on nobody is going to be asked to wear goggles in this plant. If you fellows are going to work on these jobs, you are going to wear goggles. I am not going to be responsible as manager of this plant for lost eyes. If you don't want to wear goggles, you will have to get a job somewhere else."

That established confidence all right. That is one way to do it. There is another way to do it. What is the discussion?

C. G. SMITH (N. Y. State Insurance Fund, New York City): I have listened with a great deal of interest to the letter that has just been read. I would be very much surprised if it did not provoke a great deal of discussion. It seems to me that there are a number of things to be noted about the letter. In the first place, it sounds to me like a letter that was dictated but not read. In other words, the vice-president of this company, whoever he may be, got sore about this whole proposition, as I read it from the letter. He dictated a letter out of the fullness of his heart, as evidenced by the many repetitions, and to my mind the poor way in which the letter is constructed. In other words, he hit the ceiling. If I ever dictated a letter like that, I would want to leave it on my desk and reread it before I sent it out, and I would put it through a good deal of editing. I say that because it seems to me the letter was not well considered. The vice-president seems to think that safety is something he can get by ordering it done; and at the same time he orders it done he scraps all the forms of organization which have been set up as a result of long experience for the purposes of producing safety. It is just like ordering the tide not to rise, it seems to me.

It also seems to me to involve the assumption that you can get anything done by firing men who don't do it. That may be all right, but when you fire a man who doesn't do something you have ordered him to do, you have got to get somebody to replace him. How do you know you are not going to get somebody worse than he is? You may get someone who is a lot worse that you have to train. It seems to me the letter represents a distinct step backward in the movement of accident prevention, and it doesn't look constructive at all.

Be Sure You Deserve the Confidence You Ask For

CHAIRMAN WINANS: Mr. Colville very kindly presented this letter because he wanted your opinion as to that method. It is an interesting proposition. Of course, we heard quite a bit about this proposition of securing the confidence of operating heads from Dr. Harry Meyers in the Automotive and Power Press session this morning. He placed the emphasis on whether you deserve the confidence you are trying to get. What are you going to do with it if you get it?

Do you remember that story of Johnny who came home from school with his grade card, not so good? Pa looked it over and said, "Johnny, what is the matter? You are not getting good grades. Don't you know, son, that when George Washington was your age he was the head of his class?"

Johnny looked up and said, "Yes, pop, but when he was your age he was President of the United States."

Let's be sure we deserve the confidence we are trying to get.

E. J. WOLLMAN (Great Lakes Forge Co., Chicago): I think Mr. Arkills' discussion is a good example of elementary safety and Mr. Colville's letter is an example of bad safety.

I notice at the top of this program that the meeting is for junior safety men. I think it is a little out of line here to discuss a letter of that sort. I think it should be presented to a gathering of men who have been in the safety game a good while.

R. S. BONSB (Standard Oil Co. of N. J., New York City): I think it was a good idea to have that letter read. While that might have been polished up a little

bit, yet it came from the fullness of the man's heart and when a man speaks from his heart he usually gets his message across.

We people who have been in safety work a long time know that we never got anywhere until safety ceased to be a matter of welfare and became a production matter. Just as soon as management discovered that the man could not produce in the graveyard or in the hospital, we got somewhere. Therefore, putting it up to the department head, such as he has done, made it a direct part of his job to get results. I think that is a splendid idea. I wish I could get our people to write such a letter. I am happy to say our president has issued a letter in which he says the management, the division heads, the department heads, will be held responsible in the future for serious accidents. I want to say that ever since that letter was sent out, there has been a greater feeling for safety than there ever was in our entire organization throughout the world, because that went all over the world. That letter got results, more results than any of our safety committees ever could have gotten or ever would have gotten, because when you put that up to the man himself, he knows better than anybody else. It is impossible for a safety committee or a safety engineer to go into a plant and tell a man what he can do. I used to think I could do that, but the older I get the more sense I get. I find you cannot do it. But if you can arouse that man's interest and get his confidence, he knows all the different factors and he can do the job better than anybody else if you make him do it.

Occasional Man Failure Is Still to Be Considered

CHAIRMAN WINANS: Mr. Arkills, perhaps you would like to close this discussion.

MR. ARKILLS: I might say just one thing. I believe that this letter is an unbalancing of the complete program, to a certain extent, but it is just the sort of thing that we must have, in a way. I believe that in a full rounded-out program a letter fully as strong as that should go down from the top, and right along that line; but possibly leaving out the curtailment of the safety department. He will only reach a certain percentage of the accidents if he has 100 per cent cooperation through his managers. He still would have the occasional man failure on the job under conditions that the foreman would not be able to reach for a long, long time. The managers and foremen cannot be right there for each identical operation every minute, and some fool blunder will be pulled. If the man himself is thinking on this subject he will overcome it on his own behalf. For that reason, we must carry on all of the branches of our safety work as we are now outlining them. But I do believe that letter is stronger than it should be, possibly, in that one regard.

I carry on practically all of my work through the management, right from the top down, and the foremen have done perhaps 80 or 90 per cent of the accident prevention work in the plants that I have served. We have made splendid records, but it has been the foremen who have got the credit for them. We have foremen's safety meetings. Monthly we have a foremen's safety meeting at the steel plant, and about every six weeks we have a foremen's safety meeting on the waterfront. Those meetings on the waterfront are attended by 60 to 110. At those meetings we try to get over lessons on the things that are of most importance to us, the things that are actually causing the greatest number of accidents. That is the one thing that we must stress in all of our work, to find out first of all what is causing the accidents, and then to prevent them.

MR. COLVILLE: I just want to answer Mr. Smith a little in defense of this thing. There are three points I want to bring up. One is that we expected these different ideas; but if you will notice one point, it says, "The keynote of this plan is efficiency." We go on the idea that to be efficient you have got to be safe. Another point is that you are going to have a safety supervisor there who will perform the operations of the committee.

The third point is that one of our operating heads has mentioned the fact that he has seen the production manager many times with his cost book but never with his safety book. That may give you some idea of how seriously this thing is being taken up.

Mr. Smith, this letter was not intended to be a literary masterpiece, so I think we must plead for indulgence in that regard. We have done the selling; now we are getting a little stiffer with our requirements of our management.

Incidentally, this is the United States Gypsum Company which has taken this action. I thought you might be interested to know it, and we have been very glad to have your thoughts on it.

CHAIRMAN WINANS: May I say that the purpose of these meetings, as I said at the outset, is to bring out different ideas. It wasn't the original intention simply to put over one idea. We want to be clear on these ideas here. Perhaps Mr. Colville next year will present a different letter.

We have the privilege now of witnessing a playlet which is to be presented by five employees of The Palmolive Company, Milwaukee, Wisconsin. This playlet was presented first before the safety engineers in Milwaukee, and then later at the foremen's safety school there. The subject of the playlet is "Responsible." When I looked at the program and saw that word, it made me think of that story of the young college fellow who started out to look for his first job. He had not had any experience, so he went over to a large industrial concern, went into the waiting room, looked around, and nobody paid any attention to him. He sat down and waited, waited, waited. Finally an office boy came over and sat down at a desk and didn't pay any attention to him at all. He waited a little longer, became quite impatient, straightened up, decided certainly his college education should be worth something to him, went up to the office boy and said, "Young man, who is the responsible party around here?"

The boy looked up, "I don't know who is responsible, but if there is anything wrong it's damned certain I'll get blamed for it."

Responsible

Given by Employees of The Palmolive Company, Milwaukee, Wis.

CAST OF CHARACTERS

Max	.....	The Injured Man
Gus	.....	His Foreman
Bob	.....	Committee Man
Paul	.....	Committee Man
Matt	.....	Chairman of Committee

SYNOPSIS

A press operator has suffered the loss of a part of two fingers on his right hand. The safety committee is meeting with him and his foreman to determine the responsibility for the accident.

ACT I

Committee Room: Table in center of room with five chairs properly arranged. Papers on table to represent reports. Hat rack near door.

Enter injured man dressed in street attire. The index and middle fingers of his right hand are properly bandaged. After hanging his hat on rack he seats himself at left hand end of table.

Enter two committee men in conversation with each other. Both of these characters are presumably in supervisory capacities and dressed as such.

- BOB: (*Seeing Max*)—Why, here is Max now! (*Walks up to Max who has stood up and pats him on the shoulder*). How are you?
- MAX: As good as can be expected.
- PAUL: (*Having hung his cap or hat on rack*)—Hello, Max! I was surprised to hear of an old-timer like you having a serious accident. How is the hand?
- MAX: (*Again seating himself*)—These two fingers are partly gone.
- PAUL: (*Seating himself in chair next to Max*)—Gee! That's not so good.
- BOB: (*Having seated himself in chair to the right of center of table*)—And it's your right hand at that. A machine certainly has no regard for human flesh and bone.
- PAUL: How much time will you lose?
- MAX: I have been off two weeks now and the doctor says I will be able to return in about four weeks. (*Both Bob and Paul manifest their sympathy by shaking of head*).
- BOB: (*Taking cigar from pocket*)—Have a smoke, Max?
- MAX: Yes. Thanks.
- PAUL: (*Helping Max Light the cigar*)—Gus and Matt ought to be here pretty soon.
- BOB: Here they are now.
(*Enter Gus and Matt. Gus is attired in a shop coat and wears a cap. Matt, in shirt sleeves, is carrying papers*).
- GUS: (*Going up to Max who remains seated*)—How's the hand?
(*Max holds up the injured hand and shakes his head negatively*).
- GUS: Not so good, eh? (*Shaking head while walking to chair opposite Max*)
How long before you'll be back with me?
- MAX: Oh! About four weeks.
(*Gus seats himself and taking off his cap indifferently places it on the table and lights a cigarette. Other characters may smoke at their convenience.*)
- MATT: (*Being seated at center of table*)—Well boys, you have all heard about and are no doubt interested in the serious crippling accident which so unfortunately happened to our fellow worker, Max. Following our usual procedure we have called this special meeting this morning to ascertain the facts in the case and determine, if possible, the responsibility for the accident.
- The report of this accident shows that on September 6, while operating a press, Max suffered a crushing of the index and middle fingers of his right hand, necessitating the amputation of the first joint of both these members. This certainly is a lamentable accident due to the fact that we have had no mishap of such a serious nature for a long time. I am sure that we all appreciate what this misfortune means to you, Max, for you have surely had some hard luck.
- MAX: Yes, it was too bad. I lost two important members of my right hand.
- MATT: You no doubt realize and appreciate what this loss is going to mean to you in your future life.
- MAX: There is no one that realizes that better than I do. Since the accident about two weeks ago I have had plenty of time to think about this and I can inform you folks that it will mean much to me. Those two fingers played a very important part in my private life as I have always been considered somewhat of a penman and also a musician.
- PAUL: That sure is too bad.
- MATT: Tell us Max, in your own way, how this accident really happened.
- MAX: You all know that I had been operating No. 8 press for the past five years. Due to the speed of our machines and the constant use, the dies sometimes get out of adjustment. This condition forms a shaving which accumulates

to a certain extent and if not removed will cause an imperfect impression on the bar. This accumulation was giving me a lot of trouble and I tried to flick the shaving away with my finger. This is the result. (*Hold: up fingers.*) (*Committee men understandingly look at each other.*)

MATT: Did you attempt to do that flicking while the machine was in motion?

MAX: (*Rather downcast*) Yes.

MATT: Tell us whether or not you think you did right in trying to flick the shaving away with your finger.

MAX: I must admit that I did wrong in view of safety practices.

MATT: Since by your own admission, Max, you have apparently disregarded one of the fundamental teachings of our safe practices can you give us any procedure by which this accident could have been prevented?

MAX: You folks all know how fast our machines operate and that to prevent the accident would mean a shutdown. This shutdown in order to adjust the die would mean a loss in my production and would show up on my piece work earnings. My foreman, who is also interested in production knew, of the condition of my machine. (*Committee men register surprised look.*)

BOB: Well Mr. Chairman, I think this puts an entirely different complexion on this whole case. I think . . .

MATT: Wait a minute (*Retarding Bob's sentence*). Gus, you heard what Max had to say in regard to this unfortunate accident in your department. Is his statement right?

GUS: (*Taken off guard*) I guess it is but let me tell . . .

MATT: Now just a minute, Gus. You knew of the condition of this particular machine on this day previous to the accident?

GUS: Yes. I passed this machine shortly before the accident occurred and as is customary I picked up a bar and noticed the imperfect impression. I immediately knew what caused this.

MATT: What procedure would safety measures prescribe that you should follow in a case of this kind?

GUS: Well, just what Max hinted, namely, a shutdown in order to adjust the die.

MATT: I see. Gus, please tell us what you know about this accident.

GUS: All right. I'll tell you just what happened before the accident as far as I am concerned. As I have just remarked, I noticed the imperfection on the bar and called Max's attention to this fact. Max indicated that he knew of this condition. I then continued on my observation of the other machines in the department. I had just arrived at No. 1 press when I heard the commotion resulting from Max's accident.

MATT: Observing the condition of the bar, I'll say you had two procedures which you could follow: Either to do as you did, namely, pass up the condition, or to shut down the machine for adjustment.

GUS: (*Hesitatingly*) Yes.

MATT: You certainly will admit now which procedure you should have followed consistent with safe practice.

GUS: (*Sullenly*) Yes—Shut down the machine.

MATT: (*Forcibly*) Why didn't you do it?

GUS: (*Heatedly*) You folks all know that practically every operation in my department is on a piece work basis. We in industry all know that the primary object of piece work is increased production per man. Our quotas are assigned on the basis of maximum production and therefore the foreman is vitally interested to produce his assignment. Each individual operator is interested only for himself. Therefore we are both primarily concerned about keeping the machines going, going, going, all the time.

- MATT: (*Rising heatedly*) Gus, do you mean to insinuate to this committee that speed in production is indirectly to blame for this accident?
- GUS: (*Forcibly*) Yes, I do, if you want to put it that way.
- MATT: Gus, look at that unfortunate man, one of your own employees. This man will be back in your department as soon as he is able to work and will be with you probably for many years, compelling you every day in your contact with him to look upon his condition. Don't you really feel sorry that this accident occurred?
- GUS: There isn't anybody in the entire plant that feels more badly about this accident than I do.
- BOB: Mr. Chairman, will you permit me to say a few words?
- MATT: Certainly, Bob, go ahead.
- BOB: Gus, in the course of your management of that department did it ever occur to you that the most valuable material in your department is your own men? From what I have heard during the course of discussion it would appear to me that you are stressing too strongly the point of material property and production and that you do not sufficiently consider the fact that every man and the welfare of every man under you is dependent directly upon you for protection while at work. If you had considered this point more seriously there is no question in my mind that this accident could have been avoided by an excusable shutdown.
- MATT: (*Having again seated himself during Bob's discourse*) Yes, speaking of shutdown, isn't every shutdown in your department covered by a report?
- GUS: Yes.
- MATT: (*Turning to other committee man*) Paul, have you any comments to make on what you have heard so far?
- PAUL: Yes. Gus, you have attended the Foremen's Safety School?
- GUS: (*Bored*) Yes, I have been going to the Safety School at the Auditorium for the past three or four years.
- PAUL: One of the principal talks during the course concerns itself about the fact that safe practices can be made consistent with maximum production. Did discussion along this line never interest you? Why did you go?
- GUS: Oh, I've been going to the darn meetings, as I just said, for a couple of years, but went there mostly to get five punches on my ticket so I could attend the banquet free of charge at the end of the course.
- PAUL: (*Shaking head*) There is no question but that he has a lot to learn about safety. (*Chairman and Bob nod admittingly*).
- MATT: (*Turning to Max*) You have been severely punished by this accident for your disregard of safe practices. You have suffered a great loss which we cannot replace, but nevertheless, this discussion is mostly for your benefit and also to prevent by all means a recurrence of this or any other accident. One of the principal functions of this committee is to make our organization the safest place in which to work. You no doubt admit by this time that you took an awful chance and proved to be the loser. I'll wager that you have thought about that fact repeatedly since the accident. We consider you right now one of our best arguments for the observance of safe practices, always regretting that your crippling was necessary to do so. You may go now and when you come back to work carry these thoughts to your fellow employees.
- MAX: (*Rising*) I appreciate your attitude toward me. (*Exit*).
- MATT: (*Turning to Bob*) Have you any further comments to make?
- BOB: (*Shakes head negatively*).
- MATT: (*Turning to Paul*) How about you Paul?
- PAUL: No.

MATT: Now Gus, without going further into this case it appears that in running your department you take a peculiar attitude toward safety. Off hand, I'd say that you are responsible for this lamentable accident. I base this statement on several reasons. This particular machine was producing goods of inferior quality. This is absolutely inconsistent with the policy of our company and any other company. If nothing else, that was sufficient reason for shutting down that machine to make the adjustment.

You maintain and stress the factor of speed. I will venture to say that the necessary shut down in this case would have meant about thirty minutes. Isn't that right?

GUS: (*Shakes head*)—Yes.

MATT: Presuming that you could not pick up that lost production in the course of a day, or week, or maybe the entire month, you could nevertheless protect yourself, as we have pointed out to you and as you have admitted, by means of a shutdown report. In fact, I would say that this is the principal reason for having this form in effect. Then again, you have expressed an indifference toward the Foremen's Safety School. This has been an annual affair for seven years in this city and has been maintained at no small expense by local industries. The mutual understanding which you and Max seemed to have had on the quality of the product would indicate that this sentiment prevails throughout your entire department.

I am almost willing to discount these various points in your disfavor if you will just let me impress this fact on your mind: In the future Max will always be a living example of your superficial interest in your fellow worker. Don't you realize that in this day and age you are your "Brother's Keeper" in industry? In my mind you are liable for this preventable accident. Have you anything to say for yourself?

GUS: (*Dejectedly*) Gentlemen, I am now convinced that I have been wrong in my attitude. There is no question but that I was at fault but I have learned my lesson and I can promise that in the future I will cooperate with you to make our plant the safest.

MATT: We appreciate your change of attitude, Gus, but nevertheless we will take all the facts under advisement and in a few days we will inform you as to our decision relative to imposing a justifiable penalty.

TO COMMITTEE MEN: That will be all for this morning boys, and I wish to thank you for the interest and sentiment expressed toward this case.

(CURTAIN)

CHAIRMAN WINANS: We thank you very much, gentlemen, for telling us that story.

Our next subject should be "First Aid Training and Its Relation to the Prevention of Accidents." For many years Mr. Titus was connected with the telephone company in the installation work. All of us know the remarkable work along the lines of first aid training that has been done in that wonderful organization. It is no wonder that he believes as he will tell you he does.

First Aid Training and Its Relation to the Prevention of Accidents

W. A. Titus, Western Electric Company, Hawthorne Works, Chicago, Ill.

I take it that the acceptance of my subject constitutes a challenge to me to prove that training and first aid really mean something in accident prevention.

I want to make this thing clear to you. We have at the Hawthorne Works a very adequate hospital. We have a large staff of physicians and nurses. We do not encourage or permit lay first aid on the premises. That means literally this: that first aid training as we do it is not for the purpose of preparing our people to handle accident emergencies within the plant at all. It is solely for educational value in the safety picture. That makes the problem just a little harder to prove, I think.

I imagine that in most industrial plants first aid training is being given where there is some idea that lay first aid work will be done in handling the emergencies of the industry. I may say that I have yet to hear of an industry in which first aid training is being done (except our own) where that condition of not permitting lay first aid in the plant prevails. If there are others represented here, I should be interested to hear from them.

Perhaps in order to understand clearly what we are getting out of first aid training and in order that you may take away any values there may be in our methods of approach, I should tell you briefly how we carry on our training program. I hope to get over to you this one idea in that explanation—that the organization and administration of a first aid training plan, either on a large or a small scale, is both simple and economical. I imagine that many people who would like to go in for this thing hesitate to do so because they are afraid either of the course or of the problem of finding adequate features.

Organizing a Program Among 28,000 Employees

We have been doing first aid training in the Bell System, of which the Western Electric Company is a part, for a number of years now, but by and large, prior to the time that we started it at Hawthorne in June, 1926, I don't think any training had been done strictly for educational purposes.

In the operating companies they have problems in which lay first aid plays an important part; that is the telephone companies proper, because their organizations, particularly the exposed personnel, work in the field pretty largely, and and many times out of contact with adequate surgical or medical facilities. They need that sort of thing. We are so equipped that we don't. As least we haven't discovered the need for it yet.

A year ago last June I was told to go ahead and organize the program. Up there at Hawthorne at that time we had some 28,000 people. The project was to teach those 28,000 people what they ought to know about first aid. I submit that that is a mass production problem, and we tackled it on a mass production basis.

The first thing we did was to select 300 supervisors. You will get presently the reason for that. We selected 300 supervisors on the theory that their supervising position implied that they already knew enough about handling men to put over a simple idea, to maintain a reasonable degree of classroom discipline to command a proper hearing.

We divided those 300 men into 15 groups of 20 men each. We assigned each of those groups to one of our staff doctors. That may suggest right away to you: "My Lord! If they have got 15 staff doctors out there, what kind of a place are they running? They must be killing them right and left."

Let me explain so you don't get a wrong impression that there is only one man on surgery; the others are health men. We used those 15 doctors as instructors. We got those fellows together with the American Red Cross for special technique in first aid. We turned them out in the summer of 1926. We had 201 men that summer who on the basis of their instruction, we were convinced, could go ahead and teach a class. Naturally these men had never

taught before, at least they didn't know they were teaching. Some of them were pretty much scared at the prospect of getting up on their hindlegs and talking before a group of people. They bucked under the saddle like unbroken colts. They brought me all sorts of stories why they ought to be excused from this teaching problem. So I worked a mean trick on them. I told each class that one week subsequent to that date we were going to have a first aid contest and that it was up to that class to produce a five-man team, that I expected at a certain time and place to find 15 five-men teams lined up for a contest.

Then I got hold of Dr. Gentles, the head of the first aid division of the American Red Cross in Chicago, and persuaded him to come and act as referee. He was good enough to get Dr. Orr, who is head of the medical organization of the state militia, as a judge, and three or four other doctors. We added a few from our hospital as judges.

We brought those instructors together in our main rescue building, gave them a little feed, let some of our visitors talk to them, and then wound up with a good peppy talk from one of our works officials who has a reputation for just that sort of thing. When he asked me what to say, all I said was, "I want these boys to get clearly that this thing they are getting ready to do is something that the management believes in and is squarely behind." He did the job to the queen's taste.

A Remarkable Demonstration by New Men

Considering the fact that for the week previous a very considerable percentage of those team men had had wives sick in bed, children on the verge of death, and grandmothers to be buried, and all the stuff that goes with baseball games, as you well know, I was a little bit surprised that every single one of them showed up. When we got up from the table, they went out on the floor and went after those first aid problems, presented under Red Cross conditions, like terriers after rats. It was the most remarkable thing I ever saw. Our visiting doctors commented upon it. The poorest team score on that floor, under those conditions (and remember they had had no time to organize the teams, they were simply demonstrating before a select audience how much they had learned), was 78, which incidentally gave me a chance through that medium to prove to the management that we had some fellows who knew their first aid, and that we had not wasted their good money in that summer training.

Their audience that night was made up of staff people pretty generally. It was limited to about 200 folks, because I didn't want them worried by having a big wild audience to work in front of the first time.

I got them together the afternoon after that contest just to see what their reaction was. They were all enthused and warmed up. I said to them, "Fellows, I wonder if one thing struck you as it struck me; that is, that you individually learned more first aid in that brief hour of contest than you had learned in 15 hours of intensive instruction through the summer." And they just came right up like that: "You're darned tootin', we did."

"That being the case, maybe the way to teach this first aid thing is to make it a succession of first aid problems."

"We guess you're right."

We threw away all the teaching outlines that we had used on the teachers' training course, and we wrote a succession of ten practical first aid problems covering the field of the thing we were trying to put over, pretty largely with their own suggestions; practical problems, not industrial problems, but problems of the highway and the home, beginning with the simple and ending with the complex.

The class was given the problem and the specific text-book references through which they could read up the solution. They came into the class and a certain number of them were invited to demonstrate the correct procedure. They tried their hand. The rest of the class sat back and criticized. If Bill Jones didn't like the way it was done, Bill Jones was invited to do it better. Every lesson was a practical first aid contest.

We enroll our classes entirely on a voluntary basis. We simply get out the necessary publicity announcing that at such a date we will start first aid training. We did start in September of last year. Simple little enrollment forms were passed out to all the supervisors in the plant. Anyone who wanted one filled it out and turned it in.

We organized the class on a first-come, first-served basis. Each branch, on the basis of its total personnel, was allotted a quota of a maximum, based on what we thought we could handle with our available teaching staff and our classroom facilities. We organized a maximum of 85 classes, assigning 20 men to a class. On that basis we put over three semesters before warm weather started this year. We had graduated, under Red Cross standard requirements for examination, 3,001 men under that plan up to that time. We now have in our fourth semester of training a little better than 1,600 men at work.

There are some tricks in the handling of the examination on a mass production basis that may be of interest to you, and while they perhaps mean nothing in my subject. I am going to tell you how it is worked.

Two Hundred Questions on First Aid

The question came up early in the game whether, examining so many people on so many different points, it was going to be practically impossible to avoid an exchange of examination information between men who had been examined and men who were to be examined. We prepared 200 questions covering the whole field, 25 series of eight questions, balanced on a card, to cover the different departments of first aid training. Then we put that up in a little booklet. The cards were numbered and reproduced in this booklet form for convenience. We handed it out like this: "Here it is. This is what you fellows are going to be asked when you are examined."

"Oh, is *that* going to be it? Oh, that's fine." Then, "Holy Moses, which one am I going to be asked?"

"Lord knows, that's up to you."

They come into the examination room, the examiner sits down behind the desk, shuffles the cards, spreads them out and says, "Come on John, pick yours." The only answer that John has got is that he has to know the answer to 200 questions before he starts. If he knows his 200 he knows his first aid.

It is just a mass production stunt but it is perfectly applicable on a large or small basis. It allows you to do the job quickly and uniformly. It relieves you of the situation which might develop where Bill says, "I fell down because that particular instructor had it in for me anyway and asked me a stump question." The instructor has no option in the matter. John picks his own block of questions.

Before we go any further into the attempt to prove this thing, maybe the question—Why first aid training at all?—should be discussed. I ask that question because we have to break down the resistance of hard-boiled individuals who can't see the sense of taking it.

Primarily, as I see it, this question of first aid training is something that we owe to ourselves, our families, to society at large.

Picture this simple situation, if you please. (I hate to drag in the gruesome, but it helps to make the picture.) You are driving alone on a highway. You run off the road and your car turns over. You wind up in the ditch with a simple fracture of the leg and a splinter of glass through an artery in your upper arm. You have no right to assume that the next car along that road will have a doctor in it. Stop and consider what probably will happen to you. The next outfit along the road may be one or two men; they have got red blood enough in them so that they stop and try to help you. They get out, drag you out of the ditch, pull you into the rear end of the car, and go hunting for a hospital. When you arrive there, what does the surgeon on the job at the hospital find? A shell bled white, a hopeless case. He can't do anything.

Suppose the hospital was around the corner and you got there quick enough so he could plug the hole and save you partly, at least. He commences to strip the clothing away, and what does he find in the leg? A simple fracture compounded, a broken bone piercing the flesh, churning around in an infected wound. It means weeks in bed, with a possible amputation, out of a simple situation that any intelligent man could be taught to handle in one of these elementary first aid courses. Any intelligent man can learn the blood control in one minute.

The Rising Flood of Accident Is Appalling

Let me submit, if you don't like the idea that this is the kind of treatment you are going to get, what are you going to do about it? Have you got any right to expect any better treatment in an emergency like that than you are prepared to give yourself? I say, no. That argument usually gets them.

You can duplicate that type of situation to the queen's taste. Picture it for yourself in a thousand and one different ways. It is always the same darned issue. You have no right to expect any more expert treatment in the emergency than you are prepared to give yourself.

I am a nut on the subject, I admit, but it seems to me that the gradual rise in accidents on the highway and in the home is appalling. With all we have done to educate people both with respect to the home accident and the shop accident, there are 3.22 ways of getting hurt outside the plant to every one in the plant, on the basis of our own figures; and our plant is one in which we have got every hazard that anybody in this room can think of, I'll gamble.

I want to make this prediction, that that rising tide is going to force a popular reaction on this question of first aid that will result in a short time in a situation where no man or woman would confess ignorance of first aid principles any quicker than they would confess illiteracy. That is my guess.

I will tell you what it costs us to do this thing we have been talking about. . . . By the way, this first aid thing is part of the problem of interesting folks. The stationery to be considered—the publicity to be considered, first aid supplies, special furniture for equipping classrooms, service to classrooms, preparation of supplementary text material, teaching outlines, teachers' codes—need not worry you the least bit, because the job has been done and well done. You can have anything we have got, so far as we are concerned. Other people have got good samples of the same thing available if anybody wants to try it.

It costs us \$2.50 a man to put that program over. I hope I can prove to you that it is worth it.

Let's get right down to the challenge of the subject. What does this training thing mean in accident prevention? It means this: I don't have to argue with you over the question of whether or not the keynote of supervision is the ability to teach. The whole success of the supervisor depends upon his ability to

teach. This question of keeping folks safe is not the mysterious thing that I thought it was; it is a matter of finding a sound, whole, intelligent man teaching in his trade and then supervising them to see that they follow his teaching. That is all there is to it. Who in the place can do that teaching job but the foreman? He is the technician, the man who knows the job. Who can supervise it but the foreman? It is when staff organizations attempt to get in between that man and his supervisor that situations arise which produce such letters as you heard here. Our attitude with respect to this staff interference idea is: Don't do your personnel job in such a way that you get between the man and his boss. When you break that line you are headed for trouble.

We have taught our supervisors, at least 300 of them by this process of training, to teach some one thing that is closely allied with safety. We have demonstrated to the man in practice that he teach that thing. He has learned a confidence and a technique with respect to teaching. That is one gain, perhaps intangible, but I think it is there, certainly.

A Safety Consciousness Alive to Carelessness

We have taught the men in the class through the presentation of an infinite variety of practical situations to see eventualities. In other words, we have created mental image after mental image after mental image. Those of you who are psychologically inclined will get my drift in that connection, a safety consciousness by the reiteration of situations which are the result of carelessness and indifference.

The guardable hazard is now down to two per cent or less in our plant. Any further improvement we make must be made through the education of the other 98 per cent.

We teach our first aid with due regard for anatomy. We don't give them rules of thumb which they can forget in six months. We teach them why these things are done. We are teaching them to understand that this body is an intricate machine—not an Ingersoll watch that ticks and keeps time, to be sure—but a wonderful mechanism with jeweled bearings, a thing to be cherished and cared for, a thing which when it gets out of whack should be taken to the expert watchmaker—the doctor—and not tinkered with individually; which reaches back to this question of personal first aid in the face of surgical facilities.

In most things that we do in personnel work we are dealing with a lot of intangibles; they are pretty hard to measure. I have got one little unit here which seems to be a measurement, although it may have to be limited. In the year since we started training these men, the 3,001 men I have named who completed training have yielded four accidents. That is at the rate of 1.3 accidents per 1,000. The remaining personnel have yielded a rate of 5.74 per 1,000.

I will submit right here that in all probability these 3,000—the first to rise when the call came—represent perhaps a superior level of intelligence in the organization. Maybe it is true that those fellows, left to themselves, would not have yielded a 5.74 ratio; I don't know.

On our basis of enrollment, where definite quotas are allowed by branches and departments, we have attempted to provide a homogeneous enrollment with representation from all levels of the organization, all types; and I will submit this one thing, that the chance taker, the fellow you worry the most about, as a rule, is no dumbbell. The devil-may-care type is rarely a dumbbell.

I will just close by saying I am happy to state that my folks tell me that we have cracked all previous records this month by way of celebrating the Safety Congress. We are turning in the month's accidents with a record 26 per cent better than any month in the previous history of the company at Hawthorne.

CHAIRMAN WINANS: Thank you, Mr. Titus. There is one question that I should like to ask Mr. Titus to discuss for a moment. Perhaps it is in the mind of one of you at least. How, in your opinion, Mr. Titus, can this first aid training principle be applied in a small plant, say, of 250 people? I take it from your statement that you feel the principles are possible of application practically anywhere. Can you suggest to those of us who do have such small plants how we might do it economically?

MR. TITUS: It seems to me it is only a question of pyramiding, any way you work it. If you want to start in a small way, with one man, go get a doctor from the Red Cross. They have got plenty of them and they will be glad to serve you. They will put over a whole course for you under their own supervision for \$60. That gives you not only a teacher at the start, but a chance to train 20 teachers, or 25 teachers, as the case may be, right off the bat. Select the best of your available timber as you see it; put them in a class under a Red Cross instructor. In ten weeks' time you have got available as many as that selected group will yield. It may be all of them. From that you can expand as fast as you please. Twenty will yield you 400 enrollments, possibly, right off the bat.

There is nothing at all difficult about it. The Red Cross has worked the thing down now to a point where it works splendidly.

Talking the Conservation of Life and Limb

MR. CHAPMAN (R. R. Donnelley & Sons, Chicago): I want to ask if the training was done on the company's time or on the employees' time.

MR. TITUS: That is the beautiful thing about it. Even the training of the teachers has been done on their own time. Remember this: when we talk about safety to our men, we talk about the conservation of life and limb as a social obligation that we all carry. The circumstance of association with an industry is only an accident. The safety of the individual is something that belongs to me as a man and not as a supervisor, and I am going to handle that job, no matter what it costs me in personal effort and personal time. That is the way these fellows are going at the thing.

After all, this contribution is a social contribution, it is not an industrial contribution. They don't use one hour of that training time within our plant.

CHAIRMAN WINANS: What time of day is it done? In the evening?

MR. TITUS: Immediately after quitting time for an hour and a half. Of course, we have all our people within one fence. A large proportion of them live within two miles of us. That makes it relatively simple from that standpoint. That arrangement, of course, is capable of infinite modification.

H. J. SPOERER (Youngstown Sheet & Tube Co., Evanston, Ill.): What are the working hours?

MR. TITUS: Seven-thirty to five sharp; eight-thirty to five-fifteen, office. We make no differentiation between shop and office people in these classes. They all start together.

IRA V. KEPNER (Pennsylvania Salt Mfg. Co., Philadelphia): I should like to ask Mr. Titus a few questions with reference to why he will not permit first aid inside the plant.

MR. TITUS: What is to be gained, with a first-class hospital, expert surgeons, nurses and good transportation?

MR. KEPNER: What size is your plant? Is it all confined in one large building?

MR. TITUS: Two hundred acres, about 240 buildings.

MR. KEPNER: The Pennsylvania Salt Company plant at Philadelphia is probably that size. We have a great deal of outside work which comes to the plant. Just to illustrate what we do in case of a serious accident: One of our barge captains,

while changing the position of his barge, became foul of one of the towlines and it just snapped off his leg below the knee. If it had been done by a hatchet it could not have been cut off more smoothly. One of the railroad men just inside heard him give a little yell and rushed down there. He was a first aid man. He had nothing about him at all except his belt, which he took off and used for a tourniquet. The man was about six minutes from the hospital, but that first aid that he received there saved his life; there is no question about that.

MR. TITUS: Of course, it is fair to qualify my statement somewhat in this way. It does not make any difference how many prohibitions you put on the giving of first aid in emergency, if there is a red-blooded man on the job first aid of some sort will be given, trained or untrained. What we are trying to do, primarily, is to avoid the big hazard of infection. We don't want people under the encouragement of first aid training to try to take care of themselves and stay away from the hospital. The hospital is perhaps some distance from the average man's work. If he can get away with a dab of iodine and a bit of rag on his own initiative, we don't get the case. We are not satisfied always that that is the best treatment. Certainly the puncture wound never should be allowed to go on that basis. We think it is better to establish the prohibition, accepting the inevitable with respect to the outstanding emergencies. Thank the Lord they are darned rare with us.

CHAIRMAN WINANS: I think we had better stick to our subject, which is not how to administer first aid, but what the value of first aid training is in accident prevention.

The Psychology in First Aid Training

Mr. Titus, will you tell us just why you think that first aid training makes a man safer? What is the underlying psychology? Why is it? You believe it.

MR. TITUS: I tried to make that point in the statement that the deliberate reiteration of pictures of eventualities is the way it is done; and, after all, we are only applying the psychology of the safety poster and the safety film when we do that. We are trying to build a picture by reiteration.

Suppose it were possible for you to assemble all your whole and sound employees and parade them along a platform, a la fashion show, and the same with all your maimed employees, and you pulled that regularly once a week. Do you suppose it would have its effect? We don't want to do that. That is gruesome. That is an offensive way of doing it.

But you say to a man in the class, "All right, we want a problem to work with. You think up one for us." He spreads one out for us, something he read about, something he heard about, something that happened to a friend of his. Everybody hears about that problem. We try to treat it. There is another one and another, ad infinitum. They are all piling up a brain picture of an eventuality behind carelessness.

MR. ARKILLS: I should like to ask Mr. Titus if in his course he mentions that these are the result of carelessness and tries to put over that thought while they are being trained.

MR. TITUS: My answer is that each problem is fully dramatized.

A. C. WALL (Larkin Co., St. Louis): May I ask Mr. Titus if he can read some of the questions that are asked?

MR. TITUS: At random we will pick the question asked by the man who picked Card No 11. I just cut it out of the deck.

"While driving alone in the country you run down a cow on the road. In the collision you are pitched through the windshield and receive cuts on the arms and shoulders, all bleeding dark blood slowly. It is ten miles to town and about a half mile to the nearest farmhouse. Describe your action."

"Willy is bitten on the left lower leg by a stray dog. Wound is lacerated and

bleeding dark blood freely. His mother has fainted away on the kitchen floor. How would you handle the case?"

"While the family is vacationing at the summer cottage Johnny falls out of the tree and receives a compound fracture of the right thigh bone, just above the knee, with a severe sprain of the left wrist. There is considerable bleeding of dark, red blood on the leg. In order to get a doctor you have to drive 13 miles. Describe how you would handle the case."

"You are alone in a car on a side road and pass a farmer with a team of young horses. The horses run away, tipping over the wagon. The farmer suffers severe sprain to the right ankle and dislocation of the hip. How would you proceed in rendering first aid?"

CHAIRMAN TITUS: Do these relate to plant accidents?

MR. TITUS: No, they are all outside accidents. They may happen to any of us under average living conditions.

I will be glad to send you this booklet which details all the examination questions if you will write to W. A. Titus, Hawthorne Works, Western Electric Co., Chicago.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Public Speaking Class

Tuesday, September 27, 1927

C. D. HARDY, Lecturer

Professor, School of Speech, Northwestern University, Evanston, Ill.

The first session of the Public Speaking Class at the Sixteenth Annual Safety Congress was called to order at nine-forty o'clock by Mr. Julien H. Harvey, director, Territorial Councils, National Safety Council, Chicago, Illinois.

Mr. HARVEY: This series of sessions, ladies and gentlemen, is something of an experiment on the part of the National Safety Council. We feel that every man and woman interested in the safety movement is called on, more or less frequently, to deliver safety talks, and we believe that a good many are not just as well satisfied with their efforts as they would like to be. We all haven't the opportunity of attending schools of oratory.

We felt, therefore, if we could bring to you a series of lectures on this subject, giving you some of the fundamental principles, it might be extremely helpful to you in your future work. If we are going to make these safety talks, we want to make them just as effective as possible. I said it was an experiment, but judging from the attendance here this morning I don't believe it was much of an experiment. I feel confident that tomorrow morning we are going to have to have a bigger hall for these meetings because you are going to inform your friends and are going to bring them back with you to the second and third lectures.

I don't want to take any more of the time of the speaker in introducing him, except simply to say that the gentleman who will handle these three lectures is Professor C. D. Hardy of the School of Speech of Northwestern University, who will now take the floor and tell you just how to do it.

Some Guiding Principles for the Speaker

When I was first asked if I could come down here to make some suggestions by way of discussion on general effective oral discussion, I was considerably confused as to what type of people I should meet, how many I should have here, and just what I ought to say. And now that I am here and find, not a class, but an audience, I am even more confused; I am even nonplused as to what I ought to say and just how I ought to say it. I am a bit in "statu quo." I don't mean by that term "in statu quo" what your lawyers mean when you go to seek their advice and they use that legal term.

I have in mind a bit of a story that my father, who was Yankee-born, up in Maine, used to delight to tell. It was about a group of old Mexican war veterans who lived up in Maine, in Aroostook County, who were too old to go to the Civil War but were

nevertheless very patriotic. It was their custom to gather around a stove in a little old country store up in Aroostook County to hear the news from the front. On this particular morning—it was the sixth day of McClellan's seven days' retreat from Richmond—they gathered around the country store and the reader of the group was reading the morning newspaper, and he read across the top of it, in headlines not quite so large and conspicuous as those that are used by certain modern newspapers but nevertheless rather conspicuous, these words: "The Army of the Potomac is in statu quo."

Where the Army of the Potomac Lay

This old fellow had never studied any Latin. He didn't know exactly what those words meant. He took off his spectacles, wiped them, reread the line, "The Army of the Potomac is in statu quo," and said, "Now, then, gentlemen, them thar words be from the Latin and they mean that the Army of the Potomac is in a hell of a fix."

Now, when I, a mere teacher, am asked to talk to a group of practical business folks about a practical matter such as you frequently confront, I am in a bit of statu quo as to what I ought to say and just how I ought to say it.

In this series of discussions (three of them), I am going to try to point out some of the fundamental principles that govern good public speaking, in this first lecture. Second, I am going to discuss some of the principles that govern the development of the speech by way of the selection and application of material, and in the third address or discussion, if you do not want to dignify it by the name of address, I am going to attempt to say some things about the conduct of the man on the platform, his use of voice, his use of body and the emphasis necessary to make his oral discussion effective.

There are, as it seems to me, good and sufficient reasons why a group of folks like yourselves should be interested in oral discussion. You are called upon very frequently, I am sure, to make talks before audiences of one kind or another. Public speaking has always been an important asset in our American democracy. It is much more important, in my judgment, in these days than it has ever been. Our life is no longer simple. Go back 100 years, and we had but very little industry in this country. We were principally an agricultural people. Our business organizations were simple. The business institution did its work in a limited area. Now that same type of institution does business all over the country and perhaps all over the world. That means a complex organization. You multiply that one complex organization by the number of large businesses that we have in the United States, and you get the tremendously complex social and economic business organization.

Ability to Explain Ourselves Important

Well, the moment you get a complex business and social organization, just that moment you get more difficulty in understanding what is going on and understanding how different individuals run their businesses, and the more difficult you find understanding, the more important it is that we get on the basis where we can explain ourselves one to another; explain our businesses, each to the other. That requires considerable development in the way of expressing ourselves, and, for that reason, if for no other, in my humble judgment, men who have occasions to make addresses may do well frequently to look into and to check themselves up on the best methods of making oral discussions.

I read an interesting book not so very long ago in which the author made this

point: That we were developing in science, in invention and in complex social and economic order much more rapidly than we were developing in our ability to make adjustments and to explain ourselves to one another in this complex social and economic organization. And he made the point that in the next 25 or 50 years we must develop much more rapidly in our capacity to express ourselves to one another than we have in the past, else we would not be able to understand our rapid development in economic and social organization.

I think there is some truth in that principle and, for that reason, I think it is well for us to take some interest now and then in this whole matter of discussion of problems.

Three Things to Avoid

First, I want to point out two or three things that in my judgment effective oral discussion is not. In the first place, it is not dogmatism. In a democracy, the last word on any subject can scarcely be said. Recently I heard a man in my own field make a speech in which he was very dogmatic, speaking as though he had the last word in the case. He made a very poor impression upon his audience because he was speaking to people working in the same field, thinking in the same field with about the same body of facts that he had to deal with, and he spoke as though he knew it all. The impression made upon those to whom he was talking, and with whom he was discussing his subject, was unfavorable. There are two types of men who can perhaps speak dogmatically. The man who is a tyrant, who has arbitrary authority, who can make men come and go as per orders, may speak dogmatically. He may speak as though he had the final word in the case. The other type that may speak dogmatically, is the individual who is recognized by everyone, to whom he is speaking, as an authority, as the one man who knows more about that subject than anyone else.

Now, if you recognize yourself, in speaking to a group of people, as a man who has either the arbitrary power to make your suggestions effective, or who has a position of authority, so that you know that everyone to whom you are talking recognizes you as authority, perhaps you can speak dogmatically. I do not mean to suggest that that is the thing for you to do, but, unless you belong to one or the other of those classes, it seems to me you ought not to speak dogmatically. You ought, on the other hand—I will take this up a moment later—to sit down and reason with people, or stand up before people and reason with them, rather than speak dogmatically to them.

I think it is true—I have had a bit of experience in business, not a whole lot, but a little—that the man who develops great power and influence in business has a temptation, when he speaks to an audience, to speak dogmatically. In his business he has developed the habit, the tendency of speaking with a great deal of positiveness. I suggest that when addressing an audience one ought not to speak with too much of that dogmatic attitude. It suggests rather an unfavorable front, if you will permit me to put it in that way.

The second thing I want to say is that public speaking is not demagoguery. What do I mean by demagoguery? I mean the man who makes purely an emotional appeal. I mean the man who makes facts say a great deal more than those facts inherently will say, or a man who takes facts and disguises them so as to make those facts say what he wants them to say, rather than what the facts in and of themselves would say, if presented and left to tell their own story. I am aware that there are a good many public speakers, even in America here, who do speak in terms of the demagogue, and get away with it for a time, but in the long run your misdemeanors on the public platform are going to find you out. In the long run the truth will come to the front and you will be recognized for exactly what you are, namely, a demagogue.

A third thing that effective public discussion is not is, that it is not the grand manner. What do I mean by the grand manner? I mean the delivery of an oration to people, a show, the spread-eagle, grandiloquent type. Fifty years ago you could do something in this respect that you can't do in this mechanical, this practical, this workaday age. Men on the whole are no longer interested in listening to the man who puts on grand gestures, who throws out his chest, who bellows so that you can hear him an entire block, who builds up his periods to make an emotional appeal, or an appeal to the imagination only.

Public Speaking Has Been Greatly Modernized

We have a great deal of bad teaching even in our schools in that respect. In the past we have taught a great deal the type of oratory that was characterized, or the type of speech that was characterized, by a Daniel Webster or a Henry Clay. There are two things to be said about that, the first is that we are not living in the age in which Henry Clay and Daniel Webster lived. We have changed our type of public address very materially. Wendell Phillips taught us how to do it. And the second thing is that unless you are different from the type of fellows that you look to me to be, you aren't Henry Clays and Daniel Websters. If you know yourself to possess the magnificent personality, the sweep of personality, the colorful, the imposing personality of a Daniel Webster, you can speak in the grand manner. If you can command language, as he commanded it, you can speak in the grand manner, otherwise it seems to me that you ought to adopt a different method. Now these are three things that I wanted to suggest, by way of introduction, that I think public speaking is not.

There are several things I want to suggest that I think effective public speaking is. The first one is, that effective public speaking is having something to say. Personally I cannot conceive of a good speech that is made up merely of words and sentences and paragraphs. In our age what men, particularly in business, are demanding is fact, a speech that is built upon fact. There is altogether, I think, too much belief, on the part of many people, that the development of effective speaking, oral expression is a gift, a matter of what nature has done for us. Now I wouldn't say that nature has not done a good deal for many people, but anyone who thinks that effective speaking is purely inspiration, forgets, I think that, after all, effective speaking is perspiration, not inspiration; it is hard work. It is delving into the facts until you get all of them.

You build your speech upon information. That is particularly true, I think, the moment you begin to discuss safety matters. If one is to make (now perhaps I ought not to mention this field but I am going to make this statement) an effective speech on safety matters, I submit to you that he ought to know what has been done in safety, not only in his business, but in other similar businesses, and what has been done in safety matters the country over. He ought to know historically what has been done as well as what is now being done in safety matters. In no other way, in my judgment, can a man make an effective speech.

The first thing, I repeat, that an effective speech is, is having something to say. The second thing that I want to suggest is the development of the power to think in the facts that you have, to analyze those facts into their various parts—divisions we would call them, if I were speaking to a class in public speaking—divide the body of information into its logical parts, presenting one part at a time.

If my experience means anything, friends, I think here is the greatest limitation of public speakers. They may have quite a body of fact, they may know quite a little about a subject, but they do not spend time enough in thinking about that subject until they have thought themselves through from the beginning to the end of the material; discovered what is primary, what is secondary, and then, in the statement of that material, state it so that the primary is first and the secondary is second, so that

the primary is principal, and the subordinate follows in support of the principles. To get that gradation in the organization of one's material, goes back to one's capacity to think into his information, through his information until he has discovered the significant.

The third thing I want to suggest is that public speaking is conversation; elevated conversation, magnified conversation, if you please. Do I mean to suggest that the speaker before an audience converses with an audience? Well, that is exactly what I mean. What is the difference between conversation on the part of a speaker before an audience and conversation between two individuals in a room? The difference is not in kind, but in degree. If you will just imagine the intimate, well done conversation between two individuals, put under a magnifying glass, you get about what I mean.

I mentioned Wendell Phillips a moment ago. He taught public speakers in America a great lesson. He taught them that it was possible for a cultivated, dignified New England gentleman to step upon the platform, before a group of people and talk to those people just as though he were talking intimately with them. I want to give you a striking illustration of how that worked in his case. He went to Cincinnati, according to report, in the days before the Civil War. He was warned not to appear there to deliver that address. He went. When he got there, there was no one that could be found in the city who had the courage, as chairman, to introduce him. The audience was assembled. They waited fifteen minutes for the chairman to introduce the speaker. No one appeared. Then a gentleman appeared upon the platform and began to talk. Everyone thought of course that that was the chairman of the meeting introducing the speaker. The speaker had been going for ten minutes before the audience recognized that it was Wendell Phillips opening his discussion. So conversational was he, so simple was he, so unlike a speech maker, the customary speech maker of that day, that they didn't recognize that he was the lecturer beginning his lecture. Now that is what I mean by a conversation.

Bryan a Master on the Platform

I dare say that practically everybody that I am talking to here has heard William Jennings Bryan make a speech. Now you don't need to have agreed with William Jennings Bryan, in either religious matters or political matters, to recognize that he was a master on the platform. I don't think I ever agreed with William Jennings Bryan on anything, certainly in politics I did not, but I recognize in him the most powerful platform man in our day and generation. What was the secret of his power? Well of course there were several phases to his power, but one of those elements was the fact that he could talk to you. He conversed with an audience. I heard him several times, upon the chautauqua platform out through Iowa and Missouri, talk upon his story of the two conventions. I refer to the two conventions in 1912. And I heard him many times talk for no less than two hours upon that subject. The interesting thing to me was that, as he stood on the platform scarcely moving at all, scarcely making any gestures of any kind, scarcely raising his voice above a conversational level, he just talked to those people. He never for a moment delivered a lecture to them or a speech at them. He conversed with them.

Now that doesn't mean, folks, that you can't put intensity into the speech. That doesn't mean that you can't put force in it. That doesn't mean that you can't put emotional drive into it. You can. But you keep it on the conversational level, and I submit to you that is the way to get hold of the interest of people and to hold the attention of people. Particularly, friends, is this true in the age in which we are making our public addresses.

Then in the fourth place I want to suggest that effective public speaking is getting the intimate approach, the individual approach. Have you ever asked, or attempted to answer this question: Why is it that the man of affairs, the man of a great deal

of influence in his community, the man who has accomplished results, who has standing, when he gets upon the platform before an audience, is quite frequently frightened to death at that group of people? I have in mind at the moment a banker, a bank president, who has no difficulty in saying "no" whenever he wants to say no, who has no difficulty in facing the most imposing individual in the community and saying to him exactly what he wants to say to him, or what he feels, under the exigencies of the occasion, he must say to him; but put that man upon the platform before 50 or 100 people and he shakes like a leaf. He is frightened. I don't think he could say no then at all. What is the matter?

There is one explanation of the situation. I think it is this, as near as I can analyze it: He thinks of that audience in front of him as a great composite, big individual: just as big as there are numbers of individuals, thought of as one, in the room. I suppose there are 250 people in this room this morning. That means there are 250 individuals in the room. All right, if that is true, then what is my mental attitude toward you? Is my attitude toward you the same as though you were one great individual, or as I talk here are you listening as individuals and responding as individuals? On the whole, of course, you are responding as individuals and not as one great big unit. Now, if I didn't recognize that to be true, I should be a great deal more scared of you than I am, and I am scared enough, so far as that part of it is concerned. My approach to you is that of one individual mind to another individual mind. If the speaker on the platform, before an audience, can once get the consciousness of that, it is going to be much less a problem for him to face and to talk to that audience. Just bear in mind that they are individuals listening to you. And bear in mind, further, that they are individuals, on the whole, sympathetic with you. They are individuals, on the whole, who are anxious to see you succeed with your talk. It is only now and then that you will find a mind out in the audience that would like to see you fail, who does everything in his own thinking that he can do to see you fail. The audiences in America are very sympathetic with the speaker, whether they agree with him in policy, or in fact, or not. They are in agreement that they would like to see you, as an individual, make your talk a success.

The Question Provides Individual Approach

Now, if one can just get that individual approach, so that, when he asks a question, those in the audience will feel that question to be theirs, as individuals, he will be more nearly a success. And I mention again here the case of William Jennings Bryan. He asked a great many questions, he used what we pedagogues call the rhetorical question, a good deal. And it was always interesting to me to sit away back in the last rows of the chautauqua tent and listen to him. When he asked a question I was conscious that that question was effective with me. It was my question. He asked that question of the individual, not of the mass. It was to reach the individual in the crowd, that was his purpose.

You will find that speaking is a great deal easier matter if you get the individual approach. That involves two or three things, I think. I am not going into great detail on this but I think it does involve two or three things. It involves, first of all, the capacity to stand on the platform and to look people straight in the eye. The man who does not have the capacity to look people straight in the eye and talk to them as individuals, loses 25 per cent, at least, of his power. The man who stands upon the platform and looks at the corners of the room, while he talks, or the man who stands on the platform and can see nothing but three feet of carpet in front of him, loses, I say, 25 per cent of his effectiveness. Get the ability and the freedom to stand before a group of people and to look directly at them as individuals, and you have taken a persuasive attitude toward them.

The fifth thing that effective public speaking is, is speaking so as to be heard. There

is nothing more irritating surely, as one sits in an audience, than not to be able to hear what the speaker has to say.

There are several items to be emphasized on this point. I can't discuss them all this morning. I may get some of this discussion into the last talk of the series, but there are two or three general things that I want to mention this morning. Being heard, having a voice to be heard, is, as a rule, ladies and gentlemen, not a matter of degrees of loudness. Loudness has something to do with it, but as a rule it is not a matter of loudness primarily; but is a matter of the way one focuses his tone so as to give it carrying power. One may speak in a voice no louder than I am talking now and be heard anywhere in this room, provided the voice comes to a focus at the front part of the mouth. Too many speakers use the throat muscles only; too many speakers use the chest muscles only. Very few speakers use the diaphragmatic, the abdominal muscles correctly. The good speaking voice is produced just exactly as one breathes. If you can catch yourself relaxed, you find that the power that brings the breath into the lungs, the power that gets it out of the lungs is the diaphragmatic muscle, the pear-shaped muscle which crosses the body here (indicating), and abdominal muscles here (indicating). The voice that has carrying power is the voice that is produced here (illustrating), one, one, one, two, three, four, a, e, i, o, u, up, out. Get the force from this point (indicating). Then the column of air comes up through the throat, which should be relaxed, into the front part of the mouth, where it is focused. The important matter is to get the voice up and out.

Illustration of Correct Voice Placement

This suggestion perhaps is the most practical one that I can make on this point. Get the ability if you can, to throw the voice from you to the back part of the room. Just imagine your gathering the tone up into a little ball and throwing it from yourself against the back wall. Now the tone that is produced in that way will carry farther and be more easily heard than the loud, blatant voice. I had a great lesson in that once, when I was a student, back in 1903 and 1904. There was a performance in the Auditorium Hotel, of that great pageant, Ben Hur. There were three speakers in that pageant who interested me specially. One of them played the part of Messala and another played the part of Ben Hur and the third played the part of a minor character. The fellow who played Messala and the man who played Ben Hur were favorably known as actors with splendid voices; strong, full voices. They were conscious of the fact that they had those big voices and they used them with the idea of being emotionally impressive, rather than with the thought that their voices should carry in that auditorium; but the minor character was a little fellow, with a thin voice, but he knew that it was light, and he knew that if he was to be heard, he must make an effort to project the tone.

I sat way up in what was called "nigger heaven" those days. The condition of my exchequer made that necessary. But I remember this very well, that I could hear every word that that minor character spoke and I could hear only half the words that the other two men spoke; and why? Because that minor character recognized that he had vocal limitations and, as he spoke, he turned his voice out over the audience and made a conscious effort to give it a little propulsion, a little projection of that voice up into the gallery, and we heard him without any difficulty. He didn't strain for it, but he did make that effort to project the tone.

The sixth thing I want to say is, that public speaking is speaking so as to be understood. This involves not only, of course, the use of the voice, but it involves also articulation. Remember this, men, if you don't remember anything else, that the outstanding fault of American speakers is indistinctness of articulation, mumbling of words, lapping one word upon the other, dovetailing words, throwing words so closely together that you can't tell where one leaves off and the other begins. That is the outstanding fault. We are what I would call a lip-lazy people.

You who have been born and reared in the Middle-West particularly, have behind you, as I have, about the most difficult environment of any place in the United States to get away from indistinctness. I have fought it all my life. My difficulty has always been that I let loose of the consonantal elements too quickly. Let me give you an illustration. Suppose I should ask each individual in this room to pronounce one word, b-o-l-d. I venture that not half of the people in the room would articulate it correctly. You would pronounce it as though it were spelled b-o-l or b-o-w-l; I wouldn't hear the "d" at all. I wouldn't catch that "d". Now, our difficulty in articulation arises almost entirely, I say *almost* entirely (there are some other factors that enter into that that need not be mentioned here), almost entirely because we fail to bring out the consonants to make ourselves understood. That little word is one illustration. Here is another one. Streams. Now if I should ask the individuals in this room to use a sentence with that word in it, unless I could catch from the context of the sentence whether it was plural, I couldn't tell whether there was an "s" on that word or not. You would pronounce it as though it were stream rather than streams. You wouldn't get that "s".

Laziness Accountable for Faulty Diction

Why don't we? I am condemning myself here just as badly as I am condemning any man or woman. I know what I am talking about on this point. I know what difficulties I have had. The reason that we miss those final consonantal elements is because it takes a little muscular exertion to bring out the end of the word, the final consonant, and we are too lazy physically and from habit to emphasize, to give it that little final stroke.

Let us carry that idea just a little bit farther. Not only do we have difficulty with the ends of words, especially those words ending with double consonants, but we eliminate syllables, whole syllables within words, and for the same reason that I suggested a moment ago. Take a word like "institution" or "constitution." Very frequently, you will hear that word pronounced as though it were "instution" and not "institution." You will hear "constitution" pronounced as though it were "constution," instead of "constitution." The word "multiplication" will be pronounced as though it were "mulplication," rather than "multiplication."

Why do we do that? If you analyze what the lips do in the pronunciation of any one of these words, you will find, when you get through with one syllable, and before you begin the other, the articulative machinery must let loose and then take a quick forward jump in order to give that second syllable. And we are too frequently careless and don't make that extra effort. That makes us indistinct as speakers.

Let me take that one word, multiplication. Mul-ti-pli-cation. We pronounce it very frequently "mul-plication," leaving the "ti" out.

Notice, when you get through with the "mul", where the tip of your tongue is, "mul", it is in exactly the right position to begin the "pl". You don't have to make an extra move. If you put the "ti" in there the tip of the tongue must come back and then come forward with a rapid movement. Rather than do that we cut across lots and get "multiplication."

I have been illustrating. Of course you are not interested in constitution, institution, or multiplication just as words, not at all; but I think you are interested in what makes you speak indistinctly; and you are interested in that proposition because you want to speak more effectively when you are orally expressing yourselves before a group of people.

What is the remedy? There isn't any remedy in the world but work. There isn't any remedy in the world but attention to the elements that are involved. Take such a word as bold, b-o-l-d, enunciate one consonant, then the next, then blend them. Practice that, and when you find any word that is difficult, when you find a word that

you are indistinct upon, go over it again and again, bringing out those final consonants until you develop the habit of speaking distinctly.

This sounds like a pedagogue talking, I know, but it is vital in this matter of public speaking, and there is no country in the world, I think, where it is more vital than in the United States. We are notoriously indistinct speakers.

I said something a moment ago about the carrying power of the voice. I said placement was a primary element. I want to include now this matter of distinctness of enunciation as another element in the carrying power of the voice. You want to be heard, you want to be understood. You cannot be understood, cannot be heard and understood, unless you do those two things, get projection power into the voice and distinctness of enunciation.

I am going to skip one point suggested in the outline in your hands and go to the last one because my time is pretty nearly up.

The Message and Audience Should Be Correlated

Effective speaking in the last place, is putting one's idea in terms of the other man's experience, in terms of the other man's knowledge. I want to set down this as a principle. You cannot form a judgment upon any policy or truth that is uttered by another, unless that utterance is in such form as to make it appeal to what you know, or what you have passed through at one time or another. Notice how that applies. If a banker is going to talk to a group of laboring people, will he talk in terms familiar to bankers? If he does, he fails. He must talk in terms that the man knows about. We do not quote the Bible to a Mohammedan and we don't quote the Koran to a Christian. We get into the experience of those to whom we are talking, and here once more you will find the finest example that I know of, in American speech, in Abraham Lincoln. What gave him his power? Certainly it wasn't his beauty. Certainly it wasn't handsome physique. Certainly it wasn't beautiful voice. Not at all. It was his ability to take a fundamental principle of government or of law and put that principle in language so simple that it appealed to the information and the life experiences of those to whom he was talking. How frequently you hear a man talk to an audience, a man who knows what he is talking about perhaps, but talking over their heads or outside of their experience. He is going to fail when he does that. Hence, the last thing I want to say to you is that a fundamental principle of effective speaking is that the speaker must put his ideas in terms of the other man's experience, if he is going to get the other man to understand him.

What have I been trying to say this morning? Very briefly summarized it is this: I have been trying to point out that there is a very important place for effective oral discussion in this modern world. I have been pointing out that public speaking is not dogmatism. I pointed out that public speaking is not demagoguery, twisting facts so as to suit the speaker, regardless of what the facts say themselves. I have been pointing out that public speaking is not the grand, or the grandiloquent manner. It is not a show-off. I have been saying that public speaking is having something to say; public speaking is clear, clean-cut, well-analyzed thinking in a field of information; it is conversation, a gentleman, an earnest man, a straight-from-the-shoulder, honest to goodness business man talking to a group of people and trying to explain something to them in an earnest, conversational manner. It is getting the individual approach; it is speaking so as to be heard; it is speaking so as to be understood; and lastly, it is an attempt on the part of the speaker to put his ideas in terms of the other man's experience.

ADJOURNMENT.

Wednesday, September 28, 1927

Selecting Materials For the Speech

The first thing I want this morning, folks, is a show of hands. How many people are here who were not here at the lecture or discussion yesterday morning?

I ask that question for a purpose. I want to find out whether I ought to make a brief statement of what I discussed yesterday, in order that we may proceed a little more intelligently this morning.

In the discussion yesterday I tried to point out why, in these days of complex business and industrial organization, there was a greater demand for executive speech, in order that we might better understand one another in our social order, than there had ever been in the past. I think the presence of as large a group of busy folks as you are at a convention like this to hear academic talks on an academic subject, is sufficient evidence that there is an interest on the part of men of affairs in the practical interest known as public speech. I tried to point out in my first lecture some things that public speaking was not.

I said in the first place that public speaking was not dogmatism; meaning by this that in a democracy, when men talk on and about principles, and with about the same degree of authority in the field of information as the audience possesses, no man has a right to say that he has the final word.

I said in the second place that effective speaking was not demagoguery. By that I mean pure emotional appeal, a misuse of facts, and an attempt on the part of the speaker to make a few facts reach and establish a conclusion altogether unwarranted by the nature and the significance of the facts used.

I said, in the third place, that public speaking was not a show; it was not a demonstration. It was not the attitude of a man who gets upon the platform and virtually says to his group of people, "Now watch me do it and see how well I can do it." From that point I went on to suggest that public speaking was first of all having something to say; knowing one's material. I put considerable emphasis upon that. Secondly, I pointed out that public speaking was the development of the power to think effectively, and to analyze clearly, in a body of information that one was at the moment attempting to use. I said, in the third place, that effective public speaking was just good, earnest, straight-from-the-shoulder conversation, magnified conversation and large conversation to be sure, but nevertheless one man talking to other people, not declaiming at them, not lecturing at them, but talking to them, reasoning with them, appealing to them.

I said, in the fourth place, that good effective public speaking was getting the individual approach. By that I meant presenting one's material so that as he talked he gave the impression that he was talking to each individual in the audience, and talking for his information, for his benefit, and appealing directly to him. I pointed out in the fifth place that effective public speaking was speaking so as to be heard, which involved a voice that had some carrying power, and the development of that kind of an instrument. We do not, unless we stop to think about it, recognize what a vital instrument we have, what a useful instrument we have in the human voice, the most fascinating musical instrument in the world when properly used. And I pointed out also, in the sixth place, that effective speaking was speaking so as to be understood. This involved the whole field of articulation. I pointed out one or two suggestions as to the development of the power to articulate better the words that we use. I think I shall repeat some of that discussion in the last lecture, or the lecture tomorrow, so I will not go into detail on that.

Lastly, yesterday I pointed out the importance, if the speaker is wise and if he is to be effective, of the speaker putting his material in such form that he appeals to

the knowledge and the experience of the group of people to which he is talking. I put considerable emphasis upon the fact that none of us has any capacity to form a conclusion, draw an inference about anything on which we have information, either in the way of knowledge or of experience.

Now that is about what I covered in the talk yesterday, stating it as briefly as I can.

Between that talk of yesterday and today, if I had had the time, I really ought to have put in another discussion which would go over the general ground of the importance and some of the principles involved in the selection of one's point of view. Then if I had had the time I should have given you some discussion on the analysis of the proposition, the organization of material around the proposition, and then a discussion of the relationship or the importance of getting a proper relationship between one's detailed evidence and the original proposition that one was discussing. But in a series of three talks it is necessary to leave out some things; and so that portion of the discussion, which logically belongs in there, I will have to leave out. This leads me to the discussion that I am to present, in the best form I can today, namely, final statement.

After one has gathered all of his facts, after he has analyzed that material into its principal and its subordinate elements, after he has properly graded it with the primary first, and the secondary second, then comes the whole matter of final statement. I want to emphasize the importance of this final statement. I want to emphasize the final statement particularly with people who speak *extemporaneously*. By extemporaneous speaking I do not mean conceiving information on the spur of the moment. Such is purely *impromptu* speaking. But I refer to that type of speaking where the man has gone into his subject, has gathered information and has arranged it so he can deliver it. Then he trusts to the spur of the moment to give him the final statement.

Final Statement the Crux of Your Speech

The point I want to make with you this morning, and I want to make it very definitely, is that this final statement is almost, if not altogether, as important as the facts you use themselves. You know you can spoil a logical argument by a very poor final statement. I have heard it done again and again. That is particularly true, I think, with scientific people. This is not a criticism of scientific people at all. I know why they do it; I can understand their point of view. They are interested in their facts. But I have heard those scientific people. I have in mind for the moment an engineer who is a very able man in his field, but who pays no attention to his final statement. That is all right when he is talking to a group of people familiar with the information in his field, but it makes his presentation very weak when he is talking to a group of people who have but very little, if any, information in his field, and his failure lies at the point of final statement.

Now if you will go into a bit of study of the strength of such men as Abraham Lincoln in his public speaking of William Jennings Bryan in his, of Henry Ward Beecher in his, and all of the rest of them, I think you will agree with me that a large part of their power lies in final statement. In other words, final statement itself is really argument. Daniel Webster's greatest speech before a jury, that of his Capt. White murder trial, when subjected to analysis, shows that the real strength of it lies in the simplicity, the directness, the amplitude and the cumulative power of his statement of the details of evidence.

So much then, for the importance and the significance of this final statement. When we speak extemporaneously we so frequently trust to the spur of the moment for all of the material in that final statement. We would do better if, in our thinking about our material, we thought it through to the last step and got pretty well in mind what this final statement was to be. I won't advocate this with you, but this is what I do with college students. I say to the college student, "You never know

whether or not you are going to be able to say the thing well, until you have said it," and with that in mind I require them to write, I require them to write out completely and in full detail. I don't ask them to memorize, not at all, excepting now and then, but I do ask them to write fully in order that they may test their final statement. But of course you can't do that you are too busy to do that, but you can think your material through far enough so that you know what your final statement is going to be.

There are four ways or four principles that I want to emphasize this morning in getting an adequate final statement, and the first is what we call restatement, a form of support; second, statement in details; third, the use of illustration; and the fourth is the citation of or the use of, authority.

The Value of the Restatement

I don't know whether I will be able to cover all that ground this morning, in the way I would like to, or not. If not, I will cut off the last step and leave it for tomorrow morning. By restatement I mean not necessarily a repetition in the same words that the original proposition is given in, but a statement in other words. What makes a point interesting to a group of people who are listening to a speaker? Well, as nearly as I can analyze, it is this: The speaker makes a general affirmation of what he is advocating. That holds it up to view for a very brief instance. That may be sufficient, but with the popular audience, the ordinary audience, not familiar in detail with the material, it is likely not to be sufficient; he must go one step farther. How will he do it? Imagine, folks, the idea or the proposition as a little globe. You make one statement about it from one point of view; you turn the globe just a little and you make another statement about it in other words; you turn it a third time, make another statement, fourth time, make another statement, a fifth time, make another statement. But all the time you are talking about the same idea.

Teachers of composition in colleges and universities put a good deal of stress upon the value of restatement in writing. Well, certainly if it is important for the individual who writes, it is doubly important for the individual who speaks before an audience. Why?

Remember this, that there is a peculiar relationship between a speaker and an audience that does not obtain between the writer and his reader. The audience hears, hears once only, must hear rapidly, and, if he is to get the idea, he must get it practically instantly, for the speaker has gone on to a second step, and if the speaker has failed to present his material so that his hearer does get it instantly, and the auditor finds it necessary to reflect, that moment he is lost because the speaker has gone on while he reflected on the significance of a statement already made.

Bear that fundamental relationship between the speaker and the audience in mind and you get the significance of this point that I am talking about.

I want to illustrate that just a little this morning. I mentioned Abraham Lincoln a moment ago. One of the fundamental elements of the man's strength was his power to make a statement. I can't illustrate elaborately this morning, we haven't time, but if you will recall your American history for just a moment, you will remember that the Civil War had been going on for about a year when Horace Greeley, who was then editor of the New York Tribune, and a very influential power in American politics, wrote an open letter to Abraham Lincoln in the columns of the New York Tribune stating that the war had been a failure and insisting that Abraham Lincoln do certain things and report to the American people why he did not do certain things. Abraham Lincoln replied to Horace Greeley also in an open letter. That is a famous letter, it is a classic. It is one historical document. It is brief. I can't quote all of the words, and I won't quote the words exactly, but

I will quote them in such a way that I think you will see how it illustrates my point of restatement.

In his reply Abraham Lincoln said, "I would first of all save the Union, I would save the Union under the Constitution." He goes on to say, "I would save the Union in the easiest way possible." Notice that is practically a restatement of his original proposition. Then he goes on to say, "If I could free all of the slaves and save the Union under the Constitution I would do that. If I could free part of the slaves under the Constitution, and let the others go free, I would do that; if I could save the Union under the Constitution without freeing any slave, I would do that. Whatever I do, whatever I may do, I do because I want to save the Union. Do you think otherwise?"

Now, that is a good letter. That is a good statement. To be colloquial about it, it is a corking good one. He has done what? He has just made one statement and then he has talked all around it until, when you get through reading that letter, you will know exactly what Abraham Lincoln's position is. That is what I mean by restatement. Do you have the power to do that? Is it not worth while for one to cultivate the power to do that? Notice how practical it is. It applies to everything that one does, whether he is talking as a salesman, as an executive, as a safety man or as a preacher, Fourth of July orator, or what not.

Now let me keep the same idea in mind and bring it just a little closer home. I have written a little paragraph here. I don't offer this as a classic, by the way, but I thought, in our own field, it might be suggestive.

Driving the Point Home

This is what I have said: "Safety on the streets and highways is more a matter of law observance than it is a matter of law enforcement." You may agree with that proposition or disagree with that proposition as a safety matter, but that is the proposition that I am stating here. Now let me see how we can employ restatement to bring that out a little bit more definitely. Here is the first restatement. Notice as I go through five or six restatements here that I do not leave my pivotal point. The second restatement is this: "Let the laws and ordinances be obeyed as they are written, or are built up by custom, and the accident totals will diminish." Third, "In proportion as every driver of a motor vehicle knows what the traffic regulations are and conducts himself accordingly, in that proportion will he and his vehicle cease to be a hazard on the streets in the cities and on the highways of the country." Fourth, "When the pedestrian learns to keep his mind alert and his eyes open to recognize the regulations, the common sense customs and the ordinances that are provided for his convenience and his protection, his life and limb will be no longer in danger."

Fifth, "Enforcement of traffic laws at all times, and at all points, is not humanly possible, but it is possible for all people, drivers and pedestrians, to learn what the rules are, and to obey them without a police officer at their elbows to compel recognition of the rights of others."

Sixth, "That community is safest where the habit of law observance has become second nature to every man, woman and child that uses the streets and the roads."

Seventh, "Constant vigilance by all alike is the price of safety in modern civilization."

Here you have six restatements of an original proposition. I have used care, I think, not to deviate, and not to change my original statement, but I have stated the same thing seven times and in seven different ways. Now, as a principle of public speaking, what does that amount to? It simply amounts to this, that you are taking a point of view, holding it up before the mind of your hearer, revolving it around several times until you can make an impression with it. Bear in mind what I said a moment ago, that your relationship as a speaker to

your audience is different from the relationship of the writer to his reader. The reader can stop to think about it, the reader can read it twice, he can read it three times; the hearer can do none of those things.

Now I come to my second form of support, I call it, going into details. Any good teacher of writing will, I think, tell you this: That good composition means the use of details and more details and still more details. Now I know I am treading on a bit of dangerous ground here because unquestionably, if you should say, "Can't you become tiresome in the use of details?" I should be compelled to answer, "Yes" in regard to that, under certain circumstances. You become tiresome in the use of details, in the application of a generalization, which do not change the point of view, which do not, by the use of a new detail, add a little to the significance of the proposition. But every time, in the use of details, you add a little to the thought of the proposition you are not tiresome. In other words, when you move the thought forward all of the time you are never tiresome simply because you use details.

I want to illustrate that two or three ways this morning. I want to take you to a classic illustration. You remember, it was in 1896 that William Jennings Bryan, here in Chicago in the Coliseum, nominated himself for the first time for the presidency of the United States. That was a famous speech. It was a famous occasion. He was just thirty-six years of age. The occasion for the debate was this: Whether or not a free silver plank should be included in the Democratic platform of that presidential campaign. The people of the commercial centers of the country, led by David B. Hill of New York, objected. Those from the Central West and the Far West headed by William Jennings Bryan, wanted that plank in the platform. They couldn't decide the matter in the Resolutions Committee. It came out on the floor of the convention. David B. Hill concluded the argument for the gold Democrats. William Jennings Bryan concluded the argument, and I think was the final speaker, I know he was the final speaker for the free silver contenders. That speech is known in history as the Cross of Gold Speech. There was one paragraph in the speech, and only one, that attracted a great deal of attention, and that was William Jennings Bryan's definition of the business man. And I want you to note, after he states his general proposition, which states: "You have made your definition of a business man entirely too limited," how he goes into detail to show what he means, when he says that you have made your definition of the business man entirely too limited.

Expanding the Detail

Now this is what he said of that speech, and I heard Mr. Bryan say this. "That was the only paragraph in the speech that was new." He had used everything else before, and that was the one paragraph in the speech that attracted the most attention and provoked the most discussion, and this is what he said, "We say that you have made the definition of a business man too limited in its application." (Notice the details now): "The man who is employed for wages is as much a business man as his employer. An attorney in a country town is as much a business man as the corporation counsel in a great metropolis. The merchant of the cross roads store is as much a business man as the merchant of New York. The farmer who goes forth in the morning and toils all day, who begins in the spring and toils all summer and who by the application of brain and muscle to the natural resources of the country creates wealth, is as much a business man as the man who goes on the Board of Trade and beats upon the price of wheat. The miners who go down 1,000 feet into the earth or climb 2,000 feet upon the cliffs and bring forth from their hiding places the precious metals to be poured into the channels of trade, are as much business men as the few financial magnets who, in a back room, corner the money market of the world. We come to speak

for this broader type of business men. "Ah! my friends," he goes on to say, "we say not a word about those who live on the Atlantic Coast—but the hardy pioneers who have braved all the dangers of the wilderness, who have made the desert to blossom as a rose, the pioneers who have reared their children near to nature's heart where they can mingle their voices with the voices of birds, out there where they have erected school houses for the education of their young, churches where they praise their Creator, and cemeteries where rest the ashes of their dead. These people, we say, are as deserving of consideration of our party as any people of this country. It is for these, that we speak."

Now, I don't know that you agree with William Jennings Bryan in his definition of a business man. I am not interested in that at all. What I am interested in is pointing out to you how William Jennings Bryan as a public speaker on a great occasion made first his general statement, then in the development of that theme, in the enlarging of that theme, went on into great details; one detail is the wage earner; another detail is the small lawyer; another detail is the small merchant; another detail is the small banker; another detail is the miner—one detail right after another, until he builds up that idea, and he did make a great impression with it.

Comparison Used to Emphasize Detail

Now let's bring our material just a little bit closer home.

I hold here in my hand a little book called "A Manual for Speakers," gotten out by the National Safety Council. It contains about 60 pages of facts and figures in regard to safety material, safety facts. You will find on the left page on the sheet of notes, a full statement in regard to this booklet. It can be procured, and if you are interested in this subject of safety far enough to get information over a wide field, I think you will find considerable of it in this book. I believe it is for sale. I don't know of any place, although I have done some searching, where there is quite so compact a lot of safety facts as there are here. I am not particularly a salesman for this book. I wasn't asked to be a salesman for it. I am simply suggesting that there are some facts here that are interesting. I want to bring out one or two facts that will illustrate the point I am talking about, namely, how to make an idea stand up by going into detail. Let us take the proposition of the total fatality accidents and the economic cost records in the United States in any one year. This record is sufficiently high to challenge the attention of every right-thinking citizen. That is my proposition. Let's see if, by going into a little detail, we can make that proposition stand up a little larger than simply by the mere statement in those general terms.

I turn to page five of this book and I find these facts: that the total accident fatalities in the United States, approximately figured in 1925, is 90,000. There were 46,000 public accidents, 20,000 home accidents and 24,000 industrial accidents, making the total of 90,000.

Now perhaps for many occasions just the presentation of detail, 90,000 fatal accidents in the United States in any one year, is sufficient to make your idea impressive; but supposing that it isn't sufficient, or you think it isn't sufficient, for a given audience; what are you going to do anyway?

I suggest that the thing you need to do there is to explain the significance of that 90,000 and what it amounts to. There might be many ways to do that, but here is one way to go a bit into detail. We had a World War. We were in that World War about two years. We find, in going into the statistics, that we have buried in France something over 45,000 American soldiers. We, here in the United States considered that a great loss. Many homes were deprived of loved ones, many friends lost their friends, and so forth; but note that the total number of buried men in the World War for the United States and that now lie buried in

France, is but little more than one-half of the folks that are killed in the United States in any one year from our total accident fatalities.

All I am trying to do here is to illustrate how you can make the proposition stand up. Let me carry that just one step farther for purposes of illustration and clearness. I turn to page seven and I find this significant figure, that the total economic loss for the United States in any one year is approximately \$3,000,000,000. You are business folks; maybe you can think in terms of billions of dollars. Maybe your minds get around a billion; mine doesn't. It is beyond me.

Can we make that \$3,000,000,000 for an audience any more significant by going just a bit into detail? Perhaps we could help by saying that \$3,000,000,000 loss from accidents in the United States in any one year is approximately one twenty-fifth of the total national income. That may help a little. Go one step farther. That \$3,000,000,000 represents an amount, if I have the figures correctly, that is a little more than one-half of what it costs the United States Government to run its business for one year.

What have I done? I have simply made an attempt to take a generalization, then to apply it and to apply it by going into the details of the facts, leaving not only the general statement standing up there for the mind of hearers, but adding to it a detailed application to make an impression upon the minds of the individuals in the audience.

Illustration Most Effective Medium for Conveying Idea

Now I go on to the third form of support that I want to emphasize, and that is the use of illustration. I think this is the most important thing that I shall say this morning. We catch the significance of ideas through the medium of illustrations much more easily than we can catch the significance of ideas in any other way. What is an illustration? An illustration is simply a description or a narration of a general idea practically applied to human affairs to show how that general idea when practically applied works out.

Why is it that illustrations are so effective when presented to an audience? The answer to that question lies in the psychology of all of us. But few of us can think in terms of generalizations. We have to think in terms of concrete facts. The philosopher thinks in terms of generalizations and he can do that successfully because, as he speaks in abstract terms or generalizations, his mind immediately works that generalization out into the field of practical application. He makes that thought connect up with life as it is lived. It is his business to do that. He is accustomed to doing it.

Most of us are not in that business and are not accustomed to doing it, with the result that we haven't quite the capacity to do it and quite the disposition to do it. But if some speaker will take the generalization, put it in terms of a practical illustration, we can get the significance of that generalization much more easily.

I want to illustrate that because by illustration I think I can impress the idea better. I am going to take an illustration from a very famous lecture. I suppose many of you men, probably not all of you but many of you, have heard at one time or another in your life Russell H. Conwell, of Temple University of Philadelphia, deliver his lecture on "Acres of Diamonds." It is the most famous single lecture ever delivered in the United States. It was delivered over 6,000 times.

Delivering a lecture 6,000 times means that if a man delivered that lecture on every day except Sundays it would take him over 19 years to deliver that lecture 6,000 times. I mention that simply to draw attention to the fact that you have here a classic, a piece of public speaking that is enduring. Why has it endured? That is what I am coming to. What is there about that speech that makes it enduring? There are a number of things about it that make it enduring but the

one outstanding thing, in my judgment, is its use of illustrative material. He speaks very little in abstract generalizations, glittering generalities or glowing periods. He speaks constantly in terms of exact, definite, typical, genuine, human experience. I want to show you how.

I will take just one illustration from the lecture. His general theme is that the secret of success lies in your own neighborhood, or lies at your own doorstep, if you only know it. He develops the idea by the use of illustrative material. This is what he says. The lecture as a whole is just filled with illustrative material very much like this:

He says, "Professor Agassiz, great geologist of Harvard University, that magnificent scholar, told us at the summer school of mineralogy that there once lived in Pennsylvania a man who owned a farm and he did with his farm what I should do if I had a farm in Pennsylvania, he sold it" (I suppose there are some men here from Pennsylvania), but "before he sold it he decided to secure employment connected with coal oil. He wrote to his cousin in Canada that he would like to go into that business. His cousin wrote back to him, 'I cannot engage you because you don't understand the oil business.'

"Said he, 'I will understand it,' and with commendable zeal he set himself at the study of the whole theory of coal oil. He began way back at the second day of God's creation.

"He found that there was once another sun that shown on this world and that then were immense forests of vegetation. He found that the other sun was put out and that this world after a time fell into the wake of the present sun. It was then locked in blocks of ice. Then there arose mighty icebergs that human imagination cannot grasp and those mountains of ice did ride those stormy seas, and they beat down that original vegetation. They planed down the hills, they stormed over the mountains and everywhere buried this original vegetation which has since been turned, by chemical action, into primitive beds of coal and in connection with which only is found coal oil in paying quantities.

"So he found out where oil originated. He studied it until he knew what it looked like, what it smelled like, how to refine it, and where to sell it. 'Now,' said he in a letter to his cousin, 'I know all about the coal oil business from the second day of God's creation to the present time.' His cousin replied to him to come on. So he sold his farm in Pennsylvania for \$833, even money, no cents.

Right at His Door

"After he had gone from the farm" (now get this because this is the most interesting part of the whole illustration), "after he had gone from the farm, the farmer who had purchased the place went out to arrange for watering his cattle and he found that the previous owner had already arranged for that matter. There was a stream running down the hillside back of the barn, and across that stream from bank to bank the previous owner had put a plank edgewise at a right angle, at a slight angle for the purpose of throwing over to one side of the brook a dreadful looking scum through which the cattle would not put their noses, although they would drink on the other side below the plank.

"Thus that man who had gone to Canada and who had studied all about the oil business had been himself damming back for twenty-three years a flood of coal oil which the state geologist in 1870 said was worth to our state \$100,000,000.

"The city of Titusville stands bodily on that farm now, and yet though he knew all about the coal oil theory he sold that farm for \$833, and again I say, no sense."

There are two or three things about that little illustration which I want to emphasize, and the first is that it makes clear and definite and specific the point that he has in mind, which is that the secret of success lies at every man's door; it is next to him.

The second thing I want to say about that illustration is that it is interesting. It is an interesting illustration in and of itself. It is an interesting bit of narrative.

Not only is it important in speech to get an illustration of your general point that actually illustrates, but if you can go one step farther and make it interesting, so much the better. And that is what Mr. Conwell has done.

The third thing I want to say about that illustration is that he has injected into it a very delightful, quiet bit of humor, and that suggests to me in closing that you can use humor by way of illustrative material.

I have, in times past, done some talking before business organizations and have attempted to state the significance of American business, the largeness of it, how it covers enormous territories.

There is probably no better illustration than the story of the Irishman who considered himself very much of a traveled man. As he said himself, he had been all over Ireland. He planned to come over to the United States and travel over it. He planned to land in New York, go through Chicago out to San Francisco, down the Coast to Los Angeles, to El Paso, to Dallas, Fort Worth, Birmingham, Washington, Philadelphia, New York and then home. That was his itinerary.

He landed in New York and, after considerable confusion, he found himself finally on one of the rear coaches of one of those long Pullman trains at the Grand Central Station. If you have ridden in a New York Central train up to Albany (I suppose most all of you have) you know it takes quite a long time for the conductor to get back to take up your ticket, particularly if you happen to be in one of the rear coaches. By the time the conductor, on this occasion, got back to the Irishman he was getting considerably nervous. He pulled out a yard and a half of green paper and said to the conductor, "You won't let me go by?"

The conductor promised him he wouldn't let him go by. The train went north and after two hours and a half of running stopped at Albany. The Irishman got up, picked up his bags and started to get off and was considerably surprised when the porter told him he hadn't reached San Francisco yet.

He settled back in his seat and the train went west through Buffalo, Cleveland, Toledo and into Chicago. Here, as you know, in the nature of things, he has to change trains. He was very much indignant when one of the red caps insisted that his ticket called for another train, but after the use of considerable picturesque language he was persuaded to get on another train.

The train went west across Illinois, Iowa, Nebraska, through Salt Lake City, and after three days and nights of travel he got into San Francisco.

By this time the Irishman was completely subdued and he sat back in his seat in a sort of dazed, semi-comatose state. When the porter came and told him he had reached San Francisco he looked a bit startled, got up, picked up the bags, trudged out through the car, set his bags on the platform and stood there looking out over the Golden Gate; and then he said, "So they say it is a wonderful thing that Columbus discovered America. It is not wonderful at all, at all; how in hell could he have missed it?"

I have used that story in the past simply to illustrate the significance of nationwide, extensive American business and it is possible to use humor in that way by way of illustration.

ADJOURNMENT

Thursday, September 29, 1927

The Speaker on the Platform

In our little study yesterday we were attempting to present the importance and significance of final statement in the speech, and I drew attention to four means of doing it. I had a chance to discuss three of them.

First. What I called restatement or repetition in different words, a varied form of expression of the original proposition.

Second. The amplification and enforcement of that original proposition by way of statement in details.

Three. The development of that proposition by way of use of concrete illustration.

The fourth method of doing it was appeal to authority or the citation of authoritative statements with which to illustrate or to enforce one's point of view. I did not get a chance to discuss that.

Americans Dependent Upon Authority

I think in the opening remarks of this little study this morning, which I am afraid is going to be pretty sketchy as I am going to cover a number of points, I ought to say something about the use of authority. I think here in America, perhaps more than in most public speaking among the nations of the world, we have a faith in authority that most nations do not have. I have spent some time examining and listening what the Englishman does in his public speaking and I do not think he relies upon authority quite as much as we do.

I think there are two reasons in America for authority. The first is, we are a little bit reluctant about making the analysis that is necessary for us to get ourselves informed upon a subject so that we know the facts ourselves. Perhaps, to put it very bluntly, I may say that we are a bit lazy about getting at the facts. I find this to be true with the students that you work with on this subject. I assign them something to work on, and what is the first thing they do? They rush to a library to find out what someone else has said on the subject.

The most important thing for them to do would be consult their own mind, their own thinking on that subject, and their own search for facts and information on the subject. One of the reasons why these students do that is because they are just a little lazy intellectually. But that is a general tendency here with a man in America. He rushes off to find out what some authority has said on the subject and bases his own observations upon what somebody else has said. Now, that is one reason why we are very fond of authority.

Another reason is, we must be dependent on authority. We must rely upon authoritative statements. Very few of us can know much about any one question in a complex civilization such as ours. It is necessary for us to consult those who do know, so that it is perfectly justifiable for us, in building a speech, to find out what others have thought on the subject and what others have said on the subject, and to use that material, providing we use it legitimately and providing we use it wisely.

Now, if you have a copy of the notes that were distributed yesterday, you will find that I outlined there several tests, I think there are eight or nine of them. I don't think I remember them all. I have a note of them here and just as likely will forget half of them and forget I have the notes in my hand.

I applied some tests and while these tests don't apply in every case, most of them, perhaps, ought to be applied with a great deal of care. In general, these tests are well enough for us to observe in the citation of authority, and the first test I have applied there is to ask the question, "Is the citation of authority complete?" Now,

what I mean by that is this. Have we quoted, if we quote, sufficiently so that we satisfy the demands of the address? A sketchy quotation may be of no particular help in the development of one's idea. A sketchy quotation may stand in your way rather than be an asset to you if it be so sketchy, so scattered a quotation or citation, that the hearer in front of you is not impressed by what you say and the way you say it. In the citation of authority then, one needs to bear in mind to get a sufficient quotation, a sufficient citation, to meet the demands of his subject and, at the same time, to meet the demands of his hearers.

Second. Is the reference to authority definite? When one quotes from a government document, let us say, do you, in your quotation, state sufficiently definite as to where you got that information? Now, why do that? You want to make an impression. You want to get those who are listening to you to believe what you say. One of the ways to do that, if one is using authority, is to draw attention to the man you quote and who he is, the document you quote and what it is, and how it comes to be an authority and where that document may be found. In other words, put your information on your proposition in such form that those to whom you are talking will be able to check back and find that authority and perhaps test you and perhaps investigate that subject considerably further.

Now, so far as our intercollegiate debating is concerned, this is one of the cardinal principles that we emphasize because we are sure of the fact that if we quote an authority and do not definitely cite where it comes from, the man who is sitting out in front of us, as a judge, is going to discount the value of that material. That is true in the academic performance, but it is also true from the point of view of the practical use of that material.

Three. Is the authority mere hearsay? I don't think I need to discuss that. The significance of it is at once evident to you.

The fourth test I have suggested here is: "Has the man you quote been in a position to know?" Has he been in a position to learn? That is, has he been in a position where he can get at the information? Has he been in a position where he, through experience, through information, through contact with the facts, has been able, as we think, to learn what the facts actually are? You know, going up and down this country, we have a lot of people who are posing as authorities upon this issue and that issue, who have done what many of us do, a lot of superficial reading, and quotes himself or states himself as an authority.

If we are seeking for authority on commercial matters in the United States foreign trade, for example, we can quote Mr. Hoover or men of his kind. Why? Because those men are spending their lives in the examination of that sort of subject matter. They are in a position to know.

Is Your Authority Prejudiced?

Next, is the authority prejudiced? That perhaps does not need much discussion, but what do I mean by a "prejudiced statement?" I mean by a "prejudiced statement" pretty nearly the same thing that I emphasized the other day in connection with demagogues. A prejudiced statement is a statement of a man who can see but one issue and that issue the one which meets his own self or selfish interests. Try the authority by that test. You know that can go for expert authority just as well as most any other kind of an authority.

Last night, if you were at the banquet, you heard a definition of an expert. Let me give you another. An expert is just an ordinary man a long distance from home. We have a lot of authorities in this country who can qualify under that definition.

Now, I don't mean to suggest that you shouldn't quote from a man who has an interest in the subject in which he is giving information, or about which he is talking, or about which he is writing. He may even be a propagandist for his subject.

But, if he is to be a reliable authority, if he is to be one that you ought to quote, he should so put his material, so thoroughly analyze his material, as to remove the atmosphere of prejudice out of it.

The fifth test I have suggested, "Is there too much reliance placed upon any one authority?" When a speaker before an audience begins to quote or cite authorities, and he cites but one, very soon those who are listening to him become just a bit suspicious that perhaps that one man is the only one who knows anything about that subject, and that that one man may not be from all points of view a competent authority, so that in the use of authority, one would do well in the development of his address to get the opinion of more than one individual to support the proposition that he has for the moment in mind.

Next, is the authority supported by other lines of argument? Now, I want to make a general statement. It doesn't always hold true. Many of the things I am saying won't always hold true in every circumstance, but, as a general rule, authority becomes valuable in explaining a subject, valuable in the argument upon a subject insofar as it is supported by other evidence. What do the lawyers do in the development of their briefs? They state their proposition; they analyze it; they argue it and then they cite their authorities to support the position that they have taken.

Let me repeat that again in other words. The lawyer states his proposition; he states his evidence; he draws his own inferences from the evidence or attempts to show how that evidence points in a given direction, and after he has done all of that, then he cites his authorities, citations from this court judge and that judge, from that state court and from this court. You see, their authority is not used solely for the purpose of argument, but for the purpose of supporting argument.

Good Argument but Applied Common Sense

After all, isn't this true, that good argument, good exposition is nothing more or less than simply applied common sense to a given situation? When we are listening to a speaker who quotes from an authority, who has drawn a conclusion that is all out of balance with the laws of common sense, just that moment those who are listening become a bit suspicious of the strength or the value of that kind of authority.

When citing authority, apply that test to it, and the last suggestion that I want to make is this one. In the authority likely to be impressive for the audience before which you are quoting the authority? A great many mistakes, as I view it, are made upon this point by those who use authority in addresses. This is what most of us do. We have our subject before us for investigation and for analysis. We get at the largest body of fact that we can. We find those who support our contention and without thinking exactly what we are doing for a specific audience and for a specific purpose, we cite our facts and we quote our authorities, because they are ours, failing to bear in mind that we are not quoting the authority, not citing the facts, for our own satisfaction, for the relief, so to speak, of your own expressional facilities. We are quoting that authority for the purpose of reaching hearers in front of us and so it becomes a very important matter to apply this test as to whether the man we quote is an authority for those to whom we are speaking.

If you are discussing a question before a farmers' convention on marketing, let us say, you don't quote a steel magnate, if you are wise. You don't quote a Standard Oil magnate, if you are wise, even though the Standard Oil magnate be ever so informed, the steel magnate be ever so informed. You quote an authority that will be effective for the people to whom you are talking. It will have to be the Secretary of Agriculture or, perhaps, it will even be Senator Capper of Kansas who is supposedly, I think, an authority on all agricultural propositions. If you are talking to a group of laboring people, you are not going to quote, if you are wise, a man who is anti-labor in all of his convictions and all of his sentiments and most of his

utterances. You will quote Samuel Gompers, you will quote the former great labor leader of the miners, Mr. Mitchell, or some such an authority as that. A man who will be accepted as an authority in that particular field by those to whom you are talking.

Now, I have put a good deal of emphasis on that. I have put that emphasis on the point, I think, advisedly, and I have put it there as strongly as I have because I have decided feeling that, in the use of authority, we again and again fail to recognize that fundamental principle. It comes right back to something I said in the first discussion, namely, that if you are going to be effective before a given group of hearers, you must find some way to put your ideas in terms of the information and in terms of the experience of those to whom you are talking, and while that applies, in general discussion, it applies even more importantly, as I view it, in the citation of authority.

Now in our studies, we have gotten this far. We have laid down some general principles that the speaker must obey if he is to be successful. We have discussed the address and how to develop it. Now, we come to getting the man upon the platform.

First Impression of Primary Importance

The first thing that I want to suggest about this is that the first impression that the speaker makes upon an audience is through the eye. The audience sees him. What impression does he make? Is it an effective one or is it an ineffective one? When he gets before that audience, how does he stand? Does he stand like he was scared to death? Does he give the impression of pulling away from an audience? Does he give the impression of a shrinking violet? If he does, he is lost before he begins.

I don't know whether you men have ever done it or not, but it is very interesting to me—I suppose because I am primarily interested in the subject—to study the first impressions that speakers make. Let me suggest this rule or principle. Either you are going to command or you are going to be commanded by an audience, and I don't know of any experience in the world that is more exquisitely painful than to be before an audience and feel that you are commanded by instead of commanding the situation.

Now, it is very difficult to lay down any definite rules on this. I have no dogmatic statements to make about it. I have this suggestion to make, that the individual, when he appears, the individual in the poise of his head, the individual in the set of his jaw, must give the impression of downright earnestness, downright energy.

Now, men do that differently. Some men do that by an imposing front. Some men do it by a quiet, steady, earnestness, but the man who actually succeeds before an audience must, somehow or other, give a first good impression, else he is handicapped. I don't mean to suggest that you can't give a bad first impression and still be effective before you get through. The famous Thomas De Witt Talmage used to do the exact opposite from what I am giving here. He used to give the impression of intentionally shrinking away from the audience. Talking to a group of people, he would back away from them. Before he had even made a statement he would be way back on the platform and all at once an inspiration would seem to seize him and he would move out to the front of the platform enthusiastically.

Now, he took advantage of a little human psychology that is very interesting, the surprise element. He got his audience down, so to speak, then with a jerk, he brought them back. That is all right if you have the personality to do it with. No objection to it that I know about. But, as a rule, that is a difficult thing and a dangerous thing for most people to try. But, whatever you do, let the impression be one of command, one of energy.

Second. I suggest that it is important for the speaker when he first appears (I am speaking now physically and emotionally and intellectually and imaginatively), when he first appears before the audience to give the suggestion of good temper, of good will, of friendliness. How you like to get that first impression from a speaker, that impression that makes you feel he likes you as an individual! How an audience likes to get the impression from a speaker that he is a friendly sort of an individual, that he likes folks. Test it. Test it in history. Test it in your observation to see if this principle is not true.

William Jennings Bryan's—I won't say the greatest—but one of the greatest assets was the ability he had, perhaps unconsciously, to make the audience feel that he liked it, that he was friendly to it. One of the most unfortunate impressions you can make with an audience, when you step before it, is that you are chesty, that you are a very important individual. There are men psychologically made up so that they do not seem to be able to get rid of that and the four-flusher stands out in the front as that kind of an individual.

A skillful student of human nature can, in about seven cases out of ten with the average speaker, be able to spot a four-flusher almost before he begins to speak at all, because of the front which he puts up. You know, if you want friends in the world, I am being a bit philosophical here, but if you want friends in the world, you will have to be friendly. Friendships come out of you rather than from the outside into you. Now, if that is true between individuals, it certainly is true as between the speaker and his audience. William Jennings Bryan liked folks. No question about it. He gave you that impression when he stepped before an audience.

Theodore Roosevelt liked folks and while he was a pugnacious sort of an individual, just the same you felt that Theodore Roosevelt was a good mixer. And if Abraham Lincoln's history means anything at all, it means that one of the things he always impressed upon people when he talked to them was that he was a kindly, sympathetic, whole-souled man and that when he discussed a question, he discussed it from the point of view of the welfare of those to whom he was talking.

So, the first impression is very important and you know it is more than just physical, it is more than just the outside, it comes from way down in the depths of a man.

To develop ability of the kind that I am talking about takes a lot of thought. It takes a lot of growth in bigness of human nature, of mind, of body, of imagination and sentiment and of ideology, if you please.

A Restless Speaker Creates A Restless Audience

All right, we have the man in front of you. He begins to work. His physical action is rather important. Now, there are two or three things I want to suggest here. You have very frequently, I am sure, seen the man get upon the platform before an audience and make peculiar motions as he talked. He took about ten steps to one side and talked; took about ten steps to the other side and talked; and back and forth, back and forth, he went. Now, there are two things to be said about that. The first is that the moment the speaker does that thing, though he may be successful (because men are successful sometimes and do that) he suggests restlessness, uneasiness, nervous tension before an audience and the psychologists have told us some rather important things here.

You are imitative folks. If the man up here is restless, nervous, can't control himself and he fidgets about in his actions, you begin to become confused and restless and intense yourself, as a reflection in imitation of that action. That is the word I want, imitation, in imitation of what he does. Now, of course, you do that unconsciously. You never do any of those things consciously, but there is a principle there for the speaker to bear in mind.

Now, there is another thing I want to say about that. It wouldn't be noticeable

here because I am above you, you can all see me and what I do (that makes it more embarrassing for me too) but if you are standing on the level, for example, with an audience and in speaking you speak a little while in this position and then you move over and speak a little while in that position and you just get nicely settled and those in front of you get you in line through the heads of those in the audience, you step over again and what happens out here? Nine out of every ten people will have to move in order to get you in line for the next few sentences that you are going to utter. All right, you get them in the line the second time and everybody is settled and everybody is comfortable, and away you go again. You get over here in this third position, everybody moves, you settle them again, and then off you go again. I have seen that happen with audiences until you pretty nearly had a pendulum swing. Now, as I say, it wouldn't happen with a platform like this where the speaker is above you, but it will happen where you are on anything like a level with your audience. It is a little item, but something that ought to be avoided.

You know, that is something that is so easy to avoid, if you just stop to give it a little thought.

Now, next, I don't usually say anything about gestures in these talks on public speaking, but recently I have made a number of talks on public speaking before various groups of men and nearly every time somebody has expressed their disappointment because I didn't say anything about gesture. They like to get into action. Well, there aren't many things that I am going to say about gesture. One or two fundamental things. Gesture, of course, springs out of the relationship between the speaker and his subject and there ought to be a proper relationship between the kind of physical action you have, to emphasize your thought itself. For example, we do not talk about elevated emotions, sentiment, immortality, beauty, harmony in the world of imagination and in the world of affairs and gesture this way (indicating). Yet, I have seen it done. I have seen ministers stand in the pulpit with the pulpit high in front of them and come down on a long period of immortality and says: "If you are going to see your God, you will have to do so and so." (Indicating.) Knock it into them. Well, you are just a little out of proportion. You aren't doing what Shakespeare said—the best thing that has ever been uttered in English in his play Hamlet, "Suit the action to the word and the word to the action."

Now, this other general suggestion. If one is going to get into physical action, by way of a gesture at all, the strong part of a gesture is the end of it. Now, here (indicating) or here (indicating) or here (indicating). That gesture should come in at the point where the emphatic idea is, the emphatic word is and not somewhere else. And yet, how often I have seen that simple principle violated. Let me illustrate.

If You Must Gesticulate Use Discretion

I know a very distinguished clergyman (who, by the way, has stopped this type of gesture I am talking about now), and his preparation for his gesture would be long and steady and strong. He would build up his period and get up here (indicating) with his hand all quivering with intensity of his emotion, and then as his chest would swell up and he would wind up his period, this (indicating) is what he did. Now, notice the absurdity of that. A long preparation for a gesture, all kinds of force behind that gesture and then that sort of a dishrag finish.

Again and again have I seen eccentricities of that kind in gesture. Now, if you are going to gesture and you know you can talk very effectively without gesturing at all (I don't know whether I could, I always fly into action, some of it I know is absurd, violating the very things that I am talking about) you don't need to gesture at all; but if you are going to gesture, give a little attention to proportion so that your gesture corresponds, your physical action corresponds to the thought, and

that you get the gesture and physical action in at the point where the emphasis should be.

Now, one or two other things. We get in a lot of action sometimes that ought not to be there. This general principle should always be remembered. Any physical action that begins to attract attention to itself as a physical action is wrong and is in your way. Let me illustrate that just a little. Here's one. (Indicating) I remember as a college boy, a very distinguished man coming to our college chapel to talk to us. He made a very good talk, but this is what he did. (Indicating) He stood upon the platform and talked to this group of people out here and he was examining the floor down in front all the time. I was wondering if he was studying the nail heads down there, or what it was. He did that to such an extent that as a college youngster, sitting out there in front, I didn't do anything but watch him to see what he was going to do next.

I also saw a very able speaker doing this (indicating). He would talk a little while and then he would do this (indicating). He would get off another half dozen sentences and then this (indicating). Now, I suppose the thing which started him doing that was wearing tight collars. But, do you know, that got in his way until really he couldn't make an effective address. I have used this illustration before. I have used it before in connection with the name of the man. I am not going to name the man this morning, but he is one of the famous orators of this country.

Beware of Mannerisms

On a dignified occasion, by the way, on a Sunday afternoon, a certain speaker made a very effective address, but about every ten or fifteen sentences, and the more earnest he was the more often he did it, he had this gesture. He would get to going and he would get his arm up here and about to make a gesture, when he would do this. Well, now, that done once or twice wouldn't attract any attention, but that done as a mannerism, as an eccentricity, makes the speaker look very absurd, and he made a very absurd impression. I want to give you an illustration of just how far this goes sometimes. At the Chautauqua, about ten or twelve years ago, there was a very distinguished clergyman from the East lecturing. He had a very peculiar habit. Every time he would get interested in his subject he would hitch his trousers, and he would go along a dozen sentences and then he would hitch his trousers again. He had his coat and vest off on this particular occasion. He was wearing a belt and suspenders. He was doing what I think most men in these days do not do, he was wearing two-piece underwear. When he began his lecture, he talked for about fifteen minutes, then he made his first hitch. Then he went on and made a second hitch. Then he missed the belt and grabbed the tip of his trousers on the third one and on the fourth or fifth one he missed his trousers and grabbed the underwear. Now, before he got through he had six inches of his underwear, pretty nearly, in view.

That of course, is an extreme case. I haven't stated it extremely at all; I have simply stated the case as it was. Well, the thing that interested me was when he began his hitching. I didn't pay much attention until he did it a number of times. A number of the young folks began to notice that hitch and before he got through, I don't think there was anyone in that audience under 35 years of age who heard a word he said. They were watching the hitch.

This is interesting to me. I heard that same man this last winter and I don't know whether somebody told him about it or not, but his hitch is all gone. He has ceased that eccentricity.

Now, in the use of the hand, for example, in physical action, get that hand in the best position you can. Learn to open the hand. Can you open it? Can you put your hand up here and bring it down and let it come open? Most people who make that gesture make it that way (indicating). Let it come open, that's the way to be emphatic. Let it come down there (indicating) and come open. Or, if you are going

to gesture with the finger, let it be the index finger, with the other fingers closed. I want you to note this bit of an illustration. I take this out of my observation and experience with an old college friend of mine who was a college debater and an able man. He afterwards became a law student in Chicago, and he is now a practicing attorney in Arizona and a mighty able fellow. He wanted to be emphatic in his debate; he wanted to use what we called the intellectual gesture, and this is what he did (indicating). Instead of using this (indicating) this is what he did (indicating). Now, I defy you to put your hand in a more awkward position than that. It can't be done. I have tried it.

Now, all he needed to do was that (indicating) and he would get grace, proportion and ease in his gesture. He wanted to be easy, but he did exactly the thing that he ought not to be have done.

Now, the only thing that I am trying to illustrate here, friends, is that in this whole matter of physical action before an audience, don't do things that attract attention to themselves as such. Now, I want to make one observation, one reservation there. There are people who have eccentricities, who use those eccentricities as an asset, but there is this difficulty; the eccentricity, the manner, that I am talking about is purely a physiological, an outside, an external one. A man who has a mannerism, a peculiar characteristic which is a part of his character, a part of his whole being, perhaps can use that eccentricity without getting himself into a great deal of trouble. But aside from that kind of an individual, look out for the eccentricity, the mannerism, that attracts attention to itself.

Variety the Spice of the Speech

Now, there is one other proposition that I want to talk about from the point of view of the oral address. Get in it variety, variety of emphasis. You will note on those outlines I have named six things. I can't take time to discuss them in detail this morning. I have named six items. First is slide, then there is force, then there is pitch, then there is rate, then there is pause. The last one for this occasion is of no particular significance because it belongs more to the actor's art than it does to the plain public speaker's art. Now, get this principle: emphasis is contrast and when you get contrast between sentences, I mean your oral utterance of sentences, you begin to have the stroke of the voice upon the emphatic word. Every time my finger falls, I drive the word home. Let me illustrate. I will quote, if I can, a passage from memory with which you are familiar.

"Fourscore and seven years ago our fathers brought forth on this continent a new nation, conceived in liberty and dedicated to the proposition that all men are created equal. Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battlefield of that war. We have come to dedicate a portion of that field as a final resting-place for those who here gave their lives that that nation might live. It is altogether fitting and proper that we should do this. But in a larger sense we cannot dedicate, we cannot consecrate, we cannot hallow this ground. The brave men, living and dead, who struggled here have consecrated it far above our power to add or detract. The world will little note nor long remember what we say here, but it can never forget what they did here."

Take that last sentence. Notice how you can make the thought stand out there by the use of slide, emphasis of slide. "The world will little note nor long remember what we say (indicating) here, but it can never forget what they did (indicating) here." Two slides, to make the saying stand off, over against the doing with emphasis of slide.

Most of you, I suppose, know something about music. I don't. I don't pretend to know anything about it. I just pretend to know this general principle about music, that you have great variety in it. You have rapid movement: then you have

slow movement; have volume, then you have quiet notes; you have harsh notes, then you have mellow notes. They are all written on the musical score. The musician follows them up and down. Now, why is music written that way? Well, there is a psychological reason for it. You are a sensitive organization, nervously speaking; you can't stand to listen to the strain of the same note the same rate, for any great length of time. Just imagine a violinist who would strike the same note for three minutes, never changing it for three minutes, before an audience! How long would you stay? Well, just long enough to get out the back door.

Now, the interesting thing is that that same principle holds with oral utterances, your voice is a musical instrument, you are playing with it. The difference between you and the musician is that the music is made for him and you have to make your music while you talk. You are sensitive, I say, as hearers. There must be variety, change.

One of the ways to get it is through the use of slide.

Force. When you want to be emphatic, when the ordinary public speaker wants to be emphatic, how does he do it? Making more noise. If he wants to be still more emphatic, how does he do it? Making more noise. He just builds it up, builds it up and builds it up. That is all right. No objection to that within certain limits, but the interesting thing is, he could get his contrast just as well, and therefore, variety, by going down in force as well as up in force.

One other thing I want to say about that, you can get your contrast sharp when you go up quickly in force and then drop it until you can just be heard; you get the low degrees of force and the high degrees of force, so to speak, right together, one right up against the other. The man in speaking throws out a word with a great deal of volume and the next words come quietly spoken and the man who is skillful can pretty nearly awaken the dead by that sharp contrast. I have tried it. I don't see anybody sleeping here or I would try it on you. I have had fellows in front who seemed to be not interested at all, half asleep. As I have stood upon the platform, I have thrust a note at them as hard as I could, then the next one just as soft as I could and it is very interesting to see them perk up. Now, I did that mechanically, but the skillful speaker, of course, accommodates his change in force to the change in thought. He does it unconsciously. But, if we are students of the subject, we learn to do it by attempting to practice it.

Well, now, folks, I simply must stop here. There are one or two things I want to say. I was asked about one or two months ago to come down here and talk to you on public speaking. I said, "Why, these business men won't be interested in a discussion on Public Speaking." "Well, come down anyhow." And so I consented to come down and I expected we would have perhaps 25 or 50 stray souls who had wandered in. I didn't expect that I would be talking to a theater two-thirds full of men on the third of these lectures. Please be assured that I appreciate the hearing you have given me.

ADJOURNMENT.

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Tuesday, September 27, 1927

ERNEST W. BECK, Chairman
Supervisor of Safety United States Rubber Company, New York City

The first session of the American Society of Safety Engineers, Engineering Section, of the National Safety Council, was called to order at two-thirty o'clock by the chairman, Ernest W. Beck, supervisor of safety, United States Rubber Company, New York City.

CHAIRMAN BECK: I am sorry Mr. Singleton is not here. In his absence, I will call on Mr. Owen of the Council staff, who is secretary of the committee on Static Electricity, to present the report of this committee and to lead the discussion.

Progress Report of A. S. S. E.—Engineering Section **Research Committee on Static Electricity**

F. C. Singleton, Safety Director, Standard Oil Company, (Indiana), Chicago.

History and Scope of Committee

In 1922, the National Safety Council formed a committee to study static electricity. Several meetings were held at which static electricity and the National Safety Council's Safe Practices Pamphlet No. 52 "Static Electricity" were discussed to a great extent. That pamphlet has been of value to many in the study of static electricity hazards and their elimination.

Upon the consolidation in 1924 of the American Society of Safety Engineers with the National Safety Council, the American Society of Safety Engineers became the Engineering Section of the National Safety Council. That section organized a committee now known as the A.S.S.E.—Engineering Section Research Committee on Static Electricity.

The primary purpose of the committee last mentioned was to study the generation of static electricity on motor vehicles and to recommend practical methods of eliminating static electricity as a cause of motor vehicle fires. A report of that committee was made at the Fourteenth Annual Safety Congress.

In order that the personnel of the Committee would be representative of the various activities most interested in a study of the static electricity problem, the following persons have agreed to serve as members of the A.S.S.E.—Engineering Section Research Committee on Static Electricity.

Chairman. Frank C. Singleton, Standard Oil Company (Indiana), Chicago, Ill.
Secretary. Stewart J. Owen, Jr., National Safety Council, Chicago, Ill.
 Thomas W. Butler, Standard Oil Company (Indiana), Chicago, Ill.
 L. A. DeBlois, National Bureau of Casualty and Surety Underwriters, New York City.
 Frank A. Epps, Tidewater Oil Company, New York City.
 E. E. Follin, Standard Oil Company (Indiana), Chicago, Ill.
 Dr. C. F. Hagenow, Washington University, St. Louis, Mo.
 Dr. Frank B. Silsbee, United States Bureau of Standards, Washington, D. C.
 E. J. Smith, Underwriters' Laboratories, Chicago, Ill.
 Roger T. Waite, Aetna Life Insurance Company, Hartford, Conn.

The scope of the committee has now been increased to include static hazards and their elimination in all industrial activities. A brief summary of the more important studies made by the committee is given below.

Tank Trucks and Static

At the Fourteenth Annual Congress, the committee reported that several assumptions may be made as to the possible source of the static charge which could ignite gasoline.

- A. The vehicle may arrive at the filling station charged from such causes as:
 1. Air friction against the body of the car.
 2. Tire friction on the road.
 3. The splashing of gasoline within the tank.
- B. The static may be generated at time of filling as from:
 1. The flow of gasoline through a hose, either grounded or ungrounded.
 2. The breaking up of the gasoline stream into small drops after it leaves the hose nozzle and before it reaches the bottom of the tank.
 3. The flow of gasoline through a strainer as, for example, a piece of chamois skin.

Air Friction Against the Body of the Car. Experiments made at the U. S. Bureau of standards show that static electricity charges may be generated on an insulated metal plate by blowing air currents with a slight dust content against the plate. So far as we know, no experiments have been made to prove or disprove the theory that tank trucks traveling over a road at a fairly good rate of speed, especially where the air is dusty, will become charged with static electricity because of the friction of dust particles against the sides of the tank trucks. However, since an insulated metal plate may become charged because of air currents mixed with slight dust being blown against it, it seems reasonable that a tank truck in transit may become charged with static because of the friction of the dust particles being blown against the tank truck.

Tire Friction on the Road. Experiments made at the U. S. Bureau of Standards show that a motor vehicle may become charged with static apparently because of tire friction with the road. A sedan with disc wheels and balloon tires was driven over a dry concrete road at low speed (not over 12 miles per hour). A metal rod connected to the chassis projected to one side so that as the car passed a certain point, the rod made momentary contact with a fixed wire connected to an electrometer. Under these conditions the instruments indicated a potential of about 3,000 volts. The potential was not much affected by changes in car speed or in the distance which the car had gone before contact was made, provided this distance exceeded 50 feet. The experiments were made on a cool day in the spring, but the electrical resistance of the tires was so low that the car discharged in a few seconds. A person touching the car could detect no charge and no spark was visible in the

daylight. The effect was substantially the same when the engine was stopped and the car coasted down a slight incline past the electric testing instruments. No material difference was observed when the brakes were dragging.

Splashing of Gasoline within the Tank. This theory is based on the knowledge that water falling through the air at a velocity exceeding 25 feet per second will often break into spray and that these small spray particles will carry a static charge. Since gasoline has a surface tension less than that of water it may be assumed that the gasoline will break into spray when poured or thrown through the air at velocities less than 25 feet per second and thus develop static charges on the spray particles. Since gasoline is not a good conductor of electricity, the charges generated do not at once find their way to the sides of the tank and a considerable charge may thus accumulate in the body of the gasoline.

Static Generated at Time of Filling. The experiences of various oil companies show that static developed while filling or discharging a tank truck may be due to the friction between the hose or strainer and the flowing gasoline.

The theory of the development of a static charge because of the breaking up of the gasoline stream into spray after it leaves the hose and before it reaches the bottom of the tank is similar to that given for the development of a static charge by the swishing of the gasoline in a moving tank truck.

Methods of Elimination of Static Hazards on Motor Vehicles

A. While Truck is in Motion. It is the general practice to equip tank trucks with chains long enough to drag on the ground in order to "bleed off" such static charges as may be generated in any manner while the tank truck is in transit.

While the drag chain will not discharge to ground at all times any static that may be on a tank truck, particularly when the truck is passing over dry pavements, etc., the chain will act as a conductor to ground when the truck drags the chain over conducting objects such as man hole covers in the street, railroad rails, damp earth, etc.

The use of drag chains is not approved by some persons who state that a drag chain is dangerous because it may catch on some obstruction in the street with damage to the tank truck. This objection may be overcome by inserting a soft link in the drag chain so that the chain will easily part if it is caught on an obstruction.

Some persons who object to the use of drag chains as dangerous agree that bonding while loading and unloading is to be recommended. The recommendation of such bonding is an admission that static may exist on the tank truck, and if the providing of a drag chain will but partially help to discharge the static to ground, it is a precaution well worth installing.

B. At Filling Stations. Various methods are used to eliminate the static hazards while filling or discharging tank trucks at supply stations. One company has installed a metal ball on top of each tank truck. At each loading platform there is a handle known as a "contact" handle which is permanently connected to the grounding line of the filling station. This handle hangs directly over the truck when it is standing at the loading platform. On this handle is a sign "Ground your trucks before loading." The men are required, before loading, to attach this handle to the metal ball on the tank truck, thus equalizing the potential between the filling line and the truck.

Another company has devised a mechanism by which the loading cap is locked in the closed position. Before the tank truck can be filled, it is necessary for the man to unlock the loading cap of the truck by using a plug which is attached to one end of a grounding line of the filling pipe.

Where a funnel is used, it should be provided with a metal bail with spring straps on the side to insure metallic contact with both the filling pipe and the tank truck. The hose used should be metal lined and directly connected to the ground at one end, and having the nozzle on the other end in direct contact with the container being filled and the metal lining of the hose.

The generation of static by the breaking up of the gasoline stream into spray after it leaves the hose may be avoided by using a hose long enough to reach within a very short distance of the bottom of the tank being filled.

Experiments. Various oil companies have been approached in regard to making experiments to prove or disprove whether a gasoline tank truck may become charged with static because of one or more of the three reasons given under A. above. The companies have been reluctant to make the experiments because of the cost of the necessary tests and because of the fact that since the grounding methods now used on gasoline tank trucks and filling lines at supply stations have been employed practically all of the hazards from static have been eliminated. Therefore, while it may be of advantage to know exactly why a gasoline tank truck may become charged with static, unless funds are provided for making the necessary tests, it is very doubtful if such tests will be made.

Gasoline Tank Cars

The generation of static charges while filling or emptying tank cars is generally due to the friction between the flowing gasoline and the gasoline lines.

It may be that static charges are developed on tank cars while the cars are in motion, for the same reasons given for the charging of a tank truck while in motion, but since the tank car is in direct contact to ground through the rails over which it passes, it is not believed much trouble will be caused by static charges so developed.

Static hazards encountered in handling tank cars may be protected against by a permanent bond between the rail and the gasoline lines and also a temporary bond between the filling stem and the car. As a further protection against static as well as a protection against stray electric currents from sources foreign to the tank car or gasoline lines, such as street car tracks, etc., the tracks upon which the car rests while being filled or emptied are generally insulated from the remainder of the tracks and a grounding bond established between the different rails of the insulated portion of the tracks and the filling or discharging lines.

Dry Cleaning Establishments

Static charges in dry cleaning establishments may possibly be caused by:

- (a) Splashing of the cleaning solvent in the machines.
- (b) Friction between the cleaning solvent and the supply lines.
- (c) Friction between the cleaning solvent and the articles being cleaned.
- (d) Friction between the parts of the articles being cleaned.

Possible remedies for the elimination of or protection against static hazards in dry cleaning plants are:

- (a) Use of cleaning solvent with high ignition point.
- (b) Use of certain soaps in the cleaning solvent.
- (c) Avoidance of alcohol and ammonia in the cleaning solvent.
- (d) Moistening of silks before cleaning.
- (e) Humidifying atmosphere.
- (f) Bagging of goods in nets.
- (g) Grounding of machines, etc.
- (h) Closed cleaning system.

A. *Dry Cleaning Solvents.* The dry cleaning solvents now generally used are prepared in accordance with what is known as "Stoddard's" formula and have an ignition point of from about 100 to 105 degrees F. The use of such solvents has done much to lessen the fire hazards in dry cleaning establishments.

B. *Certain Soaps.* The use of certain soaps with the cleaning solvents is said by some authorities to be of great value in decreasing the fire hazards. A desirable soap is one which, when mixed with the cleaning solvent, will not lower the ignition point of the solvent. Many soaps, because of their low flammable bases, are said to be a factor in the causes of many fires in dry cleaning establishments.

C. *Alcohol and Ammonia.* The use of alcohol and ammonia is claimed, by some dry cleaning authorities, to be poor practice. Alcohol, if an appreciable amount is used, will lower the ignition point of the solvent because alcohol has a lower ignition point than the cleaning solvent. Ammonia is said to be objectionable because it sets the spots that may be in the goods being cleaned because of the water in the ammonia.

D. *Moistening of Silks.* It has been found that moistening silk articles before cleaning helps to prevent the accumulation of static charges. Many substances, such as silk, are non-conductors when dry, but they may become conductors at least on their surfaces, when wet or moist with water. It is, therefore, important to have the goods stand in a humid atmosphere some appreciable time before they are cleaned.

E. *Humidifying Atmosphere.* It has been found that a high humidity helps to prevent the accumulation of static charges. High humidity tends to make insulating materials conductors, at least on their surfaces.

Moisture Content of the Air Has a Marked Effect

The average moisture content of the air which prevails in the summer months is sufficient to produce a marked difference in the capacity of bodies to build up charges. It is, therefore, generally more difficult to get a static spark in summer when the air is humid than in winter when the air is drier.

In damp weather, all objects carry a slight film of moisture containing some impurities (such as carbon dioxide) from the air. This film of moisture is a fairly good electro-static conductor and serves to connect every object with the ground, thus preventing the accumulation of static charges.

It will thus be seen that the fundamental effect of high humidity in reducing static trouble is the result of the moisture film which it produces on the surfaces of most solid materials. As an appreciable time is required for this film to form, it is important to have the material stand in a moist atmosphere some time as well as it is to have the air humid during the operation.

It is said a relative humidity of not less than 40 per cent should be maintained in dry cleaning rooms at all times. Humidity may be easily maintained by allowing steam to discharge at a low constant rate from a pipe connected to the exhaust steam line of the plant.

F. *Bagging of Goods.* Bagging of all goods in a net bag, particularly silks, rayons, etc., has been found to help in the prevention of static charges while such goods are being cleaned. Such a practice tends to keep the parts of the goods from rubbing against each other, thus limiting the possibility of static being generated by friction between the surfaces of the goods.

G. *Grounding of Machines.* All machines in a dry cleaning establishment should be grounded by means of copper wires soldered or otherwise securely fastened to the machines and to pipes or iron rods buried in a moist earth. Ordinarily, it is

not sufficient to depend upon the cleaning solvent supply pipes as a ground, as these pipes do not always form a direct ground connection.

H. *Closed Cleaning System.* Apparently, at least one manufacture of equipment for dry cleaning has solved the problem in a way that has much that would seem valuable in connection with other dangerous operations. The scheme is simple. The naphtha or other volatile solvent to be used as a cleaning medium is kept in a closed system, out of contact with air. The washing machines are arranged to be closed air tight. The basket in which the goods to be washed are placed is constructed of tubes expanded into headers to form a skeleton tumbling barrel inside the washing machine. This basket can have steam circulated through the tubes and headers to heat it. The basket also can be rotated at either a high or low speed.

The process of cleaning is about as follows: Goods are placed in the basket of the washing machine and the door is tightly closed. Then a vacuum pump is connected to the machine and the air is exhausted. When a sufficient vacuum is obtained, the valve to the gasoline storage tank is opened and the gasoline flows in under the suction of the vacuum pump. Suction is continued until there is no appreciable air in the washing machine, only gasoline and its vapor. Then the washing operation proceeds as usual, except that it is possible to turn steam into the tubes of which the basket is made and heat the gasoline so that a more effective cleaning than usual is had. When the goods have run the allotted time, the machine is not opened, but the suction connection is again opened and the gasoline is drawn off leaving a rather good vacuum in the machine. The heat is turned on the tubes of the basket to evaporate the solvent, the vacuum being maintained, and finally the basket is rotated at its highest speed. In all the process of washing and drying, the machine at no time contains air, and when the goods are finally removed they are both clean and dry so that if a spark should be drawn from them no special danger is present. In addition to the safety feature, the process is said to develop a marked saving in volatile solvent, as all the vapor is condensed and recovered.

Belts and Pulleys

Drive belts generate static electricity probably by—

- (a) Contact between and separation of the belt and pulley and
- (b) Friction between the belt and the air.

As to static charges being generated by the contact and separation of the belt and pulley, it appears that a static charge may be developed in such a manner, particularly when the friction of the belt and pulley is taken into consideration.

Most persons are familiar with the display of a static "glow" when a roll of friction tape is unrolled in a dim light. Since it is possible that static may be generated by contact and separation in such cases, it appears reasonable to assume that the friction caused by the contact and separation of a belt and pulley revolving at a fairly high speed may also generate static.

Some doubt has been expressed that friction between a rapidly moving belt and the air may generate a static charge. When it is remembered that some belts travel at high speed, that some dust may be present in the air, and that a stream of air with a slight dust content blown against an insulated metal plate will generate static charges, it seems possible that the friction between the dust particles of the air and the rapidly moving belt may generate, at least, small static charges.

Static accumulation on belts and pulleys may be eliminated or at least protected against in one or more of the following ways:

- (a) By grounding wire combs.
- (b) By grounding the hangers or shafting.
- (c) By the use of various belt preparations.

A. *Grounded Wire Combs.* The U. S. Department of Agriculture, after a thorough study, recommends the use of either two grounded wire combs which rub

the belt at the points where it leaves the pulley or a net work of grounded wires stretched parallel and close to the belt on both sides. Sag and whipping of the belt must be taken into consideration in the arrangement of these combs or net work of grounded wires. Satisfactory results are reported where a grounded metallic comb has been placed close to, but not touching, the surface of the belt where it runs off the driven pulley.

In grounding belts in a dry cleaning establishment or other places where an explosive vapor is present, the combs, if used, must be either in contact with belt or very close to it, so that there will be only a brush discharge of the static. If the combs are placed too far away, there will be "hot" sparks between the belt and the combs which may ignite the vapor. It has been recommended that a wire cable with the end frayed, paint brush fashion, be used in dry cleaning establishments in place of the metallic comb, the cable being grounded in the same manner as the comb.

B. Grounding of Hangers and Shafting. Where metal pulleys are used, the static charges may be removed by grounding the hangers on the shafting. Some say that the grounding of the hangers is not sufficient as the oil in the bearings of the shafting acts as an insulator and it is, therefore, necessary to ground the pulley or the shafting or both.

Where the shafting is grounded, metallic brushes similar to those used on electroplating dynamos may be used. Similar brushes may also be used to ground the metal pulleys.

C. Use of Belt Preparations. Various preparations have been used with success by some companies to eliminate or prevent static charges on belts.

One company reports that the use of an emulsion of one-half glycerine and one-half water applied periodically to the outer surface of the belt was successful in eliminating static charges on its belts. The effect of this emulsion was to form a film of moisture which conducted the static charges to the pulleys, the shaft bearings being grounded.

Another company reports success when castor oil is well worked in on both sides of the belt and a coating of graphite grease is applied to the outside of the belt.

Powdered Materials

Causes. Friction between powdered materials and various objects, or possibly friction between the particles themselves, may generate static in one or more of the following manners:

- (a) Materials falling through the air.
- (b) Materials being blown through a pipe.
- (c) Ejection of the materials from small nozzles or orifices.
- (d) Materials sliding down chutes.
- (e) Handling of materials in various ways.

Static charges in the presence of powdered materials are particularly dangerous where the powdered material itself forms an explosive dust mixture with the air, thus furnishing fuel for a static spark to ignite. Powdered materials which will form explosive dust mixtures with the air include not only black powder, certain chemicals and the dust of coal, grain, flour, starch and other grain products, but also those of sugar, wood, aluminum, celluloid, cork, cotton, fertilizer, powdered milk, phonograph records, rubber shoddy, soap, shellac, sulphur, and other combustible substances.

One experimenter states that static may be found on rust particles escaping through the needle valve of a compressed gas tank. Experiments have shown, it is said, that hydrogen gas escaping from such a tank rusted on the interior, may be thus ignited.

One company reports that granular or pulverized non-conducting materials, if dry, easily become charged with static electricity when they are moved. The motion of the materials need not be violent. A bag of thoroughly dry materials, sensitive to the formation of static, may, on a dry day, accumulate quite a charge if merely lifted from the floor and set down again.

Dry materials become charged when allowed to slide down a metal or wooden chute. The charge is distributed over the individual particles and cannot be readily discharged. There is a tendency, however, for a spark to occur at the moment that the last of the material leaves the chute. Static sparks five or six inches long are said to have been produced by emptying a single tray of dry smokeless powder. This does not occur if the air is damp or the powder is "green."

Possible Remedies. Dust of powdered materials should not be allowed to accumulate in such manner as to form explosive mixtures with the air. In some instances, however, there will be unavoidable dust accumulations.

Machinery or equipment in which material is ground, or through which powdered or finely divided materials pass, should be grounded at a sufficient number of points to insure the collection of all charges. This may often be accomplished by means of copper wires securely fastened at various points to the machines, etc., and connected to pipes or other suitable conductors buried in moist earth.

One company manufacturing a food product had trouble with static where the finely ground grain was blown through cloth screens. This was eliminated by the use of fine copper wires woven into the screens and connected to the ground.

Serious troubles in connection with collection of sulphur dust in a filter type collector has been eliminated by grounding the collector bags. Another company, however, reports that after repeated experiments, it was unable to remove, by grounding of apparatus, the static charges which occurred on wood pulp in the process of drying and sifting.

Humidity may also be employed if the dampness in the air does not affect the process. Where humidity is used the articles must stand long enough in a humid atmosphere to become slightly damp and the atmosphere of the rooms in which the operations are carried on must also have a high relative humidity.

One company which experienced considerable trouble because of explosions due to the generation of static while the sulphur was being unloaded into storage bins, overcame the trouble by water sprays from sprinkler heads placed over the storage bins.

Further Studies and Tests

It is the intention of the committee to take up the static problems found in other industries and to make a study of their causes and remedies. However, it will be guided by the advice of the various Council members, who are urged to submit their problems to this committee together with test and experience data.

The committee recently completed the revision of Safe Practices Pamphlet No. 52, "Static Electricity," copies of which are now available.

A. L. ARMSTRONG (Eastman Kodak Co., Rochester, N. Y.): Are the static charges which are built up on tires carried up into the tank?

MR. OWEN: From the talk that I had with the physicist who performed that experiment, I would say yes.

MR. ARMSTRONG: Your charge is first on a non-conducting surface, the tire. You would have to have at least 300 volts to break down the resistance to get to the housing, and then, your connection between housing, springs or chassis and frame, would not be very good conductors to carry static charges.

My reason for not believing that static generated by the tires accumulates on the tank is because any static charge on a non-conducting surface must come in contact

with a collector to be taken off. For instance, you take a sheet of cloth. It is a non-conductor, but it will build up static charges in passing over a roll or by pulling it off the roll. The collector must touch that cloth along its entire width in order to take off those charges. If that were not true, you would not have static charges. Reasonably, too, if your tire were a conductor, you would not have static charges, because they would be carried to ground.

Why should static charges pass through the tire onto the wheel, onto the axle, from there to the chassis and up onto the tank and into the solvent inside of the tank. I don't believe it.

Consider static on transmission belts. You can remove the static from the belt, but the static will continue to build up on the pulley and the shafting. It won't pass from the shafting to the hanger. If you ground the hanger, you still have charges on the shafting. These charges must be built up to a potential and they have built up to a sufficient or about 300 volts to break down the resistance caused by the oil in the bearing.

Removing Static From a Non-Conducting Surface

To remove static from any non-conducting surface you usually use a collector, say needle points, as nearly in contact with the non-conducting surface as possible, and carry your static charges to ground. On the shaft and pulley, if you do not ground the shaft, you build up potentials around 300 volts. The potential on a tire would have to be about 220 volts to break down the resistance of an ordinary concrete road. I am just wondering why static charges on a tire should not pass off to the road at 220 volts and not to the tank at 300 volts?

The Standard Oil Company has removed all chains from its wagons. It is claimed all static is removed by running a chain from the running pipe down into the tank.

MR. OWEN: Have they made any tests to determine whether they have any static there or not?

MR. ARMSTRONG: I don't know.

FRANKLIN L. NEWCOMB (Standard Oil Co., New Jersey, Elizabeth, N. J.): For the past two years I have had a man riding tank trucks every week or two over long trips and short ones, under all conditions of weather, over all conditions of road, loaded fully, partly loaded and unloaded, and we have never found a single, solitary trace of static electricity on a tank truck.

We have found traces of static electricity on trailers, truck trailers. We are just as convinced as ever that negative evidence is no evidence at all; your chances of getting it are mighty slim. We do not use any drag chains on our tank trucks, and we have never had an accident due to that cause.

I think it is just as logical to put drag chains on your automobile that is carrying passengers as it is to put drag chains on your tank trucks.

MR. OWEN: How about the different climatic conditions?

MR. NEWCOMB: It seems to make no difference.

I wrote and asked Mr. Singleton where he got the dope that he had, and he said the Atlantic Refinery gave it to him. I wrote and asked them; they said that in a couple of cases running through crowded areas with lots of other motor vehicles on the street they had found slight traces of static electricity on their tank trucks. They don't know to what extent, but they did find traces of it. They laid it strictly to the exhaust of other cars.

We think that is true, because we have had the same trouble with our trailers, probably caused by the exhaust from the truck in front. They seem to be the only cases under which we have found static on these trucks.

MR. OWEN: Would you mind sending that data on for the benefit of the committee?

MR. NEWCOMB: I will if the company will permit me to.

THOMAS W. BUTLER (Standard Oil Company, Indiana, Chicago, Ill.): **What instrument did you use?**

MR. NEWCOMB: Electroscope.

M. E. ARKILL (Waterfront Employers of Seattle, Seattle, Wash.): I had a peculiar happening in the purchase of an automobile a few years ago. It developed static, and would pull a spark of about three-quarters of an inch from the door knob of the coach, and you only had to drive around one city block to get it. We chased down every conceivable thing. I went to the best electrical experts I could find. I finally decided it was in the tires. When I put on the first new tire, I eliminated the static in my car. It was so bad that I was scared to pull up to a gas station without calling the gas man to me before he reached for the gas filling plug, because I felt if he ever got there before I got hold of him, he would probably blow me up.

MR. HOMER (Youngstown Sheet & Metal Co., Youngstown, Ohio): I was just going to tell of a similar instance I had with a new car. It had just been out half an hour. A man was taking his wife out. As she got out of the car she got a shock from the handle. They tried to find the trouble. It was located in the tires. They changed the tires and it was gone. They found on experimenting with the tires, that they had used cord tires that were very loosely woven, and apparently the friction of the cord in the tires had produced the static. Upon removal of the tires, the static was gone.

MR. OWEN: The instance you cite reminds me of a condition that existed here on the motor buses in Chicago. A number of people reported that they had received shocks when they stepped off the buses to the ground. The company overcame that condition in a rather ingenious manner. A piece of quarter inch cable with one end frayed, paint brush fashion, is connected to the brake lever in such a manner that when the driver throws his brake on, this paint brush end of the cable touches the ground. It apparently removes any static on the vehicles, because since the company has put those cables on, no complaint has been made of any passenger receiving a shock while getting off a bus.

One Objection to the Grounding Chain

MR. NEWCOMB: My main objection to the grounding chain on a tank truck is that your man who is operating the truck may get careless and not use the grounding devices that are provided for him when he comes back to load, or he may not be careful in making his ground when he unloads.

We do know that during the unloading and loading operation, we must ground the tank truck. We have had cases where we had trouble and even had tank truck explosions. We had one not long ago that was caused by the grounding device being allowed to get in poor condition.

MR. OWEN: Before you start to discharge, do you always ground your tanks?

MR. NEWCOMB: Before we start to discharge, the man must bring the unloading hose in contact with the customer's tank so as to equalize the potential. He inserts the nozzle in the fill pipe, and it has got to make contact with the fill pipe. The hose is metal lined with the lining connected to both the coupling and the discharge nozzle.

When filling a tank truck we have a grounding chain which we lay across the faucets of the tank; this chain is also connected to the fill pipe. Then, we always keep the fill pipe in contact with the dome of the tank truck. We use a cup-shaped affair that just fits right in there, and we have a seal or closing valve on the fill pipe, which has enough resistance so the operator must hold that pipe in contact to keep the valve open.

MR. OWEN: If your company is willing we would like to get full details of all that information for the committee.

W. F. ROONEY (Tide Water Oil Co., New York City): I have known for some time that the Standard Oil Company has done away with drag chains, but we continue to use them, because we have no good reason yet for discontinuing their use. When the end of the chain wears off, we attach a short length by means of a harness snap.

We also use grounding clamps in unloading our tanks. I inspect all of our bulk stations twice a year and occasionally I find that the grounding connections at the loading places are in pretty poor shape. I found on some of our older trucks that the tanks themselves were insulated from the metal chassis by wood sills. On such tanks, where we ground at the loading platform and at the unloading process we never experienced any trouble at all. That helps to support Mr. Newcomb's statement that the tank truck in operation does not generate static electricity. We do use the ground chain as an extra precaution, however.

Static on Gasoline Tank Cars

MR. OWEN: On gasoline tank cars static is generally due to the friction between the flowing gasoline and the gasoline lines.

It may be that static charges are developed on tank cars while the cars are in motion, for the same reasons given for the charging of a tank truck while in motion, but since the tank car is in direct contact to ground through the rails over which it passes, it is not believed much trouble will be caused by static charges so developed.

Static hazards encountered in handling tank cars may be eliminated by establishing a permanent bond between the rail and the gasoline lines and also a temporary bond between the filling stem and the car. As a further protection against static as well as a protection against stray electric currents from sources foreign to the tank car or gasoline lines, such as street car tracks, etc., the tracks upon which the car rests while being filled or emptied are generally insulated from the remainder of the tracks and a grounding bond established between the different rails of the insulated portion of the tracks and the filling or discharging lines.

THOMAS W. BUTLER (Standard Oil Company of Indiana, Chicago, Ill.): That is purely a protection against electric current, and should be treated as such. My personal opinion is that static electricity is not a vital factor in handling tank cars.

MR. NEWCOMB: The Standard of New Jersey goes so far that we bond our rails and we directly connect our fill pipes to our rails and then our fill pipe which we clip onto the flange at the top of the tank before we allow them to put the pipe in contact with it.

MR. BUTLER: Is that done in all stations, large and small?

MR. NEWCOMB: Most of it is done in the small stations.

MR. BUTLER: Our practice is to use overhead unloading at all our stations.

MR. NEWCOMB: Even then, I think I would do it. We don't unload overhead.

A Hazard in the Unloading of Tank Cars

MR. BUTLER: This proposition has been brought up by a number of railway companies. They bring it up as a hazard in the unloading of tank cars. We have something like 4,000 or more stations scattered over the ten states of the Middle West, and we have no record of tank car fires that could possibly be caused by static electricity. We have checked up and have found that it is stray electric current that is causing all the trouble. Stray electric current is a different proposition from static electricity. I object to spending a lot of money equipping 4,000 or more stations with protection against static electricity when actually there is very little danger.

MR. NEWCOMB: I think you have very little danger, because when you open up the tank car to make your connection, you have vapors that are so rich that they won't explode anyhow.

I am more afraid of the large volume of explosive mixture at the loading operation than I am of the car full of gasoline. You could probably throw something over it to close it up.

A. L. ARMSTRONG (Eastman Kodak Co., Rochester, N. Y.): We operated for a good many years on that same theory and thought we were all right, but we did have some grief. After we had run experiments and proved that you can get an explosion with a tank car half or three-quarters full of flammable solvents, we went ahead.

Various Additional Points Are Brought Out

MR. OWEN: If there is no more discussion on tank cars, let's turn to dry cleaning.

MR. ARMSTRONG: Why is it bad to add alcohol to the cleaning fluid?

MR. OWEN: Alcohol in considerable quantities lowers the ignition point of the solvent.

R. J. CROSBY (Travelers Insurance Co., Hartford, Conn.): Why take it for granted that these things occur? Why don't we have tests made?

MR. OWEN: For the simple reason that we have no funds to pay for them. The committee's report contains numerous theories, some proved, others not proved.

MR. ARMSTRONG: I think the report should explain the method of introducing steam into the air to give the right humidity.

MR. OWEN: There is a suggestion here in the last paragraph of part "E" which reads: "Humidity may be easily maintained by allowing steam to discharge at a low constant rate from a pipe connected to the exhaust steam line of the plant."

MR. ARMSTRONG: That doesn't go far enough. It is better to introduce moisture through your ventilating system.

THOMAS W. BUTLER (Standard Oil Company of Indiana, Chicago, Ill.): I think that a constructive suggestion which should be included in the committee's report.

CHAIRMAN BECK: I was in a cement spreader house where periodically a steam hose with a one-inch nozzle was played into that room.

MR. BUTLER: That is dangerous if you use high pressure steam, for that in itself may generate static as high as 10,000 to 15,000 volts. On low pressure steam it would not apply.

An Experience in An Old Plant

MR. ARMSTRONG: You don't say anything in here about hydrometers. They should be of the wet and dry bulb type.

About humidity, we had an old plant where we were trying out explosive processes and we had continual explosions. They were daily occurrences. Realizing that it was impracticable to put in a complete humidifying equipment on a modern basis, we simply put in small circulating fans with a circular pipe through which a fine spray of water was going all the time. The idea was to raise the humidity well above the safe point, and we stopped the explosions from that day on.

D. C. WRIGHT (Western Shade Cloth Co., Chicago, Ill.): We have a man who makes an hourly inspection throughout the plant tabulating the humidity readings. Explosions were almost a daily occurrence for a period of years before we started that.

MR. OWEN: Are you ready to proceed with belts and pulleys now?

MR. ARMSTRONG: We cannot put enough humidity in the air with a six-inch belt

that is traveling at a high speed to keep that belt from building static charges. The only way to take off the static is with a collector. We use a new type of collector that was designed and built in our own plant. It is a one-inch angle iron that can't be knocked out of adjustment. We ground this collector with a number 6 wire. We drive pins through the angle iron to come within $\frac{1}{8}$ inch of the belt. The pins are $\frac{1}{8}$ -inch in diameter and are made for us by the Stainless Steel people, so they will not corrode or rust. These pins discharge with what we call a glow discharge, which is a blue flame that is not hot enough to ignite solvent vapors.

I would like to comment on the use of various belt preparations. I have been able to run experiments on all these so-called belt preparations for the last five years. I have never been able to find anything that would last more than three or four hours. We went to the Rochester Belt Company and had belts made up which were impregnated with different materials to keep them moist, and we even went so far as to have belts made with copper inserts and copper wire in them. That was going to be a beautiful patent, but it didn't work out.

Number of Collectors Depends on Size of Belt

The only logical collector is the needle point collector. That is the way we feel about it. They should never be installed so they are farther away than $\frac{1}{2}$ inch from the belt. If you don't get farther than $\frac{1}{2}$ inch, you will never get a spark discharge.

MR. MILLMAN: Do you have a particular place to put them?

MR. ARMSTRONG: There is no particular place to put a collector in relation to the belt and pulley. In dry cleaning plants and in all places where they handle solvents, it is a good stunt to steer away from wooden pulleys. You will find if you use iron or steel you will have less trouble.

MR. MILLMAN: How many collectors do you put on the belt?

MR. ARMSTRONG: That depends entirely on the size of the belt, and the load it has to pull. On most of our belts, we never have over two. With a cross belt, it is rather difficult to put them on, but it can be done. Where you have shift belts, you may have to install long collectors so the belt rides across them and at different angles.

R. J. CROSBY (Travelers Insurance Co., Hartford, Conn.): Have you made any tests in connection with the use of wire collectors or wire fastenings on belts? Do you consider the use of wire fastenings dangerous?

MR. ARMSTRONG: I don't think it has any bearing on static electricity. I don't think that a wire fastening in a belt has any bearing on the potential of static that will build on a belt.

Experience of Council Members Used

W. L. SCHNEIDER (B. F. Goodrich Rubber Co., Akron, O.): Has there been any research work made as to the type of material that belting is made of?

MR. OWEN: Not by the Committee. We have been guided by the statements made by certain members of the Council in which they have stated that belts of this construction or belts of that construction did so-and-so according to the tests they made.

MR. SCHNEIDER: I have never seen anything mentioned about the "V" belt.

MR. OWEN: No, because the "V" belt is comparatively new. Are we ready to proceed with powdered materials now?

MR. ARMSTRONG: I would suggest that the Committee write Arthur Schoen, Research Laboratory, Eastman Kodak Company, Kodak Park, Rochester, New York. I would be glad to ask Mr. Schoen to criticize the report.

MR. F. J. O'CONNOR (Du Pont Co., Wilmington, Del.): Is there anybody present who of himself has actually been present and has seen a fire or an explosion start from static electricity? I have seen in the past twelve years the reports of about 35 fires in newspapers, not engineering journals, ending with some such statement as this: "The cause of this fire is not definitely known, but undoubtedly it was due to static electricity." I think probably different persons have seen static fires in dry cleaning establishments, but I would like to ask if anybody has seen an actual fire start from static electricity outside of laboratory experiments.

A Peculiar Circumstance Causes a Fire

MR. HUNGERFORD (Firestone Tire & Rubber Co.): In our cement house early this spring, I happened to be checking up on a few rules we had issued to operators. One of the rules is that operators should not wear rubber soled shoes, due to the fact that the human body may become a fine container for static charges. It was at the end of the shift, and the operator of the spreader had gone down and changed his clothes and put on a nice pair of heavy rubber soled shoes. He came back upstairs again and stood talking to one of the other operators. As he stood there talking, a spark jumped from his finger and started a fire under the hood. Of course, we have hoods over the horizontal spreaders. There were three of us who saw the same thing. We didn't do much after it started; it didn't take us long to get out through the three big doors. (Laughter.) I guess I tried to go through two at once.

CHAIRMAN BECK: I would like to supplement what has just been said. We had a man who carried an unusual amount of static; some people do. This fellow was constantly setting fire to our spreaders. We installed a hose line alongside of his station. Then we grounded the man by requiring him to stand on a grounded metal plate and thereafter we had no trouble with his starting fires.

MR. ARMSTRONG: One of the largest dry cleaning plants in the State of New York is in our city. The owner, not thinking what he was doing, installed rubber tired wheels on his trucks carrying the clothing. He had about six fires in one day. Whenever an employee would walk near one of the trucks, a fire would start.

In *Chemicals* about six months ago appeared an article in regard to static electricity. Two men were filling a barrel with a certain chemical. The barrel was set on a scale that was set on wood. They had grounded their pipe but had forgotten to ground the funnel. When they removed the funnel, a static spark was formed and both men were killed. That was actually seen by two other men.

CHAIRMAN BECK: Mr. Armstrong, do you think, on booster tanks they would be better with metal rim wheels?

MR. ARMSTRONG: Yes. We use the bronze wheel.

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): Would not the static be discharged anyway when you let your handle down, because on the feet there is metal on the booster tank and just two rubber tires?

CHAIRMAN BECK: Yes, I think that is so.

Example of An Accident to a Tank Car

G. R. G. FISHER (Ill. Manufacturers Association, Chicago, Ill.): Is there anybody in the room familiar with the type of hose to be used when steaming tank cars to eliminate or minimize the possibility of building up static charges?

THOMAS W. BUTLER (Standard Oil Company of Ind., Chicago, Ill.): I have no personal experience, and I am not familiar with refinery practice. I would say off-hand that a metal lined hose permanently connected to the tank car would eliminate any danger.

MR. FISHER: I might give the instance which prompted the question. Two months ago we had a tank car come in for repair, and it blew up. I pronounced it static electricity. One of the men said it couldn't be that because they had used a rubber hose.

Two years before on a similar case two experts on static electricity recommended the elimination of metal connections on the rubber hose. They said, "If you eliminate the metal and use the rubber hose entirely, you will eliminate static. We ran some extensive experiments at the refinery on static electricity. We have spent a lot of money in putting in metal wrapped hoses. We also have grounded the steam line.

MR. OWEN: Is there any further discussion? Understand, please, that this is only a progress report. Various ideas have been presented for you to discuss. Any data or information that you can give the committee will be much appreciated. We are trying to help you solve your static electricity problems. The more cooperation you give the committee, the sooner we are going to find the answers to your problems.

CHAIRMAN BECK: I would urge our members to submit to this committee the data developed by their research laboratories. It wouldn't be possible for us to begin to do what some of you are doing in your own laboratories, but if we pool our data we will accumulate a vast fund of valuable information for the benefit of all. We have been fortunate in getting a man like Mr. Owen to serve as the secretary of our committee. You have seen a sample of some of the work that he is doing this afternoon.

We have one other progress report to be presented by the Committee on Wire Rope Attachments and Connections. In Mr. Sunderland's absence I am going to ask Mr. James to lead the discussion.

Progress Report of A. S. S. E.—Engineering Section Research Committee on Wire Rope Attachments and Connections

Charles C. Sunderland. John A. Roebling Sons Company, Trenton, N. J.

History and Scope of Committee

In January, 1926, in order that an impartial study of wire rope fastenings might be made and because of the importance of the problem to industry and the Safety Movement in general, the A. S. S. E.—Engineering Section of the National Safety Council formed a committee known as the Committee on Cable Splices and Clamps, to make a study and report on the efficiency of the various wire rope fastenings in use. Since the title of the committee did not clearly indicate the purpose for which the committee was formed, its title was afterward changed to Research Committee on Wire Rope Attachments and Connections. The personnel of the committee consists of representatives from interested manufacturing firms, associations, etc., and is as follows:

Chairman, Charles C. Sunderland, John A. Roebling's Sons Company, Trenton, N. J.

Secretary, Stewart J. Owen, Jr., National Safety Council, Chicago, Ill.

C. B. Auel, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

K. M. Bradley, General Electric Company, Lynn, Mass.

Sidney V. James, Underwriters' Laboratories, Chicago, Ill.

E. O. Keator, Dayton, Ohio.

Harry J. Leschen, A. Leschen and Sons Rope Company, St. Louis, Mo.
 N. O. Lindstrom, A. B. See Elevator Company, Jersey City, N. J.
 Homer J. Weeks, American Steel and Wire Company, Cleveland, Ohio.
 Eli Weyhenmeyer, Hazard Manufacturing Company, Wilkes Barre, Pa.
 S. E. Whiting, Liberty Mutual Insurance Company, Boston, Mass.

Suggested Plan of Procedure

There is a difference of opinion as to the efficiency of many wire rope fastenings now on the market, particularly those of the clip or clamp types. In order that the actual facts might be determined in a systematic manner, the following plan of procedure has been prepared.

The principal wire rope attachments and connections can be listed as follows:

- Socket Attachments Using Zinc Method.
- Socket Attachments Using Babbitt
- Wedge Sockets.
- Swedged Attachments.
- Thimble and Clip Connection.
- Thimble and Clamp Connection.
- Sheave with Clip or Clamp Connection.
- Combined Thimble and Clamp Connection.
- Spliced Eye and Thimble Connection.
- The Contractor's Stand-by.

Socket Attachments Using Zinc Method

In regard to these attachments, it will be necessary to investigate the strength of this connection with various degrees of poor workmanship, and this investigation might show that with a socket of liberal design, even poor workmanship will not affect the strength of the connection to a serious extent. It will also be advisable to investigate the strength of the socket attachment using the zinc method, but making the attachment with babbitt instead of zinc. The results will be sufficiently striking to show the user how dangerous it will be when using such a combination.

Socket Attachments Using Babbitt

The National Safety Code for Elevators, specifies the method of making socket attachments with babbitt, and states that these attachments must develop 80 per cent of the ultimate strength of the rope, and this is possible on elevator ropes which can be considered medium strength ropes, but it is not possible to secure 80 per cent efficiency when using this method for high strength ropes. An investigation of this method in connection with high strength ropes, should be made, so that the user can be fully informed as to the actual strength of this attachment in connection with high strength ropes.

Efficiency Depends on Design of the Socket

Wedge Sockets

It is stated that a wedge socket connection will develop from 70 to 90 per cent of the ultimate strength of the rope. This efficiency, however, is dependent on the design of the wedge socket, the diameter of rope, and whether or not rope is low or high strength rope. Tests should be made so that proper values could be quoted for the conditions specified.

Swedged Attachments

Swedged attachments for wire rope are being offered to the trade as 100 per cent attachments, but we find that the efficiency is variable depending upon the rope diameter, therefore, this matter should be investigated and results tabulated to give full light on the subject.

Thimble and Clip Connection

Although considerable investigation has been made in regard to the efficiency of clip connections, there is still further work to be done, to eliminate the confusion now existing in the mind of the consumer as to the actual number of clips required (of various designs) to develop the maximum efficiency of the connection. For example, *four* clips on a Plow Steel Rope may be sufficient to develop the maximum efficiency for this rope's strength, but if four clips were used on a Blue Center Rope, it would be possible to attach these clips with sufficient pressure to break the rope, but if *six* clips were used with lighter pressure, the efficiency of this connection would be at least 10 per cent higher than if *four* clips were used.

Thimble and Clamp Connection

The design of a clamp has great bearing upon the efficiency of this connection, therefore, a series of tests should be made with *three* bolt clamps having straight grooves in comparison with *three* bolt clamps having one set of grooves corrugated to fit the rope lay. The comparison of these tests, would strikingly show the necessity of the later design.

Sheave with Clip or Clamp Connection

Sometimes a moderate diameter sheave is used instead of thimbles in connection with clips or clamps, but in this case the snubbing action of the rope around the thimble being absent, requires the use of more clips or clamps than when used in connection with the thimble.

Combined Thimble and Clamp Connection

There are various designs of combined thimble and clamp connections, some of which are very efficient, and others that have very little merit. It might be advisable to make tests and point out the differences, so that the user will be fully informed as to the safety of this connection.

Spliced Eye with Thimble

There are at least *five* different methods of making spliced eyes, some being more efficient than others. A series of tests should be made to determine the relative strength of the different methods of splicing eyes.

The Contractor's Stand-by

A series of tests should be made to show how dangerous this type of connection can be. These tests can be used as basis for a definite recommendation advising against the use of this connection.

Clip or Clamp Connection without Thimble

This is very bad practice, and tests will show the danger of this combination.

Studies and Tests

It is the intention of the committee to study all of the wire rope fastenings now in use.

In some cases tests have been made, the data of which will be used by the committee. However, in many cases it will be necessary for tests to be made, in order to learn the true facts in an impartial way in regard to some fastenings now on the market.

The various members of the Council are urged to submit their wire rope attachments and connections problems to the committee together with test and experience data.

The committee has recently completed the revision of Safe Practices Pamphlet No. 26 "Manila and Wire Rope," copies of which are now available. In the revision of that pamphlet the committee has given considerable time and study to that part dealing with wire rope fastenings.

The Committee Asks For Test Data

SIDNEY V. JAMES (Underwriters' Laboratories, Chicago, Ill.): In the absence of Mr. Sunderland, who is the chairman of this committee, I have undertaken to present the committee's progress report.

You will note that the report classifies the various methods of attaching and connecting cables and then discusses each one separately in a general way, pointing out its limitations and outlining what information is available on that subject. In most cases you will find the committee recommends that tests be made on which sound conclusions can be based. Perhaps some of this test data is already available. If so, the committee will appreciate your bringing it to their attention.

The first item mentioned in the report is the zinc socket. Has anyone anything to say on this subject? The report outlines the limitations and the principal features to be kept in mind handling this method. Is there anyone here who would care to discuss this method, outlining their own experiences with it, and giving any thoughts that they might have to convey to the meeting on the use of this method of attachment in fittings?

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): In setting a socket with zinc, it is customary, I believe, first to pickle the ends of the wire with an acid to remove the grease. Is there any way known to overcome the continued action of the acid?

MR. JAMES: I believe it is generally recommended practice to neutralize the acid after cleaning the wires. Any alkaline solution such as soda is suitable for this purpose. Of course, in the use of rope having a hemp core, the core is cut off at a point beyond which the wires are not cleaned. It is best not to let acid touch the hemp core; otherwise capillary action may cause premature deterioration of the rope.

If there are no further comments on this subject, let us turn to babbitted sockets and wedge sockets.

C. D. MEALS (American Cable Co., New York City): Regarding wedge sockets, I doubt your ability to get an efficiency of 70 to 90 per cent of the rope strength under operating conditions. In a measure the efficiency is increased as you would increase the diameter of the wedge.

Discussion About Babbitted Sockets

In the wedge sockets they use on shovel ropes, however, they naturally try to keep the weight of the fitting down and they make the wedges too small for the rope diameter.

In traveling around the mining country, I find they invariably use babbitt for the sole reason that they have it around for other mechanical purposes. They don't keep zinc around the plant. The Hudson Coal Company, however, didn't like the idea of bending the strands back so they had a special socket designed that was possibly three times the length of the standard socket. They had no trouble with it.

MR. JAMES: Is any special precaution taken to clear them before the babbitting?

MR. MEALS: They simply clean them with boric acid and water.

MR. ARKILLS: I believe the wedge socket is lower in efficiency than the zinc because you can't get equal pressure on all wires.

The local branch of the Roebling Company out in Seattle tells us that zinc is the only thing they recommend because of its nearly one hundred per cent bending ability. They don't recommend turning back the end of the wire.

I will send the committee a paper that was written by our safety committee. We are printing a thousand copies for distribution to friends that have been asking for it. We have sent out over two thousand mimeographed copies of it already.

Experience of the Pacific Coast Logging Industry

MR. JAMES: The committee will be very glad to get it.

H. SLEERE-CLARK (British Columbia Loggers Assn., Van Couver, B. C.): The logging industry on the Pacific Coast is using the strand back in the sockets. They break chokers to the extent of four or five per day in every operation.

MR. MEALS: They could break the cable and still be at one hundred per cent efficiency.

MR. CLARK: The breaking of the cable occurs from any place up to the choker hook.

MR. MEALS: It is unusual to break six strands of a rope.

CHAIRMAN BECK: Some inspectors of insurance companies are asking that elevator cables be resocketed each year. How often do they need to be resocketed?

MR. JAMES: I don't believe that there is enough information available at the present time to answer that question.

MR. MEALS: Our laboratories made some tests a few months ago with the ordinary method of socketing elevator ropes and then with the new method which we have developed. We rigged up a trimming press and fixed the stroke so that we would vary the load from zero to 25,000 pounds. That was on a five-eighths elevator rope breaking at 1,000 pounds. We found that with the babbitt connection after, I think, about one-quarter of a million cycles of operation of this press that the wire started to break at the entrance to the socket. Upon further investigation under a microscope, we found it was really due to a side brittleness.

CHAIRMAN BECK: Is there any twisting of the cable?

MR. MEALS: We had relieved that.

The Fitting Is in the Form of a Cylindrical Sleeve

CHAIRMAN BECK: I am wondering if that is not a factor in a great many cases.

MR. MEALS: I think it would be.

MR. JAMES: The next is the swaged attachment.

MR. MEALS: I think our company is the only one that makes them. The report says the efficiency is variable depending upon the rope diameter. We have swedges which are essentially a cold flowing of steel on steel, and in doing that you swedge the material around your strands and around the component parts of your wires. It is merely a matter of getting enough wire surface in contact to get one hundred per cent efficiency.

This fitting is in the form of a cylindrical sleeve squeezed on to the rope. We know in a general way that a fitting whose length is five rope diameters will give us one hundred per cent.

LLOYD A. BALLENTINE (American Cable Co., New York City): We are beginning to put out another fitting made of aluminum, which is lighter than steel. We

squeeze it on with a hydraulic press, and we are able to develop between 95 and 100 per cent of the rope strength. Aluminum, of course, flows easier than the hard steel. The tests are more uniform than with other attachments.

MR. JAMES: I witnessed some of the tests that were run at the Underwriters' Laboratories. It is an outstanding feature thus far that the uniformity runs extremely high.

Now, we come to the various types of clip and clamp connections. There seems to be no conclusive test data available at the present time and the committee is considering the advisability of having special tests made.

ADJOURNMENT

Wednesday, September 28, 1927

The second session of the American Society of Safety Engineers—Engineering Section of the National Safety Council was called to order at two-ten o'clock by the chairman, Ernest W. Beck, United States Rubber Company, New York City.

CHAIRMAN BECK: In order for me to speak of the activities of the A. S. S. E. during the last year, it is necessary to mention the good work which has been done by the various committee chairmen.

One new chapter has been organized as a branch of the Metropolitan Chapter and is known as the Northern New Jersey Branch of the Metropolitan Chapter.

Six engineering clubs have also been organized, operating in most cases with local safety councils.

During the last few months, the A. S. S. E.—Engineering Section, has devoted considerable time to organizing a large body of engineers, members of this section who are serving as representatives of the A. S. S. E. in their particular field; with the object in mind of bringing about a closer cooperation with various local branches and chapters of engineering societies. They are encouraging the holding of regional conferences, suggesting topics and speakers for their programs and cooperating with them on safe practice pamphlets and code work.

We have received an excellent response from our members selected to work with the various branches and chapters of engineering societies, and we look forward to a better understanding of purpose than ever before.

Our Committee on Research, Standards and Codes has many problems which it is working on.

About 14 engineering problems are under way, and we are represented on about 30 other codes. This committee is a very important one, as it serves as the engineering clearing house for the council.

Our membership has continued to increase, and we now have nearly 1,000 members. In order to do research work on an outstanding accident hazard, our headquarters office has arranged for an appropriation to take care of doing research work on the subject of circular saws.

The problem of annealing chains is also being considered as reported by the chairman of this committee.

Regional Safety Conferences have been held in 18 cities. In each case, we have cooperated with all the safety and engineering bodies located in the particular vicinity. This work should be increased and I believe more meetings should be held. It is possible for our different sections in the Council to hold regional conferences.

We have been fortunate in securing the assistance of Mr. S. J. Owen, who is a member of the headquarters staff and serves as secretary of the research committees.

Before bringing my few remarks to a close and calling upon the various chairmen for a report of their committees, I would like to state at this time that I believe the A. S. S. E.—Engineering Section should serve as a clearing house for all safety industrial codes on which the National Safety Council may act as sponsors. There are so many codes and safety standards being drawn up today that it is difficult for any one person to keep track of them all. Some of these have been drawn up without the proper representation on the sub-committees. It is very important that the A. S. S. E.—Engineering Section should know the progress made by every code which the Council is sponsoring, and also be in a position to follow up such codes that the Council is sponsoring during the period which they are being drafted.

CHAIRMAN BECK: We are extremely fortunate today in having with us the man of whom I always think when the word "code" is mentioned, Dr. P. G. Agnew, secretary of the American Engineering Standards Committee, New York City.

Safety Codes as Company Tools

**Dr. P. G. Agnew, Secretary, American Engineering Standards Committee,
New York City**

One of the favorite bones of contention in safety meetings is, shall the subject be approached as a personnel or as a problem of equipment? Does the path of safety lie through the development of the correct attitude of mind on the part of the individual or does it lie through administrative organization and physical equipment?

Today most of us will agree that these two points of view are not antagonistic, but that they are complementary. We might as well ask which is most important in a building, the bricks or the mortar? Manifestly both the bricks and mortar are essential, and we cannot manage without either. No matter how fine the physical equipment, nor how perfect the organization, accidents are sure to arise if we do not have the right attitude on the part of the individual worker. In the same way, no matter how fine the attitude of the individual worker may be, hazards and resulting accidents are sure to follow unless there be proper administrative organization and proper physical equipment.

In the first place, it is essential that the individual develop the right thought habit; it is equally essential to develop the right kind of organization routine, that is to say, habit.

One of my teachers frequently made use of an expression that has been of great value to me: "the thing must be beaten into the habit of the mind." Just so, the thing must be beaten into the habit of the company's mind.

What has all this to do with safety codes? Everything. When the safe and efficient way of carrying out an operation has been beaten into the habits of the minds of the individuals concerned in the operation, and when it has also been beaten into the habit of the organization's mind, we have merely codified the matter.

Take as an example the safety code for abrasive wheels. In a long industrial experience with grinding wheels, a large body of information has been developed in regard to the nature of the hazards and great progress has been made in finding solutions for all of the more important hazards; limiting speeds to keep the centrifugal forces within proper factors of safety; the strength and range of protecting hoods; proper limiting angles of exposure; methods of operation and inspection. The most practical solution of each of these and a score of other questions have been codified as a simple set of rules and suggestions covering the use, care and protection of abrasive wheels. These features are becoming beaten into the habit of mind of those industries in which the abrasive wheel is an important tool.

When a manufacturer has need of a turret lathe, he does not start out to re-invent and build such a machine. He buys the lathe as a complete tool, installs it in his shop, and after making any necessary adjustments to fit it to his particular task, puts it to work as a part of his tool equipment.

Why should he not do precisely the same thing with a safety code pertaining to his business? It is not necessary for him to await a series of accidents in his shop to teach him wherein the hazards lie. He may take over as a part of his capital equipment the experience of the whole industry, not merely in discovering where the hazards lie, but may also have the benefit of the solutions which have been reached as a result of many years of painstaking study and work. The code, in fact, combines the experience not of one industry alone, but of many diversified industries.

Why a National Code? The wider and longer the experience on which a

code is based, the more valuable does it become as a ready-made tool for the use of the whole industry.

So complex has modern industry become that in seemingly simple matters the number of groups with experience in a subject of this kind, and therefore with a real contribution to make, is surprisingly large. Consequently each of the national codes is developed through a joint technical committee made up of the accredited representatives of all such interested groups; manufacturers through their national trade associations; state commissions having regulatory authority over safety matters in the industries, or charged with the administration of accident compensation, through their national association; employing groups using the equipment in question, through their respective trade associations; casualty insurance companies through their two national organizations; the workmen whom the code is designed to protect, by representation arranged through the U. S. Department of Labor upon nomination by the workers' organizations concerned; national engineering societies; technical bureaus of the federal government interested in the subject; and independent specialists. In all seventeen national organizations were represented on the joint committee for grinding wheels, which had thirty members. After two years of careful and persistent work, unanimous agreement upon a complete code was reached, and it was issued as an American standard code, in accordance with the regular procedure of the American Engineering Standards Committee, the national clearing house for standardization work.

Thirty Thousand Copies of Code Distributed

In order to place the results of all this experience and work at the service of their customers, to be used by them as a tool in the prevention of accidents in their shops, manufacturers have distributed 30,000 copies of this particular code among the firms using grinding wheels.

When one considers the interstate character of most of our industries, and the inconvenience and unnecessary loss in the manufacture, distribution and use of apparatus, resulting from conflicting requirements in the various states, no detailed argument is necessary.

The national safety code program which has been outlined, was launched as a result of prolonged consideration on the part of all interested groups, and after two large and thoroughly representative conferences held at the Bureau of Standards in 1919, at the last of which unanimous agreement was reached upon the general plan which has been followed.

In the important investigation of the relation of safety to management efficiency which has been carried out by the American Engineering Council and which has already been reported to you, a fundamental thesis was established, namely, that there is a most intimate relation between the efficiency of management and the accident record of a company. As stated by L. P. Alford: "The safe factory in general is the efficient factory; the efficient factory in turn is the safe factory."

The following statement is made by Albert W. Whitney and Sydney J. Williams:

"Suppose a box falls off a loaded truck and kills a man: For every such case which results in a physical injury there will be perhaps a hundred cases where a box falls off without injuring anyone. But in every one of these hundred cases either the box will be broken or in any case the truck will have to be stopped and the load repiled. While, therefore, there will be only one case of physical injury, there will be a hundred and one cases of inefficiency. An accident is something gone wrong and it can result only from causes which have their effect over a far wider field than that of the immediate accident itself.

The physical injury is only the spectacular evidence of some underlying maladjustment in the same way that a headache is only an alarm bell that calls attention to something that is wrong within."

In other words, if we do each job in a sound engineering way, which means the industrially efficient way, using these words in their broadest sense, we shall be taking steps to reduce accidents to a minimum. This ties up directly with the fundamental principle of industrial standardization. Mr. Whitney has elsewhere stated that standardization is the habit-forming process of industry.

The efficient plant is one which has standardized its products and reduced its operation to a systematic, effective routine. As an industry, it has formed sound, efficient habits.

In bringing this about, the plant will have saved itself much trouble and expense, and will have saved its employees from unnecessary injuries, if it has used as tools the codes available on this special subject dealing with the machinery and processes involved.

American Engineering Council Findings

The findings of the American Engineering Council show that "quality and thoroughness of management which secure consistently high efficiency of production as a major objective, will also attain a high safety record as an accompanying major objective." They also show that "maximum productivity is dependent upon the reduction of accidents to an irreducible minimum. There is such a close relationship between safety and production that it is impossible for a plant to have continued increases in productivity unless it reduces at the same time its accident rates."

A plant that will take its place in the forefront of the industry will do well to make a careful study of each of the national safety codes dealing with its work, and put into use those parts of them which are applicable to its operations.

No plant can afford to overlook new developments in the equipment and tools relating to its business. In precisely the same way, it cannot afford to do otherwise than make use of the National codes which are applicable to its work as these codes are developed. The representative sectional committee in charge of each code is a continuing body which stands ready to serve in interpreting and clarifying questions with which the code deals and in keeping the code abreast of developments. These committees are always glad to be of assistance to companies interested in the use of the codes.

Just a final word in regard to the voluntary use of codes in industry and their administration by state commissions. In the opinion of the American Engineering Standards Committee and of the men who are taking part in the development of some fifty national codes, the voluntary adoption of the codes by firms concerned is even more important than the legal adoption by the several states. Those companies to which industry looks as leaders in the development of the industry in economical and efficient operation, in personnel policies, and in safety work, are the ones which are least affected by the regulations of state commissions. They lead rather than follow the commissions and are the ones who are in the forefront in the development of the national safety code program.

CHAIRMAN BECK: I am very much impressed with the way Dr. Agnew emphasizes the word "tool." So many of us have felt that codes are abstract. You have given me the thought that codes can be used as tools to promote safety and to increase production. Each of us should study the codes applying to our specific industries.

Copies can be secured by writing the National Safety Council Headquarters in Chicago.

C. B. AUDEL (Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.): I think we are apt to dismiss Dr. Agnew's remarks with insufficient thought as to what he has intended to convey. There is no question in my own mind as to the value of his remarks. From my standpoint they permit of no discussion. The only unfortunate thing about the work that Dr. Agnew is engaged in is that it is not sufficiently well known, and apparently the American Engineering Standards Committee at present lacks a publicity department. We should one and all endeavor to advertise the work of the Engineering Standards Committee along three lines: First, among the users of such codes like ourselves; second, among the various states, some of whom even yet apparently (I say apparently, and I can only judge by appearances) have never heard of the American Engineering Standards Committee, and are consequently too apt to change state laws from year to year so that it is almost impossible for those of us doing an interstate business to keep up with them. The third line of advertising we should give these codes is amongst the manufacturers of machine tools, and, again, some of those as yet do not know of these codes. Each one of you should take it upon himself and not leave it to anyone else to do his share towards making known the work being done by the American Engineering Standards Committee, and the fact that you are heartily in accord with it.

CHAIRMAN BECK: The next subject will be "Annealing Chains." Mr. R. F. Thalner, of the Buick Motor Company, Flint, Michigan, chairman of our research committee appointed to study the subject, will present a brief summary of his committee's report.

Brief Summaries of Reports Presented

(Mr. Thalner presented a resume of the Progress Report of the Committee on Annealing of Chains. This report is presented in full elsewhere in these Transactions.)

CHAIRMAN BECK: Our next subject will be the question of "Noise—a Factor in Accident Causation." We are fortunate in having with us Dr. H. Clyde Snook of New York City, who, as chairman of our special research committee, will present a resume of this report.

(Mr. Snook presented a resume of the Progress Report of the Committee on Elimination of Harmful Noise. This report is presented in full elsewhere in these Transactions.)

MR. AUDEL: May I ask if Dr. Snook's committee is to study industrial noises? We would be pleased to have something on the reduction of noise in screw machine departments.

DR. SNOOK: We are quite convinced that we haven't enough facts to enable us to outline a proper method of attack upon any phase of the problem at the present time. We do not know how noise affects the individual. We have available a large body of knowledge that tells us how noise originates, and how with some engineering effort noise may be suppressed or reduced. Noise reduction or suppression requires skillful engineering. It is done with some difficulty at the present time. Each such job of noise reduction is an original research job, but how far noise reduction should be carried, to what noise level, to what energy level the noise should be reduced, is not now known. Because of this fundamental weakness in our position the committee believes that its greatest opportunity to render service in connection with the noise problem is to determine what the effects of noise are upon the human organism, psychologically, physically, or physiologically, and that involves hearing. That brings in the otologist who studies the science of how we hear and what we hear. The psychological reactions of human beings to noise brings in

the psychologist. Possibly there are physical reactions to noise other than those that come through the sense of hearing. Many of us believe there are nervous reactions to noise, and that brings in the neurologist. As I said before, the physicist has his job well in hand and is proceeding rapidly with it. On that account we feel these other scientists should become interested and enable us to assert a sufficiently clear, definite and large body of facts that we may know what noise does to the human being, and thereby be in position to define how harmful it may be to any and all of us.

We look upon noise elimination in industry at the present time as a specific problem to be considered by the individual manufacturer. We are not yet in a position to help him. He has available at the present time just as much information in the literature as we have regarding the methods of eliminating noise, and, as the report says, the committee does not now know whether the principal attack should be upon the suppression of the sources of noise or whether it should be upon the protection to the individual against existing noise, or whether both things should be done. We are not now in position to say, but we do believe that when, let us say, the medical profession, exclusive of all these scientists that will study the reactions and effects of noise upon the human organism, have given us sufficient information and enough facts about what noise does to the human being, we then will be in a position to make a definition of harmful noise, and we then will be of some help to our friends who now wish to eliminate noise.

Work to Eliminate Noise On Screw Machines

MR. AUEL: Perhaps some of our membership have already made certain investigations and are able to give us a little help without waiting for the committee. We have done considerable work in screw machines, and we get some curious results where we can pretty nearly eliminate noise with the round bar, we can't do it quite so well with the hex bar, and even less with the square bar, but, generally speaking, the best results we have gotten so far have been with the use of two tubes, one inside the other and the intermediate space filled with oil. We set up these tubes at the tail end of our screw machine and allow our stock to rotate inside the tubes. That is not wholly satisfactory, but it is better than anything we have run across. Maybe some of our people have worked along different lines and have gotten some really worth while results. Unless the committee has accumulated such data there might be something that is available for the membership right now simply for the asking.

H. W. MOWERY (American Abrasive Metal Co., New York City): In conjunction with the annual report of the Noise Committee last year, which I had the pleasure of presenting, there was considerable data given as to ways and means of eliminating a variety of noises. In ice cream plants, in various types of machinery through insulation and otherwise, we gave considerable data on how to eliminate noises.

But to my mind, at present, one of the principal problems of the committee is this: We have absolutely no data to show that noise is resulting in casualties in industry. We believe there are numerous cases where accidents are caused by noise preventing employees from hearing warning signals, for instance. But it was with the idea that we find out first whether noise really was harmful to the individual before we went any further in the campaign to determine what noises should be eliminated. It is possible that the noises in the screw machines are very unpleasant. Does the prevalence of such noise result in accidents? Does that noise result in undermining the physical resistance of the employees? These are some of the questions that we felt should be answered before we started a direct effort to eliminate such noises.

MR. COMPLIN (Ford Motor Company of Canada): I remember about two weeks

ago reading an article in a newspaper. They found by actual test that stenographers on silent machines were turning out more work and better work than those using the noisy machines. Surely the workman, by doing away with noise, will probably get more and safer production.

CHAIRMAN BECK: In my own office our people seem to work more efficiently when the noiseless machines are operating.

DR. SNOOK: There has been some investigation made with respect to the point raised by the last two speakers. Fortunately, one of the members of the committee was the first to make some study of the effect of noise upon the efficiency of the worker and the rate of speed of the worker. Professor John B. Morgan, Northwestern University, in 1916, then at Columbia University, published a booklet giving the results of a two years' investigation of the effect of noise upon the speed of workers, upon the reactions of a large number of individuals, and he found that at first, generally, there is a reduction in the efficiency of the individual, and a little later on, while the noise still continues, the individual attempts to compensate for the handicap of the noise, and in many instances over-compensates and speeds up beyond the normal speed that existed without noise being present. Individuals vary in this respect, and the matter of fatigue was not thoroughly investigated, but it was this work that is the basis of our understanding at the present time that noise causes the individual to consume more oxygen, breathe more rapidly, exhale more carbon dioxide and use up his energy more rapidly. The subject is not thoroughly studied and on that account the committee does not at this time wish to commit itself to anything further than that which is contained in the report. The subject needs investigation. We need more facts. We all think we see certain results of noise. What we see influences us very greatly, and they may be only individual variations. Generalizations are very dangerous at this stage of our incomplete knowledge of the effects of noise upon the human being.

Accident Prevention in Engineering Colleges

MR. CONNER (The U. G. I. Contracting Company, Philadelphia, Pa.): We have one shop in which there are several noisy machines, but we have not noted any ill effects. I think it is, in a measure, getting one's self accustomed to the situation. I know myself when I go into that shop, that the noise annoys me until I am there for about a half hour, then I get accustomed to it. So far as the men in that shop are concerned, I don't think noise affects them whatever. Possibly it might affect them when they go home, missing that noise.

CHAIRMAN BECK: I think there is a great deal in accustoming yourself to the noise. After you live with a noise for a time, it becomes a part of the rhythm.

At this time I am going to call upon Mr. R. McA. Keown, Industrial Commission of Wisconsin, Madison, Wisconsin, to present the report of the committee of which he is chairman, on "Accident Prevention in Engineering Colleges."

R. McA. KEOWN: The report of this committee is to be very brief. We had hoped that our work would be complete and in operation by this time, but there have been some unavoidable delays. Ten men have agreed to write eleven illustrated lectures on various phases of accident. Eight of these eleven lectures have been drafted and we are now awaiting authorization by the executive committee of the Council to have them published in pamphlet form for distribution to engineering colleges where they will be presented to students as a lecture course, either in connection with regular classes or at meetings of the student branches of the founder engineering societies.

MR. GEORGE SANFORD: As a representative of the American Society of Mechanical Engineers and American Institute of Electrical Engineers, I was recently called upon by both organizations to assist them in their end of the job of promoting accident prevention in engineering colleges. Accordingly we are asking a competent safety

engineer, or a representative of some member of the Council near each technical college or university to help the professors and student branch officers in that college to give accident prevention the consideration it deserves. This is just a starter. It has the backing of the A. S. M. E. and A. I. E. E., so the plan cannot fail to accomplish a lot of good.

CHAIRMAN BECK: Mr. Sanford will now present the report of the nominating committee.

Report of the Nominating Committee

The Nominating Committee, including W. S. Paine, H. W. Mowery, C. P. Tolman and myself, after considerable study and obtaining advice from a number of the members, decided on the following slate:

ASSISTANT SECRETARY: MRS. G. S. WOOD, New York City.

SECRETARY: MR. W. DEAN KEEFER, National Safety Council.

FOR EXECUTIVE COMMITTEE FOR THREE YEARS:

DR. M. G. LLOYD, U. S. Bureau of Standards.

MR. R. C. STRATTON, Travelers Insurance Co., Philadelphia.

MR. J. B. GIBSON, Western Electric Co., Chicago.

VICE-CHAIRMEN: MR. W. GRAHAM COLE, Metropolitan Life Insurance Co., New York, and our old friend, JIM BANASH of Chicago.

And for chairman, a man who needs no introduction. I believe you all know him, Mr. R. McA. Keown, engineer, State Industrial Commission, Madison, Wisconsin.

CHAIRMAN BECK: You have heard the report of the Nominating Committee.

H. W. MOWERY (American Abrasive Metal Co., New York City): I move that the secretary be empowered to cast a unanimous ballot in favor of the slate as submitted.

MR. KEPNER: I second the motion.

(The motion was carried.)

CHAIRMAN BECK: The secretary has cast such a ballot. We would like to hear from Mr. Keown, our new chairman.

MR. McA. KEOWN: Mr. Chairman and Members of the Section: I thank you most heartily for this honor that you have given me. I hope that I may measure up to it; and that this section, which I think ought to be, and is, the backbone of all of the sections of the National Safety Council work, may continue to advance and grow, and I hope that with the cooperation of the other officers, the Executive Committee and the membership we may make that possible during the coming year.

CHAIRMAN BECK: This will be an appropriate time for us to take action on the suggested changes in the Constitution. I will ask Mr. Keefer to say a few words on that subject.

W. DEAN KEEFER (National Safety Council): These suggested changes in the Constitution and By-Laws were published in a recent issue of the NATIONAL SAFETY NEWS, as required by our Constitution, and I imagine a great many present have already read and studied them. Mr. Chairman, I move the adoption of the following amendments:

Article IV. Officers and Executive Committee.

1. The officers of the society shall be a chairman, two or more vice-chairmen, and a secretary. There shall be an executive committee consisting of the officers, nine committeemen at large, all past chairmen of the ASSE-Engineering Section, one committeeman representing and appointed yearly by each chapter of the ASSE-

Engineering Section, and one committeeman representing and appointed yearly by each of the industrial sections of the National Safety Council. All such officers and committeemen shall be chosen from the corporate membership.

Article III. New York district.

There shall be an assistant secretary of the ASSE-Engineering Section with headquarters in New York City, who, with the regularly elected officers of the Metropolitan (New York City) chapter if such a chapter is functioning, shall conduct the activities of that chapter, including monthly meetings.

MR. AUEL: I second the motion.

(The motion was carried.)

CHAIRMAN BECK: Our next subject for discussion this afternoon, gentlemen, will be "Wire Rope Attachments and Connections." In the absence of Mr. Sunderland, chairman of the committee, I will ask Mr. Owen to present a summary of the report.

(Mr. Owen presented a resume of the Progress Report of the Committee on Wire Rope Attachments. This report is presented in full elsewhere in these Transactions.)

DR. LLOYD: What I am about to say is already covered in that report, but the speaker has referred to the use of zinc and of babbitt in cable fastenings. I think there is some information on that. That ought to be known by the members of the section. The manufacturers are not working at all in the dark when they claim a higher strength of fastening by the use of the spelter in cable connections. Tests have been carried out on that subject at the Bureau of Standards and very definite results obtained showing that a stronger, better fastening can be obtained by using spelter. However, the job must be done by an experienced man. It is quite possible that the ordinary man working under other than ideal conditions won't make as good a fastening on the job with spelter as he might with babbitt. It has been mentioned that the elevator manufacturer prefers babbitt, and I think probably that is the reason; that under the conditions customarily met with out on the job, they know from experience they actually get a better job with babbitt than they do with spelter. Now, recognizing those conditions, the committee on the elevator safety code has in that code given definite recognition to the use of babbitt for making cable connections. This point should be generally understood.

CHAIRMAN BECK: We will now hear the report of the steering committee on regional conferences. Mr. F. L. Hurlbutt, chairman of the committee, is not here, so I will ask Mr. W. Graham Cole to present the report.

Report of Steering Committee on Regional Safety Conferences

**F. L. Hurlbutt, Chairman, Patent Scaffolding Company,
Chicago, Ill.**

Through the whole-hearted support and cooperation of various local councils, industrial sections, council members and outside organizations, your committee has the pleasure of reporting that 19 successful regional safety conferences were organized and held during the past year. While this number is slightly less than the total reported for the previous year, it is most gratifying to note that the total attendance exceeded all previous years. In addition, it is thought that a better geographical distribution offsets the difference in the number of conferences held.

Thanks to the cooperating bodies, 7 of the 19 conferences were miniature Safety Congresses and were held in the cities of Worcester, Mass.; Grand Rapids, Mich.; Kansas City, Mo.; Newark, N. J.; Ann Arbor, Mich.; Sheboygan, Wis.; and

Los Angeles, Cal. Here several sectional meetings were in session at the same time and those that attended emphasized the fact that their individual problems were more intimately discussed.

Other conferences of the year were held in Chicago, Ill.; Duluth, Minn.; Erie, Pa.; Toledo, Ohio.; Philadelphia, Pa.; Pittsburgh, Pa.; Portland, Oregon; Birmingham, Ala.; South Bend, Ind.; and LaSalle, Ill.

So great has been the interest shown in these regional safety conferences that in several instances the demand for tickets for the evening dinner meetings exceeded the available accommodations. Many companies sent their entire supervisory staff, particularly to the evening meetings.

The free exchange of ideas and experience has brought about the success of these conferences and those attending stressed the fact that their superintendents, foremen and others get the spirit of the safety movement more forcefully than in any other way.

Encouragement has thus been given to your committee to proceed with tentative plans for other conferences to be held the coming year, and on behalf of our new committee on conferences, I beseech your full assistance and support. If any of our members want regional safety conferences in their communities, just make your wishes known to your committee and an immediate response and offer of complete cooperation will be forthcoming.

F. L. Hurlbutt, Chairman
W. A. Chowen
M. E. Arkills
E. B. Lefferts
A. J. Van Brunt
M. C. Goodspeed
G. E. Burns

Friction Caused by the Automobile Tire

CHAIRMAN BECK: Let me emphasize the last statement and urge anyone wishing a conference held in his territory to notify the committee at once. I think there is a great deal to be gained by a greater distribution of the cities in which these conferences are held.

In the absence of Mr. Singleton, chairman of the Committee on Static Electric, I will ask Mr. Owen to present a resume of the next report.

(Mr. Owen presented a resume of this report, which is published in full elsewhere in these transactions.)

DR. H. CLYDE SNOOK: Mr. Owen referred to the idea that probably the friction of an automobile tire against the road surface is the cause of electrification of the vehicle. I am inclined to think that the mere act of rolling the rubber tire over any kind of a road, neglecting the frictional effects, is sufficient to cause a tremendous electrification of the vehicle. Some of my reasons for so believing are these: A few years ago, I had occasion to investigate the effect of static electricity upon the printing of magazines in the plant of the Curtis Publishing Company. We found that the mere act of unrolling the large rolls of print paper, or lifting them, or carrying them about, was sufficient to electrify the entire roll. We found that merely bending the paper around a corner, or folding it, or the act of making the printed impression upon it was sufficient to electrify the paper. Paper, when dry, is an excellent dielectric, and I believe this is one of the examples in that long series of examples that may be cited to illustrate the fact that any dielectric when handled mechanically or when deformed in any way is caused to become electrified.

Another reason for believing in this general saying and for believing that the act of rolling tires over the pavement will electrify the vehicle is the fact that in

rubber mills where the rubber is worked mechanically in the rolls, it becomes so intensely electrified that continually in the dark, electric sparks are seen at certain places in the rubber molding or rolling process. So it seems to me it may be found that any kind of pavement may be found to be quite sufficient to account for all the electrification that an automobile or bus may acquire.

CHAIRMAN BECK: Our next report will be that of one of the most important committees we have; the Steering Committee on Research, Standards and Codes. I will call at this time on Mr. R. C. Stratton of the Traveler's Insurance Company, Philadelphia, chairman of this committee.

Report of the Steering Committee on Research, Standards and Codes

The work of your Steering Committee on Research, Standards and Codes, during the past year, has been along research lines similar to the work of past years. This work has included:

1. Giving advice to the Executive Committee of the National Safety Council upon subjects proposed for codes or research.
2. Appointing Research Committees.
3. A general check-up of research, standards and code work, which was in progress by members or representatives of the A. S. S. E.-Engineering Section.

At the present time there are the following six Research Committees:

1. The Effects of Annealing on Chains, R. F. Thalner, chairman.
2. Electrical Hazards, S. E. Whiting, chairman.
3. Elimination of Harmful Noise, H. Clyde Snook, chairman.
4. Exhaust Systems, W. J. Graves, chairman.
5. Static Electricity, Thomas W. Butler, chairman.
6. Wire Rope Attachments and Connections, Charles C. Sunderland, chairman.

Progress reports of these six Research Committees will be presented at this Congress.

In order that all of our Research Committees may be given the necessary assistance, the National Safety Council has employed a safety engineer, Mr. Stewart J. Owen, Jr., to assist all of the Research Committees with their technical problems and preparation of reports.

All members of the ASSE-Engineering Section are urged to cooperate to the fullest extent with our Research Committees in the various studies they have under way. Any information which any member believes will be of value to these Research Committees should be sent to the various chairmen in care of National Safety Council headquarters, Chicago, Illinois.

The ASSE-Engineering Section is sponsor or joint sponsor for 15 safety codes, five of which have been approved and published:

Forging and Hot Metal Stamping.
Ladders.
Paper and Pulp Mills.
Power Presses and Hand and Foot Presses.
Rubber Machinery.

The following 10 safety codes are not as yet completed nor published:

Colors for Traffic Signals—The draft for this code is under consideration and it is understood that it will soon be submitted to the American Engineering Standards Committee for approval.

Compressed Air Machinery—The standardization of the work of this code is well under way.

Construction—Work on this code has been delayed because of the recent start made in safety work by various construction associations.

Floor and Wall Openings—Considerable work has been done on this code and a final draft is under consideration.

Identification of Gas Mask Canisters—The Sectional Committee for this code has been organized and standardization work will soon be started.

Identification of Piping Systems—Considerable work has been done on this code and its final draft is now under consideration.

Standardization of Methods of Recording and Compiling Accident Statistics—The Sectional Committee for this code is now being organized.

Textiles—The work on this code is quite well advanced. The sections on "Cotton Mills" and "Bleaching, Mercerizing, Dyeing, Printing and Finishing" have been under consideration for some time and are about ready for final approval.

Walk Way Surfaces—A draft of this code is under consideration and some progress has been made in its consideration.

Window Washing—The Sectional Committee for this code is now being organized.

Committees on Fifty-eight Safety Codes

The American Engineering Standards Committee has Committees on 58 safety codes. Of these 58 safety codes the following 24 have been approved and published:

1. Abrasive Wheels, Safety Code for the Use, Care and Protection of.
2. Aeronautics, Safety Code for.
3. Automobile Head Lighting Specifications—Laboratory Tests for Approval of Electric Head Lighting Devices for Motor Vehicles.
4. Dust Explosion, Safety Code for the Prevention of.
5. Electric Wiring and Apparatus in Relation to Fire Hazards.
6. Electric Equipment in Coal Mines, Safety Rules for Installing and Using.
7. Electrical Safety Code (National Electrical Safety Code).
8. Elevators and Escalators, Safety Code for.
9. Explosions, Permissible Specifications for the Testing and Use of.
10. Foundries, Safety Code for the Protection of Industrial Workers in.
11. Forging and Hot Metal Stamping, Safety Code for.
12. Gas Safety Code.
13. Head and Eyes of Industrial Workers, Safety Code for the Protection of.
14. Ladders, Safety Code for.
15. Laundries, Safety Code for.
16. Lighting Factories, Mills and Other Work Places, Code for.
17. Lighting of School Buildings, Code for.
18. Logging and Saw Mill Machinery, Safety Code for.
19. Paper and Pulp Mills, Safety Code for.
20. Rock Dusting of Coal Mines, Recommended Practice for.
21. Power Presses and Foot and Hand Presses, Safety Code for.
22. Power Transmission Apparatus, Mechanical, Safety Code for.
23. Rubber Mill Machinery, Safety Code for.
24. Woodworking Plants, Safety Code for.

Copies of the above mentioned codes may be obtained from the National Safety Council.

The 34 incomplete codes are as follows:

1. Amusement Parks.
2. Automobile Brakes and Brake Testing.
3. Building Exits.
4. Colors for Traffic Signals.
5. Compressed Air Machinery.
6. Construction Work.
7. Conveyors and Conveying Machinery.
8. Cranes, Derricks and Hoists.

9. Electrical Fire and Safety Code.
10. Elevators.
11. Exhaust Systems.
12. Explosives.
13. Explosives, Mine.
14. Fire Fighting Equipment in Metal Mines.
15. Floor and Wall Openings, Railings and Toe Boards.
16. Gas Mask Canisters, Code on Colors of.
17. Identification of Piping Systems.
18. Illumination, Coal Mines.
19. Lightning, Code on Protection Against.
20. Meters, Electrical Rules for.
21. Piping, High Pressure.
22. Plate and Sheet Metal Working.
23. Power Control, Electrical.
24. Power Control, Mechanical.
25. Refrigeration, Mechanical.
26. Sanitation, Industrial.
27. Standardization of Methods of Recording and Compiling Accident Statistics.
28. Tanneries.
29. Textiles.
30. Tools, Machine.
31. Transportation, Coal Mine.
32. Ventilation.
33. Walkway Surfaces.
34. Window Washing.

ASSE Represented on Forty Codes

The ASSE-Engineering Section is represented on 40 of the above 58 codes. The following is a list of the names of our representatives on these 40 projects.

1. Abrasive Wheels—W. D. Keefer, G. E. Sanford.
2. Aeronautics—G. E. Peterson, G. A. L. Beaudoin.
3. Auto Brakes—J. H. Truett.
4. Building Exits—S. J. Williams.
5. Colors for Traffic Signals—S. J. Williams.
6. Compressed Air Machinery—Dr. A. D. Risteen, A. S. Johnson.
7. Construction Work—W. D. Keefer, Leo D. Woedtke, W. F. Austin, T. J. Whelan, E. W. Bush, F. L. Hurlbutt.
8. Conveyors—R. F. Thalner.
9. Cranes, Derricks and Hoists—J. F. Connor, C. W. Hines.
10. Electrical Power Control—The Committee on this code at the meeting on June 15, 1927, decided to discontinue work on this code.
11. Electrical Safety Code—G. E. Sanford, S. E. Whiting, R. W. Moore.
12. Elevators and Escalators—W. E. Crippen, W. D. Keefer.
13. Floor and Wall Openings—A. W. Benz, E. B. Tolsted.
14. Forging and Hot Metal Stampings—J. L. Thompson, W. D. Keefer, C. E. Lehr, Thomas Irving, H. L. Johnson.
15. Foundries—G. E. Sanford, S. E. Hassell.
16. Gas Safety Code—E. J. Reeder.
17. Gas Masks Canisters—S. H. Kershaw, E. S. Beaumont, B. F. Tillson, C. E. Rice, H. J. Weeks.
18. Head and Eye Protection—G. E. Sanford, S. J. Williams.
19. Ladders—C. N. Young, W. E. Welch, W. Newell, H. B. Gaffers, M. C. Goodspeed, H. G. Wiberg, H. A. Schultz.

20. Laundries—F. F. Beik.
21. Lighting Factories—W. D. Keefer.
22. Lighting School Buildings—William Darlington, G. H. Stickney.
23. Lightning Protection—F. A. Epps, E. R. Scales, William R. Rooney.
24. Logging and Saw Mill Machinery—W. D. Keefer, C. O. Hero.
25. Machine Tools—A. F. Dunnebacke.
26. Mechanical Power Transmission—John Williams, H. A. Schultz.
27. Paper and Pulp—Holger Jensen, E. M. Altman, G. E. Williamson, J. M. Sandel, A. P. Costigane.
28. Piping Systems—G. E. Sanford, H. P. Weaver, S. H. Kershaw.
29. Plate and Sheet Metal—F. F. Beik, S. J. Williams.
30. Power Presses—C. VanHorn, W. D. Keefer, C. B. Auel, A. L. Kaems.
31. Pressure Piping—H. M. Coombs.
32. Refrigeration, Mechanical—J. I. Banash, H. S. Smith.
33. Rubber Machinery—A. E. Hoener, J. E. Condon, R. H. Blanchard, H. A. Dodge, E. W. Beck.
34. Sanitation—C. F. Horan, L. D. Burlingame.
35. Standardization of Methods of Recording and Compiling Accident Statistics—Representatives on this code have not as yet been designated.
36. Textiles—Ignatius McNulty, Harvey Saul, W. D. Keefer, Everett F. King.
37. Ventilation—S. J. Williams, G. E. Sanford.
38. Walk Way Surfaces—A. S. Regula, W. F. Sterne.
39. Window Washing—G. E. Burns.
40. Woodworking—A. R. Regula.

It must be remembered that the work of a Code Committee is difficult and exacting. Many of the meetings are held in widely scattered places. Much of the work must be done by correspondence. All of our representatives on the various safety codes have given freely of their time and advice in order that our section may be properly represented on the code, a work worth while. Too much stress cannot be laid on the importance of the work in the formulation and adoption of the various safety codes. All members of the ASSE-Engineering Section should cooperate with our representatives in any manner that will be a help to them. It is only through such cooperation that the desired ends will be obtained. All that has been said in previous reports of your committee in regard to this work still applies.

R. C. Stratton, Chairman
 C. B. Auel
 L. A. DeBlois
 D. L. Royer
 A. L. Watson
 C. E. Pettibone
 S. J. Owen, Jr.

CHAIRMAN BECK: As Mr. Stratton has stated, the National Safety Council does not maintain a research laboratory. They depend almost exclusively on those of us who already have or can obtain the data that is necessary to make our ASSE work successful.

We have but three more subjects to bring up this afternoon. First, I am going to call on Mr. H. W. Mowery of the American Abrasive Metal Company to report for the Membership Committee.

The Report of Membership Committee

1926 Annual Safety Congress—567. Members
 320 Associate Members
 ———
 886 Total

Today there are 596 Members and 402 Associate Members. Total—998.

42 Cancellations during the past year.

154 New Members during the past year.

S. V. JAMES, Chairman.

CHAIRMAN BECK: Our Committee on Chapter Organization and Activities has as its chairman Mr. Ernest Hartford, of the American Society of Mechanical Engineers. In the absence of Mr. Hartford, Mr. John Sandel will report on chapter organization and activities.

Report of Committee on Chapter Organization and Activities

Three local organizations are functioning as chapters of the ASSE-Engineering Section: the Metropolitan (New York City) Chapter, the Boston Chapter, and the Northern New Jersey Chapter. The Northern New Jersey Chapter was organized during the past year.

It is unfortunate that during the past year the Hartford Chapter has ceased to function. The reasons for this have been carefully investigated by your Committee and discussed by the Executive Committee. There are numerous reasons for the failure of this chapter, chief of which seems to be lack of cooperation on the part of the local industries. It is recommended that your newly appointed committee on Chapters and Chapter Activities continue the efforts already started to revive the Hartford Chapter.

During the past twelve months engineering clubs have been organized by six community safety councils of the National Safety Council—in Detroit, Birmingham, Worcester, Atlanta, Kansas City and Cleveland. We have negotiated with these groups to bring their affiliations as chapters of the ASSE-Engineering Section, and it is recommended that your newly appointed committee continue these negotiations.

Several months ago, the ASSE-Engineering Section cooperated with the Pennsylvania Society of Safety Engineers in holding a regional conference at Philadelphia also the A.S.M.E. Local Section. We are also cooperating with the California Society of Safety Engineers and the Society of Safety Engineers of Southern California in organizing the Fourth Annual Pacific Coast Safety Conference to be held in Los Angeles during the latter part of November. Efforts have been made to secure the affiliations of these three societies as chapters of the ASSE-Engineering Section, but thus far these efforts have been unsuccessful. All three of these societies—particularly the two in California—are live organizations and your committee is strongly of the opinion that we should continue our efforts to secure their affiliations as ASSE chapters.

Liaison Members of National Safety Council to Cooperate with Locals of the A.S.M.E.

It may be of interest to note that liaison members of the ASSE E. S. NSC have been appointed and invited to cooperate with the local sections of the 4 founding societies in programs for meetings, speakers, etc. One particular safety engineer has been selected in each locality where there is a local branch of each organization and this member has been invited to attend executive meetings of the particular local section designated. It is expected that this cooperation will result in increased interest in the safety movement and bring greater coordination between the two organizations.

We heartily congratulate our three chapters whose activities have been so successful during the year which is just coming to a close. We are indeed fortunate in having such excellent leaders in these chapters as L. E. MacBrayne, Ralph W. Pendleton,

Alexander Lackey, J. E. Wolters, E. W. Beck, T. A. Walsh, Mrs. Gene S. Wood, F. M. Rosseland, A. J. Van Brunt, S. F. Larchar, etc.

Earnest Hartford, Chairman

Herman Behr

J. M. Sandel

L. W. Ferguson

CHAIRMAN BECK: Our last subject this afternoon, gentlemen, is the one of electrical hazards. In the absence of Mr. Whiting, chairman, I am going to ask Mr. C. B. Auel of the Westinghouse Electric & Manufacturing Company, to report for this Committee on Electrical Hazards.

MR. AUDEL: I didn't expect to say anything, so my remarks will be brief and more or less haphazard.

The committee spent the entire afternoon yesterday discussing this subject. It is hard to make a good start, but we at last decided to study the hazards of circuits operating at or below 750 volts. Among other things there were three fairly definite recommendations made on which we seemed to be in general agreement. One is the more general teaching of the prone pressure method so that when an accident does occur, it perhaps could be made less serious than is usually the case.

As mentioned by Mr. Sanford, we hope to promote the discussion of accident prevention in engineering colleges so that we will not eternally be in the position of bailing out a leaky boat. We feel that as the colleges turn out more engineers with a knowledge of the fundamentals of industrial safety, our problem will become easier with the passing of the years.

The third definite recommendation was to advocate a physical examination at least yearly of all employees handling hot wires, absolutely regardless of voltage. It has been felt there is no small number of instances in which the prone pressure method failed to operate successfully because of the poor physical condition of the victims, and that had the victims been in normal condition many would be alive today.

The Engineer Is the Natural Safety Leader

CHAIRMAN BECK: Thank you, Mr. Auel.

We have heard reference made a great many times this afternoon and throughout the week to the American Society of Mechanical Engineers. We are extremely fortunate in having with us the official representative of that organization. I take great pleasure in calling on Colonel John Price Jackson for a few remarks.

COLONEL JACKSON: I am glad to have this opportunity to commend the work of the National Safety Council and the A.S.S.E. in particular in helping to create a more uniform and active safety consciousness among engineers.

I am a member of two of the founder societies and really represent the A.I.E.E. as well as the A.S.M.E. I have been over the transactions of both organizations quite fully. If safety in this country were dependent upon the accident prevention data of these societies, we would have a terrible death list. That is a serious charge against the engineers of the United States. The officers of these societies feel this situation should be improved. I see only one way, gentlemen, of rectifying it, and that is for the engineers of this country who do have the safety consciousness (most of whom, I presume, at least the best of whom, are in the A.S.S.E.) to cooperate in transmitting it somehow to the entire engineering profession. You cannot talk to any really successful man who doesn't say that the engineer, not the lawyer nor anyone else, but the engineer, should be the leader in the safety movement. If that is true I think we have a very heavy responsibility, we A.S.S.E. people, in "teaching" safety to the engineering world, and all of us should give our very best endeavor during this coming year to establish a very definite program of cooperation between the National Safety Council and the four founding engineering societies.

CHAIRMAN BECK: Thank you, Colonel Jackson. I hope we all will do our best to bring about that closer cooperation. It has been referred to before this afternoon, and I feel men like Colonel Jackson, George Sanford, Mr. Auel and others are bringing about this new spirit of safety among engineers.

M. E. ARKILLS (Waterfront Employees' Association, Seattle, Washington): I happen to be chairman of the Western Washington Section of the A.S.M.E. and our programs for the coming year are all designed to take in the element of safety.

ADJOURNMENT.

Thursday, September 29, 1927

The final session was called to order at two-thirty o'clock by the chairman, Ernest W. Beck.

CHAIRMAN BECK: At this time I would like to turn the meeting over to our new chairman. It gives me great pleasure at this time to present the chair to Mr. R. McA. Keown, Engineer, Industrial Commission of Wisconsin, Madison, Wisconsin, who will be your chairman for the coming year.

(Mr. R. McA. Keown took the chair.)

CHAIRMAN KEOWN: Gentlemen, I feel we have plenty of chairmen this afternoon. I don't know of any reason for calling upon me at this time.

However, we have two items to take up this afternoon. We will receive and discuss the reports of two research committees. First I will call upon Mr. R. F. Thalner, Chairman of the Committee on "Annealing Chains."

(Mr. R. F. Thalner, Buick Motor Co., Flint, Mich., took the chair.)

Progress Report, A.S.S.E.—Engineering Section Research Committee on the Effects of Annealing on Chains

R. F. Thalner, Safety Director, Buick Motor Company, Flint, Mich.

History and Scope of Committee

At one of the executive committee meetings of the Automotive Section of the National Safety Council several years ago, the question of the proper annealing temperature for chains was brought up for discussion, and due to the fact that there were so many varied opinions on the subject, not only in the meeting, but among most all Safety Engineers, it was suggested by W. Dean Keefer of the National Safety Council that some thought be given to the possibility of determining through research work, the effect of annealing on hoist chains. The work was started and at another meeting, on discussing the matter, the question came up as to the advisability of having this work sponsored by the A. S. S. E.—Engineering Section of the Council because other sections as well as the Automotive were vitally interested in the same subject. It was therefore decided to organize this committee under the auspices of the A. S. S. E.—Engineering Section on account of the importance of the problem to industry and the safety movement in general. Various organizations interested in such a study were asked to appoint representatives to serve on the committee, and up to the present time, the following have accepted:

Chairman, R. F. Thalner, Safety Director, Buick Motor Company, Flint, Michigan, representing Automotive Section, National Safety Council.

Secretary, Stewart J. Owen, Jr., Safety Engineer, representing National Safety Council.

E. F. Blank, Safety Director, Jones & Laughlin Steel Corporation, Pittsburgh, Pa., representing Metals Section, National Safety Council.

L. E. Frazier, Metallurgical Engineer, representing American Chain Company, Inc., Bridgeport, Conn.

R. H. White, Engineer of Construction, American Locomotive Company,

Schenectady, New York, representing American Society of Mechanical Engineers.

W. J. Merten, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., representing American Society for Steel Treating.

F. M. Waring, Engineer of Tests, The Pennsylvania Railroad, Operating Department, Altoona, Pa., representing American Society for Testing Materials.

Carnegie Institute of Technology, represented by: Professor James Aston, Head of Department of Mining and Metallurgy; Professor F. M. McCullough, Head of Department of Civil Engineering; Professor H. A. Thomas, Associate Professor of Civil Engineering; Professor L. R. Van Wert, Assistant Professor of Mining and Metallurgy; Professor J. M. Daniels, Instructor, Civil Engineering Department.

Frank A. Bond, Vice-President, U. S. Chain & Forging Company, Pittsburgh, Pa., representing Chain Manufacturers' Institute.

A. R. Markel, Assistant to President, representing The Columbus McKinnon Chain Company, Columbus, Ohio.

M. H. Christopherson, State Insurance Fund, New York State Department of Labor, 432 Fourth Ave., New York City, representing International Association of Industrial Accident Boards and Commissions.

George C. Ramsdell, Engineer, The Travelers Insurance Company, Chamber of Commerce Bldg., Pittsburgh, Pa., representing National Bureau of Casualty and Surety Underwriters.

Horace H. Thayer, Naval Architect & Marine Engineer, Witherspoon Bldg., Philadelphia, Pa., representing Society of Naval Architects & Marine Engineers.

David Arnott, Chief Surveyor, American Bureau of Shipping, New York City.

Sydney V. James, Engineer, Casualty & Automotive Departments, representing Underwriters Laboratories, Chicago, Illinois.

Frank A. Bond, Vice-President, representing U. S. Chain & Forging Company, Pittsburgh, Pa.

Lieut. Com. H. N. Wallin, Construction Corps, U. S. N., Bureau of Construction and Repair, representing the Navy Department, Washington, D. C.

There has always been a difference of opinion as to the effects of annealing hoisting chains. Some persons are of the opinion that annealing is beneficial to hoisting chains under certain conditions, while others believe that annealing of chains is not of much value. Among those who believe in the annealing of hoisting chains, there are wide differences of opinion as to the proper methods and temperatures to be used. Some will heat their chains for short periods at low temperatures. Others use higher temperatures with longer heating and cooling periods. Still others use a combination of these two practices.

It was soon realized that among other things it would be necessary to determine the effect of annealing at various temperatures from about 1,000 to 1,700 degrees Fahrenheit; what effect annealing has if any on yield points, ultimate strength, type of fracture, etc., and to devise some laboratory methods to subject each chain to a repeated load test.

Plan of Procedure

Two universities were approached as to the proper procedure to be followed and the making of such laboratory tests as may be necessary. After considerable study a preliminary plan of procedure was prepared by Professor J. M. Daniels and his associates at Carnegie Institute of Technology, which is as follows:

Preliminary Outline—Investigation of the Effect of Annealing on Chains

In the preliminary study, it has been found advisable to use commercial chains of but one size, namely: one-half ($\frac{1}{2}$) inch; but to use two types of chains, one of wrought iron, the other of steel.

These chains are to be furnished by the National Safety Council in lengths of not less than twelve (12) feet or multiples thereof and they will then be investigated in accordance with the following outline:

1. Analysis of chain stock as received.
2. Tension proof load test and tension test to destruction of chain as received.
3. Impact test of chain stock as received.
4. Chain as received to be subjected to a repeated stress test.
5. Tension proof load test and tension test to destruction of chain after being subjected to a repeated stress.
6. Impact test of chain stock after being subjected to a repeated stress test.
7. Anneal chain at various temperatures.
8. Cool chain in air and in furnace after being heated for annealing.
9. Tension proof load test and tension test to destruction of chain after each annealing and cooling operation has been completed.
10. Impact test of chain stock after each annealing and cooling operation has been completed.
11. Study of the effect of low temperature heating, following the same procedure as given above.
12. Metallographic studies of chain under the various conditions outlined above.

Explanation of Items 1 to 12 for Steel Chain*1. Analysis of Chain Stock As Received.*

The analysis of the chain stock can be submitted with the samples of chain or the analysis can be determined after the chain has been received at the Carnegie Institute of Technology. It is suggested that the analysis be submitted with the chain as this routine work can be performed more economically in this manner.

2. Tension Tests of Chain As Received.

A Proof tension test load of the amount prescribed by the committee for one-half ($\frac{1}{2}$) inch chain is to be placed on the specimen, then removed and "permanent set" recorded. The chain is to be then tested to destruction and the ultimate load and type of fracture recorded.

It is suggested that a second sample of this chain be tested in tension using a strain gauge and recording the loads and corresponding elongations. Curves of this type will show the behavior of the samples more clearly than by any other means.

The yield point in chain, especially overstrained material, is a very doubtful figure. An arbitrary elongation can be used, the load being recorded when this arbitrary elongation has been reached. This load would be designated as the yield point of the material which will give comparative results. In the chains tested to date, while studying the methods of performing this work, no yield point was evident by the drop of the beam. There are a series of drops which do not indicate a definite yield point. It is recommended that stress-strain diagrams be obtained which will give the accurate behavior of the chain under load.

The elongation after failure is also a doubtful figure due to the non-uniform

elongation of the various parts of the link, the closing of the links and the manner in which the breaking link is deformed.

For tension test of one-half ($\frac{1}{2}$) inch chain the sample should contain seven links.

3. *Impact Tests of Chain As Received.*

One link will furnish two impact specimens which will be tested in a Charpy Type Pendulum Impact Machine. The specimen will be round, cut to half its diameter and tested in the regular manner. Four impact tests are considered sufficient for an average correct value.

Data from the Impact Tests will give comparative results as to the ability of the material to withstand shock.

4. *Chain As Received to Be Subjected to Repeated Stress.*

A machine will be designed and built at the Carnegie Institute of Technology which will subject the chain to a repeated load of four thousand (4,000) pounds, equal to the safe working load for one-half inch chain. The object of this repeated stress is to place the samples in such a strained condition that they will be representative of material which has been subjected to six months actual service. It is estimated that thirty thousand (30,000) repetitions of a four-thousand (4,000) pound load placed on the specimen in such a manner that the chain is not subjected to sudden impact will approximate this condition.

A sketch of this proposed machine accompanies this report.

5. *Tension Proof Load Test and Tension Test to Destruction of Chain After Being Subjected to a Repeated Stress.*

The same procedure is to be followed as outlined in item number two (2) of this report.

6. *Impact Test of Chain Stock After Being Subjected to a Repeated Stress.*

The same procedure is to be followed as outlined in item number three (3) of this report.

7 and 8. *Anneal Chain at Various Temperatures and Cool Chain in Air and in Furnace.*

The chain is to be annealed at temperatures of 1,000°, 1,150°, 1,300°, 1,450°, 1,600°, and 1,750°. After the chain is heated to the proper temperature and held at that heat for thirty minutes the chain shall be air cooled and furnace cooled. This study will give six temperature conditions, and two cooling conditions. Electric or gas furnaces will be used with pyrometers to determine temperatures.

9. *Tension Tests After Each Annealing and Cooling Operation.*

The same procedure is to be followed as outlined in item number two (2) of this report.

10. *Impact Tests After Each Annealing and Cooling Operation.*

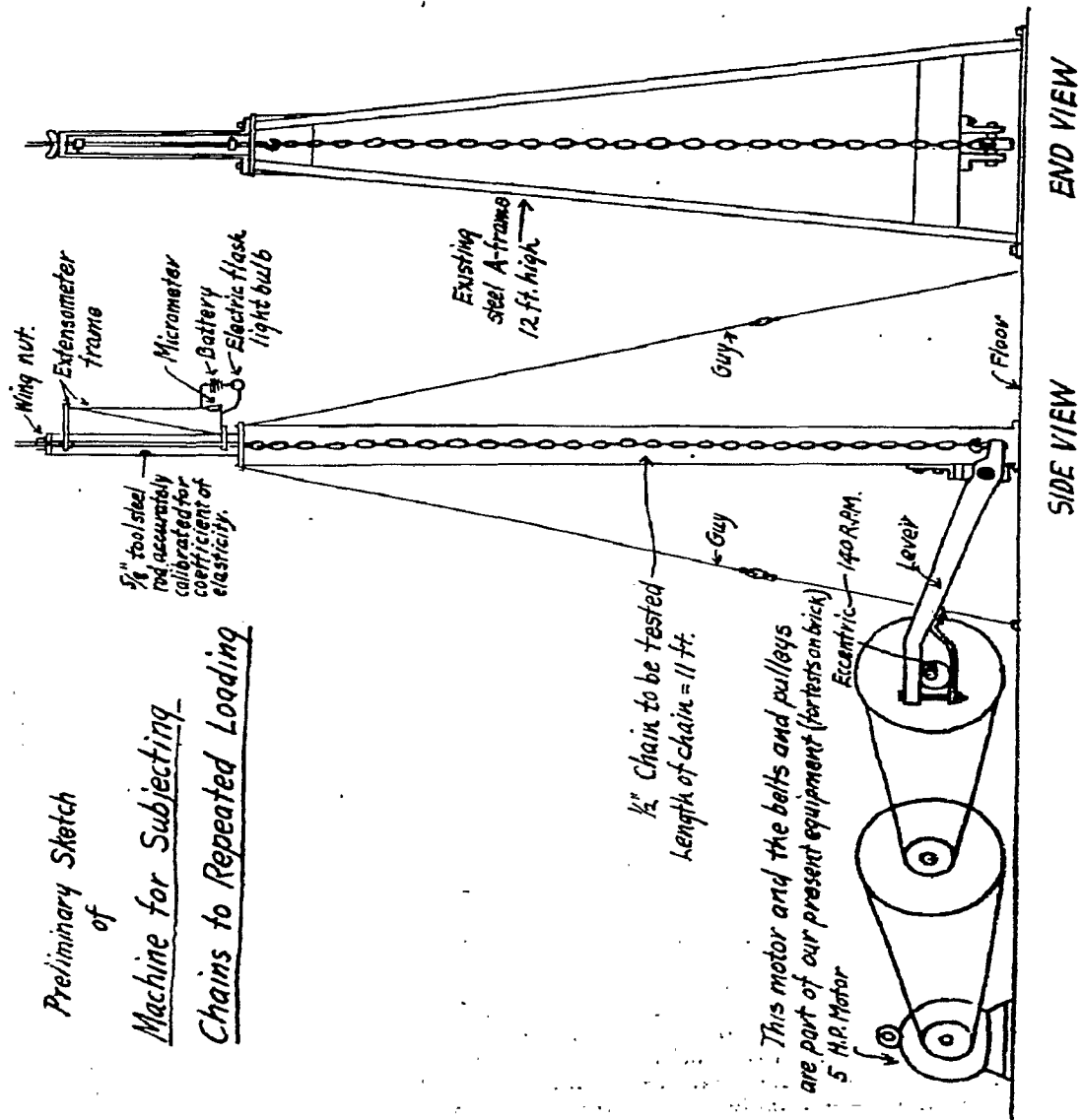
The same procedure is to be followed as outlined in item number three (3) of this report.

11. *Study of the Effect of Low Temperature Heating.*

If it is the desire of the committee to study the effect of low temperatures on chain, where low carbon chain might be subjected to low temperatures in handling hot material, the same procedure will be followed as outlined in items one to ten inclusive of this report, using the temperatures recommended by the committee. The object of this study would be to determine if the low temperatures cause undue brittleness in chain.

12. *Metallographic Studies of Chain.*

Nothing definite has been decided on the amount of work that will be necessary or desired along these lines. Metallographic studies of the chain, after the various operations, are very desirable for a complete investigation



of this subject. The amount of work to be done is to be decided by the committee appointed by the National Safety Council. If it is the desire of the committee, Professors Aston and Van Wert can decide on the amount of investigation necessary for this phase of the work and its approximate cost.

Explanation of Items 1 to 12 for Wrought Iron Chain

The same procedure would be followed using Wrought Iron Chain in place of the Steel Chain. The recommendations for the Annealing Temperatures and Cooling as set down by the Committee appointed by the National Safety Council would be followed.

Approximation of Cost for Testing One Half ($\frac{1}{2}$) Inch Chain

(Only items 1 to 10 inclusive considered)

Cost of designing, building, and installing repeated stress machine for operation.....	\$250 to \$400
Cost of U-bolt grips for holding chain in tension test.....	\$10
Cost of physical tests (16 tension tests, 64 impact tests, reduction of data, curves, etc.) 30 hours @ \$2.50.....	\$75
Cost of annealing operations 5 hrs. @ \$2.50.....	\$12.50
Total Cost of One Cycle.....	\$350 to \$500

The variable cost in this investigation is the repeated stress machine. This machine must be developed in such a way that the chain is not subjected to a shock. After being built, considerable time will no doubt be required to adjust this machine so that the specimens will all be under the same stress.

The cost of the annealing and physical tests will be approximately ninety (\$90) dollars per cycle, a cycle being designated as a complete investigation of the chain from the time it is received until all curves and data are prepared following the steps designated as items 1 to 10 inclusive of this report.

As this work progresses, the time required would no doubt be materially decreased due to the organization of the mechanical operations.

The hourly prices of \$2.50 include the time of one student assistant.

No recommendation is made as to the number of cycles to be completed in this investigation. The committee would no doubt be in a better position to state how extensive this study should be.

The cost of a study of chains larger than one-half ($\frac{1}{2}$) inch ($\frac{3}{4}$ " and 1") would be proportionately higher due to the larger loads involved. No estimate has been submitted for a repeated stress machine to use in over-straining one inch chain. The cost of such a machine would be necessarily large.

Respectfully submitted,

J. M. DANIELS.

Through the courtesy of several members of the National Safety Council, enough new steel and wrought iron chains have been contributed to start this test. Other members have agreed to supply such additional new chain as may be needed.

In order that tests may be made of chains which have failed in service, a number of members of the Council have forwarded to the Carnegie Institute of Technology Laboratory links of chain which have failed in service together with six to eight feet of the chains and descriptions of the conditions, under which the chains failed. Other members have agreed to forward such samples and descriptions of conditions when they have chain failures.

Comment on Plan of Procedure

Professor Daniels' plan of procedure was submitted to the members of the committee as well as to a group of British engineers for consideration. (This group of British engineers is studying the causes of chain failure at the National Physical Laboratory at Teddington, England).

In general the suggested plan of procedure was approved by the committee members. It was questioned, however, whether a new chain submitted to the repeated load test would then be equivalent to a chain which had been in service for approximately six months. The British engineers particularly call attention to the fact that this repeated load test would be sufficient if all chains in service were used properly at all times. They state, however, that in an ordinary shop, a hoisting chain is often subjected to unusual stresses such as when the load is picked up quickly or snatched from the ground. They suggest, therefore, that each new chain should be subjected not only to a repeated load test, but to an impact test before annealing. These impact tests are intended to approximate some of the conditions of the chain in service and should not be confused with the impact tests proposed in the preliminary plan of procedure. These two preliminary tests will then bring each new chain into the same condition in which it would be if it were used in a normal shop for approximately six months.

This objection is being considered by the committee and it is possible that before Professor Daniels starts actual laboratory work, he will amend his plans accordingly.

Causes of Chain Failure

The group of British engineers is studying the entire subject of chain failure, whereas our committee is simply interested in one particular phase of this larger question. The British studies to date indicate that many chain failures can be ascribed at once to one or more of the following causes:

(1) *Gross overloading* due to severe loads or snatches. The reason for the failure is usually obvious from the condition of the fractured link.

(2) *Defects in manufacture.*

(a) Composition defects, such as excessive sulphur or phosphorous or by admixture of steel scrap.

(b) "Laminated rod," caused by incomplete welding in rolling down the pile.

(c) "Burning" of the complete link.

(d) Presence of "burnt" piles in the chain iron. This defect occurs in the iron works and is caused by overheating in the puddling or bath furnaces. As all the strips do not usually come from the same heat or furnace, a bar may contain several of the burnt zones, the remainder being normal.

(e) "Dirty" welds, also incompletely closed welds.

All of the above possible causes of failure are, probably, well known and can usually be identified after failure has occurred. They are important and cannot be remedied by heat treatment.

(3) *Crystallization.*

The British engineers found that under working conditions which are quite normal a chain may suddenly fail. The fractured link shows no total deformation or local deformation at the fracture, the face of which exhibits a brittle "crystalline" appearance. Investigations show that none of the above

mentioned defects are present. Moreover, specimens cut from the link and subjected to the ordinary tests—tensile, impact, bending, microstructure, chemical analysis—show that the material conforms to the requirements of best quality wrought iron. As a result of lengthy experiments, they found that the cause of this type of failure was a very brittle skin on the surface of the link. The skin is very thin, penetrating to a depth of only a few crystals, and is extremely difficult to detect microscopically as in many cases the individual crystals are undeformed. The material at a short depth below the surface was found to be normal by experiments in which the skin was removed mechanically. They were able to produce a brittle skin on the surface of chain links by light surface impacts. They further showed by producing a hard brittle skin—by carbonization—that given such a skin in which a crack can be started by the expenditure of quite a small amount of energy, the crack is propagated throughout the ductile core owing to the stress concentrations produced at the base of the crack and, owing to the conditions of constraint, the ductility of the core crystals cannot be utilized.

The British engineers believe there is no reason to doubt that the brittle fracture to which chain links are liable after service is due primarily to the defects of small impacts to which the surface becomes subjected. If such an impact-hardened link be annealed or normalized, a very marked re-crystallization takes place in the outside crystals and their ductility, and thus the apparent ductility of the core (which has never really been disturbed) is restored. This is simply due to the fact that the re-crystallization temperature of impact-hardened iron is an inverse function of the degree of impact-hardening.

Tests and Studies in the United States

It has been found by some large concerns in this country that surface impacts will produce the brittle skin effects observed by the British engineers and that this condition may be overcome by proper annealing.

The committee appreciates the comment from the British Engineers and will take advantage of the suggestions offered by them. There is, of course, a difference in the scope of their work and ours which must be taken into consideration and inasmuch as our problem is to study the effect of annealing on hoist chains, and, if annealing is found to be beneficial to obtain the proper temperatures and methods to be used, it is believed to be best for the committee to concentrate its study, at least for the present, on that question.

In conclusion, permit me in behalf of the National Safety Council to extend thanks to all members of the committee who have signified their intention to serve in this work, to the Carnegie Institute of Technology for their share of the work and to the concerns which have willingly donated sample chain for the experiment. Through this committee composed of organization representatives and men of high standing in our country, and with the aid of their many valuable suggestions, the report which is made at the completion of the research should be extremely beneficial to American industry.

CHAIRMAN THALNER: At this time I would like to present Professor H. A. Thomas of the Carnegie Institute of Technology who will start the discussion on this report.

PROFESSOR H. A. THOMAS (Carnegie Institute of Technology, Pittsburgh, Pa.): I am coming here representing Professor Daniels, who is really in direct charge of this work at the Carnegie Institute of Technology, but I have been helping him out to a certain extent. He was not able to come so I came in his place.

Since getting out this preliminary outline of what is to be done in the test, we re-

ceived a great many samples of chains that have failed in service. We have made certain preliminary tests and, as a result of these tests, it seemed wise to make a few minor changes in the plan of procedure.

We also received comments on the plan from various men on the committee. We have combined some of these ideas in our plan.

I have here a few broken chain links. This is from the Central Alloy Steel Company at Massillon, Ohio. It is a typical crystalline fracture. That is very different from the ordinary straight tension fracture we get in a direct pull. It seems to me one of the purposes of this investigation is to learn how such fractures are caused and whether annealing can cure them. From reports we get, it seems that links of this kind may often fail with a much lighter load than they are frequently called upon to carry. The load may ordinarily be twenty thousand pounds yet, apparently, the chain may fail at five thousand pounds.

There are several theories as to why chains fail. One theory is fatigue failure. The metal may simply become worn out by a great many repetitions of the stress, but it seems improbable that this is such a break because that requires millions of repetitions as in the case of an automobile crank shaft.

The Theory of British Engineers

Another theory is that it is due to the hardening of the surface of the chain. It is the theory of British engineers that the surface of the chain link receives a great many impacts from ordinary service and that these impacts produce a hard, brittle skin on the outside; and then tiny cracks show up in that brittle skin which gradually work in and cause the fracture.

Another theory is that brittleness is due to overheating of the metal at the time of welding.

Another theory is that that fracture might be due to impact, the load being jerked instead of being picked up gradually.

I have rewritten our outline of tests to try to cover all of these theories.

In carrying out this revised program, we have decided to change the repeated load testing machine. It doesn't seem necessary now to use a machine which will test a chain twelve feet long. It seems better to use a machine which takes a shorter length of chain and which can be run at a high speed.

We also have been looking into the question of developing an impact testing machine. We have a Charpy impact machine, but it is much too small. We can use it for stock only up to three-eighths inch in diameter. So we have designed a new machine which consists of a pendulum swinging through an arc and striking the specimen. We hope the funds will be available so we can make that type of machine and make these impact tests.

It seems quite probable that impact may be an important factor in chain failure. We have made some preliminary tests to try to confirm what British engineers have told us about the surface hardening effect and the results are rather confused so far.

Here is a piece of straight bar, which we put between supports four inches apart and subjected to blows with the hammer, hoping in that way to harden the surface. It took three thousand blows to break it.

We are anxious to make an investigation that will be convincing and that will cover every aspect of the subject that ought to be covered.

CHAIRMAN THALNER: What are the loads to which you will subject chains of various sizes on the repeated load testing machine?

PROFESSOR H. A. THOMAS (Carnegie Institute of Technology, Pittsburgh, Pa.): We will have to make some preliminary runs to determine that. I believe we will get negative results as far as reducing the strength of the chain by repeated loads is concerned. We undoubtedly will show that repeating a safe load doesn't reduce

the chain strength very much. In formulating our plan, we have included certain tests, the results of which we are already sure, but we must have authentic data to convince even the skeptics.

I am not positive as to this surface impacting suggested by the British engineers. I have here a few bars which we have hammered; we then bent them back and forth a few times and then pulled them in tension. Such bars are thus made stronger than they were originally.

The study of annealing steels it is not a yes or no proposition. If there were any one simple test, it would have been done years ago. It seems strange in this advanced age of engineering that there is so much chaos and misunderstanding, but I am sure that we are on the right track to answer many troublesome questions.

H. W. HEINRICH (The Travelers Insurance Co., Hartford, Conn.): It seems to me it is advisable for you to have an impact testing machine that will repeatedly raise and lower your load with a jerk.

PROFESSOR THOMAS: We did have in mind such a machine, but the pendulum machine will give a blow that can be measured, so it should yield a more precise test than you could get from a simple falling weight test.

CHAIRMAN THALNER: In this impact test, will you use bars or chain links?

Experience in Bridge Construction Is Cited

PROFESSOR THOMAS: I think it will be necessary to use the bar. It is quite a problem to support a single chain link in a position where you can get a fair impact test.

JOHN G. SPONSEL (American Bridge Co., Gary, Ind.): I understand that your impact test in the foundry rattler is to be with balls. I think rather than balls you should use weights with sharp edges; cubes for instances, or miscellaneous shapes of iron. In our work, where we revolve bridge members on skids, the members fall over and cut right into the chain; that is typical service.

PROFESSOR THOMAS: I suggested using steel balls because we need something which will remain constant over a period of weeks and months, and it seems to me that a round ball is more apt to give the right impact after it is worn than something with sharp edges.

M. E. ARKILLS (The Waterfront Employers of Seattle, Seattle, Wash): With your repeated load test, it seems to me you will get nothing out of it unless you use a load to stress the metal beyond the critical yield point. When I was with the Pullman Company, I tested six chain links, after which I held three and annealed the other three. I found that by annealing the chain returned to its original condition, but the unannealed links seemed even stronger than before the repeated load test. For instance, a $\frac{7}{8}$ -in. chain carried 6,000 to 10,000 pounds more before breaking than it did before the repeated load test, showing that the cold working that it had gotten during the time it was in use had built up a hardness that raised the ultimate tensile strength.

As far as this outside impact is concerned, I know we had chains that were much abused. If abuse were to cause tiny fractures in the chain, would you not find rust in the cracks when you came to test the chain? I have never seen anything of that kind.

Poor welding is another cause of chain failure. In running seventeen tests one afternoon out at the McCormick Shops, five chains failed in the weld. That is about 30 per cent. That seems to be due to the gas pocket that forms when a little bit of coal gets into the welding heat.

There is a welding process now used where the scarfing is formed like the shape of your thumb, rounded on the outside. This forces out any coal which might be in there and eliminates the gas pocket. They close the first portion in the first heat, then when going back for the second heat, they close it down still farther, first knocking out the scale or oxidized metal to get rid of that in the weld, and then they

finally close the edge down solid. That reduces failures at the weld from 30 per cent to about 3 per cent.

J. A. NORTHWOOD (Bethlehem Steel Co., Johnstown, Pa.): We have had a number of chain breakages which the chain manufacturers tell us are probably caused by the rough usage given the chains by the men in pulling them out from under loads. In other words, the inside of the link wasn't worn, but the outside of the chain was badly worn very shortly after the chain was put into service. Perhaps the separators between the piles are not high enough.

PROFESSOR THOMAS: That was the idea which the British engineers brought out. I am not sure that is the real cause. We made some preliminary tests and I am doubtful. When a chain is carrying a load, the greatest stress does not come where the surface wear is the greatest.

H. A. McDONALD (Eric Forge Co., Erie, Pa.): It seems to me it would be a mistake to use cubes instead of balls when putting a chain in a rattler.

The Question of Impact Presents Two Problems

E. F. BLANK (Jones & Laughlin Steel Corp., Pittsburgh, Pa.): As I see this question of impact, you have two entirely different problems; you have surface impact from wear and tear on the chain; then you have special impact when the chain jerks its load.

I agree somewhat with Mr. Heinrich in thinking we should use both the impact and repeated load tests. The impact you get in your Charpy impact machine doesn't really give you the same kind of an impact that you get in service because in service you get a combination of both impact and repeated load. Every time you pick up a load you pull the slack out of the chain and get a certain amount of impact in addition to the load actually hoisted.

PROF. H. A. THOMAS (Carnegie Institute of Technology, Pittsburgh, Pa.): I think we could adjust our repeated load test machine to get both effects at the same time, by having quite a bit of slack in the chain. It might be more noisy in running and it might impose more wear and tear on the machine, but I think it can be arranged.

H. W. HEINRICH: The British engineers do not state where that impact hardening occurs, whether it is due to rough handling of the chain or to the jerking of the load. I believe that most chains in service receive most of the impact between the ends of the links as one link hits the other and, therefore, that your combination repeated impact load test will show us what we want to know.

M. E. ARKILLS: Might I suggest that the committee ask big users of chain to donate pieces of chain that have been in service so our committee can compare used chains with chains put through various laboratory tests?

E. F. BLANK: I agree that we should learn all we can from every possible source but our conclusions must be based on laboratory tests that have been conducted with a fair degree of uniformity.

PROFESSOR H. A. THOMAS: I have made some tests in the last few weeks to see if surface hardening due to abuse of the chain would weaken the chain. Some of the samples that were sent in to us were broken at the point where the link was bent rather sharply across the link. I took two rods. I surface hardened one with a hammer. Then with a hand device I bent both rods back and forth. It took approximately the same number of bends to break both rods.

R. JENKINS (Inland Steel Co., South Chicago, Ill.): I was wondering how long a chain has to be in use before it should be re-annealed. How long does it take to change a chain link from a fibre structure to a crystalline structure?

PROF. THOMAS: My own opinion is, that crystal structure was due to overheating

and not to crystallization in use. There are only three things that can produce that kind of fracture, one is overheating in the first place, another is fatigue, and the third is impact. We know that in testing.

Now, there haven't been enough repetitions of load to produce ordinary fatigue; the break doesn't look as if it were an impact break, it turns out right at the end of the link; so it must have been overheated in the first place.

It is only superstition to say the steel crystallizes. If it is good steel in the first place, it will stay good. If it is crystalline in the first place, it will remain crystalline. If it were not overheated in the first place, it would not develop that kind of a fracture.

CHAIRMAN THALNER: I know there is quite a difference of opinion on crystallization of chains. Of course, metallurgists will tell you that it is in the material when you buy it; but in practical experience, it seems to show up otherwise; that is, an average chain that has been in use for some time is very apt to become crystallized.

JOHN G. SPONSEL: Why do chains often fail during the first cold snap in fall weather?

The Chain Stretched Like So Much Molasses

M. E. ARKILLS: I think the reason for that is because the cooling of any material tends to bring the molecules closer together and increases the internal stresses. But that is only slight, comparatively speaking, and I don't believe that that is a very big factor, although we do have failure. Sudden impact, or jerking the load, is a more important factor.

I would like to take issue with you, Professor, on your statement, "if the metal is good to start with, it will always be good" because tests I have run don't always bear that out.

I must tell the story of an incident that happened in our plant. One morning I got a telephone call to go to a certain part of the plant at once because a chain had failed. They were trying to lift a punch press out of a hole into which it had fallen the day before. It was still in the blue clay about three inches and it had frozen over night. They lifted on it with the chain and stretched the chain out just like so much molasses. Of course, they blamed me for annealing it too much. I told them that if the chain had been brittle instead of ductile, someone would have been injured, but it just stretched out and gave them plenty of warning so they could get out of the way.

E. F. BLANK: The plan of procedure says that the chain will be annealed at temperatures ranging from 1000 to 1750 degrees. The iron and steel mills are interested in low temperature annealing. We pick up loads of hot metal anywhere from 450 degrees, say to 1200 degrees, and we leave our chains wrapped around these loads when they are set down in the yard to cool. Those chains are brought to a temperature that I suspect is somewhere near the said brittleness temperature and I believe that our research ought to cover low temperature annealing, perhaps from 800 degrees up through 1750 and 1800 degrees.

CHAIRMAN THALNER: We will close the discussion on the chain annealing proposition. I assure you that we have appreciated your attendance and interest.

(Mr. Keown resumed the chair.)

CHAIRMAN KEOWN: I am sorry we must stop this discussion.

We now come to have the report of progress of the research committee on "Noise—a Factor in Accident Causation," and I would like to call upon Dr. H. Clyde Snook as chairman of that committee to take charge of that discussion.

(Dr. H. Clyde Snook, Consulting Engineer, New York City, took the chair.)

Progress of Report of A.S.S.E.-Engineering Section Research Committee on Elimination of Harmful Noise.

H. Clyde Snook, Consulting Engineer, New York City.

It is worth while to recall just what noise is. To this end the following definition of noise is quoted from last year's report of this committee.

"Noise is considered by the physicist to be sound or a mixture of sounds to which no definite pitch can be assigned. In general, noise is understood to be sound that lacks agreeable musical quality. Since pitch is the quality whereby it can be designated as having a certain frequency of vibration, pitch is the assignment of the sound to a certain position in an accepted series of sounds constituting a musical scale. Their comparatively even flow, their regularity and repetition of wave form are the things that characterize musical sounds. Noises have an irregularity and an absence of repetition in their wave forms.

"It is to be noted, however, that this line of demarcation between musical sound and noise can not be sharply drawn, since very few musical sounds are entirely free from attendant noises that, to some extent, modify their smoothness and regularity; and since also musical sounds can be perceived more or less plainly through some noises."

Interest in noise elimination is wide spread. Magazine articles, newspaper items and editorials relating to it have appeared frequently throughout the country during the past year. Information and views thus given to the public has been reasonably accurate and authoritative. No small part of the material thus given publicity was obtained from the members of the Committee, who have used this means to help maintain public interest in noise elimination.

Notable in this work have been the efforts of Dr. E. E. Free, one of our Committee members, who made a noise survey of the city of New York. A similar noise survey was made of portions of the city of Chicago by Mr. R. F. Norris, of the Burgess Laboratories. These surveys have informed the public of the feasibility of noise surveys and noise measurements. Apparatus for such quantitative measurements is readily available as the result of developments made in the Bell Telephone Laboratories.

We are confronted, however, by inability to utilize such surveys as any basis for determining which noises should be eliminated or which may be tolerated. No existing data enable us to draw any line.

Physicians know, in general, that people who are very ill can tolerate only a minimum of noise. But what noises are harmful or how much noise is harmful to people who are not ill, physicians do not know. There is authority for the statement that noise may cause certain disorders of the ear. Deafness from this cause is stated to exist, for example, among spinners, loom-tenders and railway engineers. But it is not known to what intensity noise must be reduced to make it no longer a possible cause of such deafness.

Among effects which noise is known to have upon the human organism there is but one besides the perception of loudness that appears to have been measured quantitatively or studied in detail. This is the so-called "masking effect," an account of which is contained in last year's report and which has been investigated extensively by the Bell Telephone Laboratories. This effect is a temporary deafness caused by noise or any audible sound, lasting only while the noise is heard and

depending in degree upon the loudness of the noise. This transient deafness, due to masking probably is a prolific cause of accidents really due to noise, because of the hearer's inability to apprehend warnings or to detect other sounds while the noise lasts.

Another effect of noise upon the human organism, reported by Dr. John J. B. Morgan in 1916, is a possible increase in the rate of oxidation in the body when noise is heard. This is deduced from indirect evidence, such as an increase in muscular tones, vocalization and changes in breathing. This implies an increased activity of the bodily tissues and an increased consumption of energy. It may account, in part, for the necessity of shielding the sick from noise.

The Committee's Chief Opportunity for Service

There are not now available sufficient data to formulate a definition of "Harmful Noise." It is difficult, indeed, to find reliable proof that noise is harmful at all, except possibly to the sick. We believe that some noises are harmful, even to everybody, but this is unproved. There is no doubt that noise is disagreeable to great numbers of people, who want it eliminated; but there certainly is not enough scientific information to permit reliable estimates of its harmfulness or of the money value of its economic waste for any group of people.

Since information about the effects of noise upon the human organisms is so meager that we do not even know how to define the amounts or kinds of noise that ought to be eliminated, it is believed this Committee has its chief opportunity for service in endeavoring to interest competent scientists in investigating the real effects of noise upon the human body. It is believed that physiologists, neurologists, otologists, psychologists and physicists should be enlisted in fundamental studies of this kind. The various phases of the body's physiological functions, fatigue, nervousness, hearing and the processes of the mind, all are involved continually in the body's reaction to noise.

Several Investigators Interested In the Work

During the past year the Committee has endeavored, with some success, to interest investigators in this work. Among these investigators are Professor John J. B. Morgan, psychologist of Northwestern University, already known as a student of the subject. Under the auspices of the Committee, Professor Morgan has made a preliminary study in an attempt to find a test useful as an index of the effects of noise upon the human organisms. Electrocardiograph records were taken of subjects both as free from noise as possible and again when noises were introduced. The noises were produced by Western Electric audiometers, the sounds of which were amplified and this purpose having been loaned the Laboratory of Physiology of the New York University Medical School and Bellevue Hospital School by the Bell Telephone Laboratories. The work was carried on in the Laboratory of Physiology of the New York University Medical School, which institution loaned the electrocardiograph and recording apparatus.

Dr. Morgan's tentative conclusions are:

1. The heart action is modified by noises.

2. The effect seems to be more apparent in the irregularity of the action, rather than in the average rate.
3. Subjects vary in the way in which they respond to the sounds given.
4. Different sounds have different effects. The most effective seems to be an intermittent sound.
5. The suggestion of a "horrible din" to a hypnotized subject quickens the pulse, indicating that the emotional attitude of the subject toward the sounds may be of greater significance than the quality of the sound itself.

Careful Work Necessary Through Several Years

Although the work is regarded by Dr. Morgan as merely of an exploratory nature, with none of the results to be taken as conclusive, it is believed to be indicative of methods of attack that may be used to attain a reliable definition of harmful noise. The work necessary for this will not be a matter of weeks but of years. The project presupposes persistent and patient devotion to unremitting work that will yield results slowly, almost painfully. It will require, also, the interest and support of persons willing to aid in defraying expense for supplies and apparatus. The Committee hopes to obtain both scientific and financial support for this kind of attack on its problem.

One question has been raised and will be raised again. After all, critics ask, what can be done to eliminate noise? When all the information is at hand how will it help to eliminate noise? A final answer to this pertinent question is not possible now but the Committee is confident that when a definition of harmful noise is at hand it will indicate ways to reduce this noise.

In the meantime acoustic engineers will continue to work out solutions for the most flagrant noise problems. Civic bodies will continue to insist upon the suppression of preventable noise near hospitals. Whether, in the future, we shall prefer to protect the hearer from existing noise, or whether we shall try to eliminate such noise at its source, or whether we shall do both things, remains to be worked out.

CHAIRMAN SNOOK: Yesterday, Mr. Auel of the Westinghouse Company asked a specific question with respect to the method of eliminating noise emitted by screw cutting machines. I avoided attempting to point out a specific suggestion for this definite problem because I wished to confine the discussion to the general phases of the problem.

Three Methods of Eliminating Noise

A reduction in noise emitted from apparatus of the kind that he described can be accomplished and since it is specific in nature, it seems to me that a definite reply to that question is not in order at this time. I should be glad to discuss the matter with him privately if he should care to take it up with me. However, I am using this as an example of the difficulties that lie in the way of a generalized discussion of this subject. The specific question that was raised can be solved by the application of one or more methods of noise reduction.

Noise may be reduced by eliminating or reducing the original mechanical disturbance.

Second, noise may be reduced by absorbing the sounds that are emitted, and

Third, noise may be reduced by shifting the frequency spectrum of the surfaces that couple with the air so that their natural periods of vibration will be shifted to

a less audible range of the frequency spectrum. It is this third method of attack for this specific problem which has to be studied.

Fortunately, apparatus of this kind can have placed around emitting surfaces, materials whose sound transmission becomes quite inaudible. Light weight metal alloys of magnesium and aluminum, make it quite difficult to produce audible tones when these materials are cast in the form of bells because the sounds that these bells emit are in a less audible frequency range.

Dr. Morgan has made an attempt to find some method of attack whereby an index might be found that would indicate the effects of noise upon the human organism. I should like to call upon Dr. Morgan to describe to you briefly the experiments he conducted this summer.

What Does Noise Do to the Human Organism?

DR. JOHN J. B. MORGAN (Northwestern University, Chicago): My problem was to see if we could discover what noise did to the human organism. We always assume that it is harmful, but before we can decide whether it is harmful or not, we have to find out what it actually does and, to date, we have no way to know whether there is any definite effect.

The research referred to that I did in 1926 assumed what most people think, that noises did something to an individual, and I started off with the assumption that noises will distract attention. I had the subject working at a very definite object which I thought occupied all the interest and attention he could muster, and while he was working, I held myself in readiness to keep a very definite record of any move which he made, and I did not report any. Then, I introduced the most powerful, ghastly noise I could, disturbing the whole universe almost with my performance. This noise was introduced suddenly, and then I discovered something that quite surprised me. The first effect of the noise was a retardation in speed, but it wasn't for more than a few seconds and then I found he worked better during the noise than he did before. I removed the noise, whereupon he did slower work than when the noise was there.

The first conclusion you might get from this is, let's make a lot of noise and increase efficiency, but I didn't quite agree with that. I thought something might be happening to the individual in spite of the fact that he was working rapidly.

One of the first things I did was to put a spring under the keys which he had to operate, to ascertain the amount of pressure, and I found very definitely that he pressed the keys with greater vigor when the noise was on and there was also an increase in muscular energy.

Investigating Noise as a Stimulant

I took the breathing record in which there was quite a remarkable change.

You have noticed people who will be articulating with their lips in order to keep certain numbers in their minds. It shows that the individual is adapting himself to noise by doing something else.

I didn't do any more of this work until this summer when your committee encouraged me to go ahead. We talked the thing over and decided what we wanted was a measure that would indicate the heart action, a very complex thing which could be modified by individual attention. We got access to the Medical School of Bellevue Hospital and took some heart records of individuals under noise and then in quiet positions.

This electrocardiograph, as you may know, is a delicate instrument. All you need do is connect the electrocardiograph to the wrists of the subject and you get a complete record on a photographic film of his heart action, both aptitude and rapidity.

We had about twelve to fifteen subjects and we found out the effect varied. In some cases, we had a slowing down of the heart, while in others it took quite the opposite direction. We had a subject under hypnosis and I suggested to her a horrible din and her heart action went to 120 beats a minute with just simply a suggested noise. In some cases an actual physical noise will produce this effect. The heart responds very definitely to what we call the emotional.

There is another thing I want to bring in here bearing on this hypothesis. You can take a new born baby and it will be more quickly frightened by a loud noise than an adult. As we grow up, we are not so easily frightened by noise. This is fragmentary evidence of what we call the harmful effect of noises.

There are other experiments which have been suggested by the committee and one is the carbon dioxide output. I think any way in which we can measure the effect of noise on the system should be followed out. I am particularly interested in the psychological approach.

The Committee Needs More Facts

CHAIRMAN SNOOK: I think this brief discussion by Dr. Morgan certainly substantiates the stand which the committee has taken; we need more facts.

Mr. Mowery, you were chairman of this committee last year, and you must have some ideas regarding what to do. May we hear from you.

H. W. MOWERY (American Abrasive Metals Co., New York City): There is one thing which occurred to me yesterday during the course of our discussion of the abstract of this paper. We have no data to show that industrial plants have accidents traceable to noise. So would it not be a good thing if several of the large industrial organizations, such as the General Electric, Westinghouse Electric, etc., were to study their accidents for a year or two to determine whether or not noise seems to be a direct or indirect cause of accidents. That will be extremely valuable data.

Another thought came to me as Professor Morgan was completing his remarks. One of the main reasons why the committee of last year turned the future work of this committee over to more able hands was because of the feeling that was growing in the minds of some of us that perhaps noise was not really harmful to the human system to the extent that accidents were the result, and that the human body perhaps was capable of compensating by its natural resistance for the reduction in vitality due to noises. That is why it is so essential to proceed with this research to determine definitely if noise has any harmful effects on the human system. If we find there is no harmful effect, then there is no further need to proceed with the work because we have nothing that is of particular interest to the Council to eliminate.

The Intermittent Noise More Harmful

M. E. ARKILLS (The Waterfront Employers of Seattle, Seattle, Wash.): I would like to ask the Doctor if any tests have been made in studying noise and its relation to health.

DR. MORGAN: You may assume that because I said the thing is emotional that it isn't harmful. Psychologically, it is the most harmful thing that can happen to the human being. In our tests, we got a noise as intense and as harmful as we could get and we kept that noise going for thirty minutes and as far as we could make out, it is less harmful than an intermittent noise.

MR. M. E. ARKILLS: From the fact that more pressure was put on the keys, it suggests to me that people working under those conditions might over-exert themselves and thus produce fatigue earlier in the day than without the noise.

I remember an incident when I was working in a drafting room one time right near a shaft which had a wood pulley that squeaked until you couldn't hear yourself think. One afternoon, somebody took the pulley down and we could hardly work the rest of the afternoon after having worked that way for several months.

JOHN G. SPONSEL (American Bridge Co., Gary, Ind.): How many noises are repulsive?

CHAIRMAN SNOOK: A question like that is altogether too general and I am sure that Dr. Morgan can give us some idea as to the difficulties that are involved in answering such a broad and general question.

STEWART J. OWEN, JR. (National Safety Council, Chicago): There are several classes of normal persons. Doesn't noise affect some persons of the same class differently?

DR. MORGAN: That is one of the problems. I am pretty certain that there are not only two classes but that there are many classes which we haven't distinguished as yet. There is no doubt about it at all that noises affect people differently.

CHAIRMAN SNOOK: We have another member of the committee with us, Professor Watson from the University of Illinois. It will be of interest to you to know that Professor Watson has done work upon this very hotel building in the matter of noise elimination. I am sure we will all be glad to hear from Professor Watson.

PROFESSOR F. R. WATSON: First of all, I should like to express my appreciation to Dr. Morgan. I think his work and definite information will be a step forward in the final solution of the problem.

I would like to say two or three words about the beneficial effect of quiet in rooms. This particular room, for instance, is quieted by the carpet and these chairs to such an extent that you can understand what I say, which is not true in a good many rooms.

In regard to the question asked a few minutes ago, I should like to say that some work was done in New York City in connection with the Federal Reserve Bank where they have a large number of employees. What they did there was to count the number of mistakes made by employees in noisy rooms compared with the number of mistakes made in the rooms which had been quieted and it was found there were more mistakes in the noisy rooms than in the rooms which were quiet. This shows that fatigue does make the employee less efficient.

MR. ARKILLS: Would that be a question of fatigue or distraction?

Why the Automobile Runs Into the Train Side

PROFESSOR WATSON: The employees would work on the same kind of work the same length of time, in both quiet and noisy rooms. There were more mistakes in a noisy room than in a quiet room.

This whole question of the quieting of buildings is, to some extent, in its infancy, but progress is being made in a number of different directions and it seems quite certain that within ten or fifteen years, quiet rooms and auditoriums will be more numerous than they are at the present time.

I should like to add one other comment which is in a considerably different direction, but which I think comes up in the matter of safety. I have been interested in hearing that many automobiles run into trains instead of being hit by trains. I rather thought that the tremendous noise and rumble of the train must prove very confusing to an automobilist. Under the pressure of noise, I find that I have to rivet my attention very decidedly upon what I am going to do with a machine. It seems likely that the rumble of the train is explainable for the fact that so many automobilists run squarely into the middle of the train.

CHAIRMAN SNOOK: I am sure many of us know that noise arrests our attention and causes us to hesitate and take time in order to decide what we are going to do. I know that that is the reaction I have towards noise and I dislike noise so much that I am sure something of that is in my own reaction to noise.

MR. MOWERY: With reference to Mr. Arkill's question about fatigue. When I first came to New York City, I got a room on West Twenty-third Street near the corner of Ninth Avenue. There are twelve lines of crosstown surface cars, there are two more lines of north and south surface cars on Ninth Avenue and there is the elevated line on Ninth Avenue. The first week I was there I didn't sleep a wink. I am quite sure that by the end of that week I was considerably fatigued. If I had been engaged in some dangerous or hazardous occupation, I am sure that my reactions would not have been safe in all cases.

A short time ago, I had occasion to go to Asbury Park. I was seeking a rest. I got into a hotel and had a room near the elevator shaft. I believe the elevator machinery must have been bolted fast to the roof members, because the noise from that elevator spread over the entire building. I didn't get much rest. I think unquestionably that noise must cause fatigue. But, after my week's residence there, the effects of the noise diminished and I was able to sleep soundly. No doubt, if I had remained a few days longer, I would have been able to rest even under those noisy conditions. So I am wondering whether or not a human being isn't able to compensate some way or other and after a time become immune to noise. And when can we say whether a noise is permanently harmful or not?

MR. ARKILL: I think the more things we have to compensate for the less resistance we have for other outside influences.

A Campaign to Eliminate Unnecessary Noise

CHAIRMAN SNOOK: The planning of the work for the committee has proved to be tremendously fascinating because there is at the present time such a pronounced fight against unnecessary noise. People are annoyed by it and the differences of opinion regarding the effects of noise upon humans are tremendously great and we need facts. We need a solid foundation of information and that the committee is proposing to set about obtaining.

The physiological reactions to noise that are involuntary may be larger in number than the single one that Dr. Morgan has detected, namely this change in heart ratings, either slowing it up or accelerating it, as the case may be with that particular individual. There may be others, and I am happy to say that Dr. Morgan, Dr. Watson and others of the committee have been discussing and eliciting the support of other investigators so we have great hopes that within a few years we shall be able to know something about the ill effects of noise upon human beings.

C. L. YORK (General Electric Co., Schenectady, N. Y.): You know we manufacture radios and part of the process is testing loud speakers. We notice among the girls that the noise certainly increases mass production. Even the old fellows around fifty-five years of age seem to have a lot of pep.

CHAIRMAN SNOOK: This effect has long been known to the cigar manufacturers in Cuba where they regularly employ a reader who reads to the men making cigars. He entertains them. He reads magazine articles and anything that will hold their interest. Thus mass production is increased.

PROFESSOR MORGAN: It is automotive response. You get a sound which affects your automotive nervous system that causes a change in respiration, in pulse rate, and in secretion of certain glands. That keeps up this acceleration of the heart, and so on, so each change is just one part of the whole.

MR. YORK: When a new building was being constructed at our plant where we had a lot of colored men working, one of the first things done by the contractor was to get a song leader, to keep things moving.

JOHN G. SPONSEL (American Bridge Co., Gary, Ind.): I have heard of the same thing in loading cars of lumber, having a song leader for the colored laboring crew.

CHAIRMAN SNOOK: We will endeavor to maintain a strictly open attitude of mind and the books must not be closed for a long time until we have accumulated information over a period of years in order that we may know the real effect of noise upon the human organism.

MR. OWEN: If anyone has any information or test data that they believe will be helpful to the committee, of course, we are more than anxious to get hold of it.

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



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Chairman, A. F. DUNNEBACK, General Motors Corp., Detroit, Mich.; *Vice-Chairman*, A. M. WILLIAMS, Chrysler Corp., Detroit, Mich.; *Secretary*, E. H. COTCHER, Murray Body Corp., Detroit, Mich. *Committee Chairman: Poster*, J. B. GIBSON, Western Electric Co., New York City; *Membership*, C. H. CHAPMAN, Briggs Manufacturing Co., Detroit, Mich.; *Statistical*, G. S. THOMPSON, Detroit Insurance Agency, Detroit, Mich.; *Engineering Representative*, R. F. THALNER, Buick Motor Co., Detroit, Mich.; *Executive Committee*, THE OFFICERS and G. A. KUECHENMEISTER, Dominion Forge & Stamping Co., Ltd., Walkerville, Ont., Canada; L. E. AVERILL, Packard Motor Car Co., Detroit, Mich.; R. A. SHAW, Fisher Body Corporation, Detroit, Mich.; L. L. JUDGES, Ford Motor Co. of Canada, Ltd., Ford, Ont., Canada; D. C. HUNTER, National Cash Register Co., Dayton, O.

Tuesday, September 27, 1927

A. F. DUNNEBACKE, Chairman

Safety Director, General Motors Corporation, Detroit, Mich.

The first session of the Automotive Section of the National Safety Council was called to order at nine-forty-five o'clock, by the chairman, Mr. A. F. Dunnebacke, safety director, General Motors Corporation, Detroit, Michigan.

CHAIRMAN DUNNEBACKE: Gentlemen, this is the opening session of the Automotive Section of the National Safety Council, at the Sixteenth Annual Safety Congress.

You will find, on each chair, registration cards. The purpose of those cards is very definite, and they have been of great help to the Congress in its work. In the first place, it gives us a list of everybody who attends the Congress; the officers go through these lists and find out who come to these meetings; naturally, then, we can distribute our papers and pick out the men who are interested enough in the session to attend the Congress.

Then again, when a person gets up to make a remark or enters into the discussion, if there is any doubt of his identity, it is much easier for the reporter to get his correct name and address. Also, these cards help in tabulating and keeping track of the attendance at the Congress. So, the first thing, this morning, you will each take the card you find on your seat, write your name, the company you represent and your address; later on in the meeting, somebody will take up those cards.

Reports of the Various Committees

Under the regular order of business, the first thing, this morning, will be reports. We will have no long reports from your officers: whatever may be said in the way of a report will be a short, condensed general report that I will give you.

Your officers have met this year in session four different times, in which we discussed the interest of the Section, activities of the Section, and the development of a program for this year. The attendance was always satisfactory. In fact, there was only one meeting in which there were less than five in attendance, and at the other three meetings there was almost a complete attendance. This was very gratifying, indeed, because it is one of the serious and hard things in the conduct of the Section, to get officers to attend these meetings. Where the homes of the officers are widespread, it necessarily means considerable travel, considerable sacrifice of time and money to attend these meetings, and it was very gratifying to note that most of the officers attended all the meetings this year; so there has been the best of cooperation among the officers, and we hope and feel that we have, as a result of that, developed a program which will be interesting to the delegates.

That is the only thing I wish to say in the way of a report. There is one report, that of the Statistical Committee, which I am going to have Secretary Cotcher read. I think this committee has done the best work of the Section. Those of you who received the annual report of the National Safety Council, showing the vital statistics, were surprised to see how many automotive companies, this year, reported their accident experience. It was the most complete, largest and best report on accident statistics that the National Safety Council has issued; and it was largely due to the work of the Statistical Committees of the various sections. That is the reason why they are anxious to have every company in the Council report its experience. Mr. Cotcher will read the report.

Report of the Statistics Committee

Your Committee on Statistics is pleased to report that signal progress has been made during the past year, and you have been presented with a most complete report which I would suggest be given careful consideration by each one individually. It has taken considerable effort on the part of the National Safety Council to present this report and your committee men would certainly urge their respective request that all concerns, whether members of the National Safety Council or not, file their reports so that we can have a complete chart and the actual standing of the group.

I wish to thank you for the confidence you have placed in your committee men and also for the hearty cooperation that I have received. I sincerely hope that the effort made by the National Safety Council to provide these charts will prove an inspiration for greater progress in the future than has been accomplished in the past.

CHAIRMAN DUNNEBACKE: The next thing I wish to announce is the appointment of a Nominating Committee, to select a set of officers for next year. This is always an important step and calls for a good deal of thought. I have selected for the Nominating Committee, this year, three past chairmen of the Section. These gentlemen have all been hard workers in the activities of the Section, they have a wide acquaintance among the members. They are men who can pick out a good set of officers for next year. That committee consists of Messrs. G. A. Kuechenmeister, personnel director, Dominion Forge and Stamping Company, Walkerville, Ontario; R. F. Thalner, safety director, the Buick Motor Company, Flint, Michigan, and L. E. Averill, safety engineer, The Packard Motor Company, Detroit. These gentlemen will meet between now and tomorrow morning. At the opening of the session, tomorrow morning, they will present their slate for your consideration.

Now, we will enter into the program proper. It was quite difficult for your officers to decide just what form of a program to have this year. The meetings of this section have been numerous, and it is always a little difficult to decide what is the best form of program, and how to develop one that will be of interest to everybody.

New Plan Followed in 1927 Program

If you recall, last year, the officers built their program around the hazards of material here. We took materials from the time received, until put up in the machine to be operated on; then we took the materials from the time they were placed at the machine and carried through process until ready for assembly. Then again, we took the materials from the time they entered into the assembling until they were ready for shipment.

This year, the committee decided they would adopt another definite scheme; that is, we would analyze, digest and review the accident experience of several millions of hours of work in the automotive industry, and, studying those, we would know what was causing our accidents. Knowing what causes our accidents, as a rule, we can set up some remedy for their prevention. So the program has been built around that idea, to know what is happening, where the accident is happening, what parts of the body are being affected, what are the rates of severity. Then, when we know what is happening and what is costing us the most money and the most suffering, succeeding speakers will take up different injuries, show what is causing them, and tell us what to do to prevent them.

For the opening of this morning's program, the officers have been very fortunate in having a gentleman from Ontario to give the first paper. This gentleman is

chief statistician for the Ontario Compensation Board; he is a man who, perhaps more than anybody else, has a complete picture of what is going on in the Dominion of Canada, also an extensive knowledge of what is going on in the States. I take pleasure in introducing Mr. T. N. Dean, who is going to tell us what is happening, and where it is happening.

Where the Accidents Happen

T. Norman Dean, M.A., M.S., Statistician, The Workmen's Compensation Board, Ontario, Toronto, Canada

Any examination, no matter how casual and superficial, of the profound mass of industrial accident statistics promulgated on this and the European continent precludes a general statistical survey of any particular classification. This is due in part to the rather fragmentary and chaotic character of much of the published material and partly due to endogenous factors complicating clear cut definition and understanding of basic principles of classification. It is certainly in a measure also due to failure of conscious recognition that reliable statistics are compilations of facts themselves rather than records of someone's interpretation of those facts.

Two limitations on any set of statistics under analysis appear. First: erudite premises and pedantic conclusions are often the result of hastily constructed and carelessly defined columns of figures labelled "statistics." Syllogistic process may be perfect, but if premises are assumptions conclusions are apt to be fallacious. Indeed it would seem that considerable of the popular distrust of statistical presentation has been engendered in just this way and fostered by the orthodox method to obtain argumentative supremacy of bolstering up preconceived notions by arrays of figures calculated or in self deception to present a similitude of mathematical preciseness where only misinformation and confusion may result. Second: general misconception of the nature and function of the average is productive of much misunderstanding. Without technical elaboration, let it be simply stated that it is rarely, and then only coincidentally, that the average is encountered as a real quantity and that the use of averages in comparison without full statement of original data, with all attendant limitations and qualifications, is a hazardous proceeding.

New York Compared With Ontario

An example of these generalized principles is presented herein with a twofold hope: first, that it indicates some hitherto unconsidered aspects of statistical presentation in accident prevention work; and, second, that it may make some more or less technical matters less complicated and thus serve as a guide-post for the future.

The following comparison has been made. In New York State accidents compensated are divided as follows: Temporary disability, 77.5 per cent; permanent disability, 21.1 per cent; death, 1.4 per cent. In Ontario the figures are 91.4 per cent temporary disability cases, 7.8 per cent permanent disability cases, and .8 per cent death cases. The conclusions are easily made that deaths are more frequent in New York than in Ontario and that permanent partial disabilities in New York are nearly three times what they are in Ontario. The former may be due to the more hazardous nature of industry in New York and the latter may occur from a more inclusive interpretation in New York of the condition designated "permanent disability." Ontario, however, is a pioneer prov-

ince, rich in mine and forest resources, while New York is an old established community abundant in light manufactures and commercial pursuits. In the New York records are figures of non-hazardous industries; these are excluded from the Ontario data. It might also be fair to conclude that administrative interpretation of the term "permanent disability" results in a more extensive application in Ontario than restriction necessitated by the construction of a legislative schedule in New York.

Thus is presented a series of conclusions totally different and diametrically opposite to conclusions drawn from the same data. Yet in neither is the explanation wholly patent. The New York figures include temporary disabilities of two weeks or more duration while the Ontario figures include disabilities of more than one week's duration. Translation into similar terms discloses this comparison: temporary disability: New York 77.5 per cent of cases, Ontario 84.6 per cent; permanent disability: New York 21.01 per cent; Ontario, 14 per cent; deaths: New York 1.4 per cent, Ontario 1.4 per cent.

Plausible Deductions From the Statistics

To assemble reliable figures showing anatomical classification of injuries from any widely distributed field is impossible; even to combine records of two plants without definition of bases and full recognition of all qualifying factors is distasteful. Nor does it appear that any useful purpose will be served by so doing. Herein therefore generalities and deductions must serve for those usually used and generally confusing numerical statements commonly designated statistical bases.

First: The trade risk is of less importance than is the general risk.

Second: The part of the body most used in operations peculiar to the trade is most often injured by the causation agency of trade risk and less frequently injured by the causation agency of the general risk.

Third: Mental hazard is a greater causative factor in industrial accidents than either trade or general risk.

Fourth: Injury, disability and money loss are all definite results of accident.

Fifth: The function of accident prevention work is to eliminate trade risk, mitigate general risk, check mental hazard, prevent injury, minimize disability and reduce money loss.

The trade risk is the risk present by reason of the production of some specific article; the general risk is that hazard more or less common to all employments and certainly not peculiar to any one. In stamping shop risks involved through punch press operation is a trade hazard, while dangers involved from unlighted stairs or alleyways, careless handling of objects and upturned nails belong to the category of general risk. The mental hazard, more difficult to separate and analyze, consists in the attitude of mind of employer and manager as well as worker that permits preventable accidents to happen and unfortunately in many cases even induces accidents.

The pathos of the workmen's side of industrial accidents has been so often, so ably and so differently presented that one conceives accident prevention work as a social duty almost to the exclusion of all others. It is pictured as it were a challenge spark flung down by the high gods for white-shield crusaders to snatch, lay upon the heart, nurture and coax till the flaming torch of high-minded, self-effacing and self-sacrificing duty shines forth refulgently to the whole world. It is perhaps somewhat anomalous to look upon accident pre-

vention work from the purely humanitarian side when engaged in production of that which is as death dealing as some of the most deadly diseases. If the prime purpose of accident prevention work is the prevention of all accidents in industry the problem could easily be solved by the application of a four-word formula—"close down all industry." However, as production is necessary to our economy it might be suggested that safety is not first but production is and safety is a necessary concomitant of most efficient production.

Accident prevention work hence becomes at least in part an engineering function of production. From the standpoint of the entrepreneur the application is to the individual plant. The social viewpoint, that of general safety, is necessarily wider. It includes besides general safety, safety in the mass of industry within the confines of the society.

Accident prevention work is, or should be, physical and educative. In the physical sense is the application of protective devices and shop housekeeping. From the educative side it consists of not only the education of the workmen to an appreciation of possible and potential danger, but the education of the general mass of society to the suffering and cost of unnecessary accidents as well as training in first aid and appreciation of rehabilitatory methods to reduce disability.

The Harmfulness of Minor Accidents Is Serious

It can be emphatically stated without fear of successful contradiction that no single cause of accident may be listed without matching it with the complementary death found somewhere in the literature of industrial accidents. Perhaps too much importance has been placed upon the harmlessness of accidents resulting from certain specified causes. Herein enters the problem of infections. No matter how innocuous the agency, no matter how seemingly trivial the wound each and every accident is a potential death bringer. Indeed, about one-eighth of lost time accidents and one-quarter the compensation cost is caused by infection, either concurrent or subsequent, where but for the infection the agency causing the wound is comparatively harmless.

The loss to plant morale and production organization which is the direct end of every lost time accident, is perhaps more serious than the cost of compensation, although the latter is a heavy charge on industry. The removal of a hazard is a potential saving, the prevention of an accident a direct one. The minimizing of costs in reduction of lost time, confusing to organization and resultant in compensation costs, is equally saving. Prevention of infection, efficient first aid, early convalescence, reduction of disability and speedy return to employment are equally as valuable as accident prevention and for the same reasons. Concentration on accident prevention alone is conservation, but in industry as elsewhere with conservation runs its twin-brother reclamation. The scrap heap of industry is combed for reclaimable materials but the waste piles of humanity are not even turned over.

The advances made in accident prevention by individual plants is most heartening but accident frequencies are not being decreased in the main, at least as far as Ontario is concerned. Compensable accident frequency for 1917 was 6.57 each 100 full time worker; for 1923 it was 6.58; for 1924, 6.68; for 1922 it was 6.40, and for 1925, 6.50. For 1920 the average time loss in temporary disability cases was 19.62 days; for 1925, 20.68 days. For 1920 in permanent disability cases it was 74.53 days and for 1925, 92.92 days. The average medical costs per case in 1920 were \$18.20; in 1925, \$20.16. This experience is not peculiar to Ontario, but is nearly if not absolutely universal. In Ontario, as elsewhere, accident prevention propaganda has gone a long way. inspection is

frequent and careful, protective devices and appliances are well known and used, and concrete rewards are held out under a merit rating system. Nevertheless accidents generally speaking are not decreasing in frequency or severity.

That this is not a hopeless condition is evidenced by mortality rates. In spite of the strides made in preventive medicine and prophylaxis mortality rates have remained practically stationary. The great reduction in deaths from typhoid fever to use one instance has been more than balanced by deaths in automobile accidents. The number of death by rabies, cholera and bubonic plague are less than the number of deaths through air craft accidents. It is as idle to deny the efficacy of preventive medicine as it is to deny the use of accident prevention work. However, the one central idea may be left that accident prevention work is not enough. The problem must be tackled from the standpoint of reducing waste and reclaiming salvage. False sentimental appeals, tumult and shouting will not cure the disease. Study and education, a general application of safety principles in a widespread way, study of the individual problems, education of the mass to appreciation of danger, training of the sub-conscious, efficient first aid, prevention of infection, reduction of disability check up of medical services, supervision of convalescence are some suggested avenues of profitable endeavor.

To outline specific ways and means is to carry coals to Newcastle and would be presumption. The central dominating thought may be left. Strip off the artifice of statistical self-glorification, look at the situation squarely in the face. Orthodox methods of safety endeavor have not produced tangible results and from the financial point of view have not paid their way. Appreciate the application to your individual plant and to the society to which you belong, but remember safety is not first—safe production is.

CHAIRMAN DUNNEBACKE: Mr. Dean, I was afraid, when you started to talk, that you would give us a lot of dry statistics, and I want to compliment you on the way you got away from them. While I do not want to encourage too much general discussion now, because we have reserved Thursday morning for discussion, I want you to know that Mr. Dean has told me he will welcome discussion of this paper.

As I look over accident and safety work, I think perhaps some of the greatest tragedies that come to us in our work come because of eye accidents. I think, really, that 80 to 90 per cent of the pleasures, happiness and joys we get out of life and, likewise, the tragedies that come to us in life, come through the sense of sight. The officers felt that a paper in this program, dealing with eye accidents and methods of prevention would be very welcome, and we are fortunate in having Mr. J. C. Campbell, of the Union Switch and Signal Company, of Swissvale, Pennsylvania, handle this subject.

Prevention of Eye Injuries

**J. C. Campbell, Safety Director, Union Switch & Signal Company,
Swissvale, Pa.**

The prevention of eye injuries is a great task to any individual or company. Thousands of eyes are being saved from injury by the scientific application of the theory of artificial lighting, developed in electrical laboratories within the last two decades. Practically the entire science of lighting has been written since the first big experimental institution of this kind was established 20 years ago. Prior to that time little was known about a properly designed lighting fixture. The improvements in lighting in the past 26 years exceed those of all ages that went before, although the beginning of modern illumination was in 1879, when Edison

gave the first practical electrical lamp to the world. Modern homes and factory lighting have done much to save eye strain and help people to preserve sight.

According to recent surveys, of the 42 million men and women employed in America, 25 million have defective eye sight, which, added to poor lighting, is causing at least 100,000 of them to lose their positions each year. Insurance statistics traced 90,000 accidents to poor light and bad eyes in the year 1924, with a loss to the worker of three million productive days. Investigators have also discovered that a poor lighting condition is as often the result of too much light as of too little—a condition made possible through an electric light of too high candlepower. The chief source of poor lighting is the use of unshaded electric globes, causing a direct glare into the eyes of the workers. Of the two million industrial accidents occurring annually, the number of eye injuries is put down as 200,000.

The eye is about the most sensitive and delicate organ of the body and yet it is probably the most abused. In educational institutions and in industrial plants every effort is being made to protect and preserve the eye sight of the public. Yet this same public, on whom the suffering will fall, is often shamefully careless. There is little excuse nowadays for poor lighting in the plant, in the schools or in the home. The fault lies with the individual, be he the manager of industry, the professor of the school, or the head of the home. The question of adequately distributed electric light is one that should be carefully gone into by all people for the benefit of all in preventing eye injuries.

Prevention of Eye Injuries by Foreign Bodies

Now regarding the prevention of injuries to the eyes by foreign bodies. In reading the report of the National Commission for the Prevention of Blindness, it states there is no such thing as a non-hazardous industry. The loss of 82 eyes in 1925 in the practically safe occupations of merchandizing, farming and textile manufacturing is further proof that serious eye accidents are likely to occur wherever men, women and children are employed. While there may be some occupations which have not to date contributed to eye accidents, yet we find with the proper combination of circumstances they could occur. There is no such thing as a non-hazardous occupation.

The Committee also found that from a national point of view, the metal manufacturing industries are a source of the greatest number of serious eye injuries. In Pennsylvania the coal mining industry ranks first as the cause of industrial blindness. In Wisconsin it was found that hand-tools constitute by far the greatest single cause of eye injuries—being responsible for 44 per cent of their total. As an example of the important part that eye injuries play in the whole problem of industrial accidents, the report cites the experience of a large ship building company in whose dispensary 38 per cent of all injuries treated were eye cases—more than 4,300 eye injuries being treated in this dispensary in one year.

In our plant at Swissvale we have realized that eyes with foreign bodies are always dangerous, as they are likely to break out in inflammation at any time. There is no more serious injury to the eye ball than that of penetration by a foreign body, and often vision is not only lost, but the eye ball must be taken out to avoid sympathetic inflammation. We learn from this that the minor eye injury may become serious. In every industrial plant there is always some workman who thinks he is skilled in removing foreign bodies from the eye and who does not, in his ignorance of the serious consequence, hesitate to pick out the imbedded particle with a match or dirty handkerchief without thinking of the danger to his fellow employee from ulcers of the eye following such treatment. We believe this practice is at about the irreducible minimum in our plant. We attribute this to ever-

lasting personal preaching; the employees seem to have realized their eyes are one of the most vital and valuable organs of the body.

Now, I am no doctor and I am not going to give you a lecture on eyes, but how are we going to stop accidents? We sometimes don't like facts. We hate to think that we are safety men and still have eye injuries occurring daily. But what are we going to do about it? Gentlemen, I am not ashamed of the Gospel of Safety. The word, gospel, you know, means "glad news." I want you to take that as my text for the rest of my talk. Industry is saving men's eyes. Managements are getting the best of lighting in their plants. Schools are thinking first of the vision of the children, GLAD NEWS!

Four years ago it was my duty to take a fellow employee to the hospital. He had been pouring metal and putting the chill back into the chill box; it flew back on to his face and eyes. He was not wearing goggles, nor did any one else in the foundry at that time. I got into the car with him and talked to him while we were driving to the hospital. After we arrived and before the doctor came he gave me the best going-over a man ever got. He blamed the company for carelessness in allowing employees to throw garbage into the chill box. In fact he had me scared, but one thing he made me do and that was to go home and think.

The Accident Was a Stimulant to Preventive Work

That man was fixed up in a couple of days and I thank him for all the success we have had in eliminating eye accidents in our plant. We have a plant employing about 3,000 and operating a forge shop of about 40 board and steam drop hammers, a foundry with 400, a machine shop of over 1,000, and a storage battery plant with over 300. At the present time, every man in our chipping room is wearing his goggles. Every moulder when he is pouring off wears his goggles and incidentally his leggings and moulding shoes, and no "maybe's" about it. Every man working on a drop hammer wears his goggles, and I tell you, gentlemen, I feel a very small individual when I stand alongside of a 6,000 pound steam hammer and see the men pounding the steel, wearing their goggles.

Here is a list of our serious accidents sent to specialists this year so far:

One man working in the shipping department cutting wood with a hatchet had a piece fly up and strike him on the eyebrow. No injury to the eye and no time lost.

One man in the assembling room came to the doctor as he was going home and stated he had gotten a foreign body in his eye. His eye being red and inflamed, the doctor sent him immediately to the specialist. It was found he was injured at home. No time lost as well as no compensation.

A man working in the die room reported to the doctor with ulcer on the cornea of the eye. Did not know where he got it. No company case.

Foreman struck on jaw with a piece of wood reported to the relief department a few days later had the eye inflamed. Sent to specialist who diagnosed his case as cold in the eye. Loss of time—3 days.

Now, how does this come about? There are no banners flying at our gates and we have had no brass bands playing. But gentlemen, here is a good idea of our success.

The wife of an inventor once said, she never dared to tell her husband that there was anything he could not do for he would never rest until he had done it. There are not many people of this kind but when you do find one he is hard at work on the impossible. He relishes the thing that can't be done. The employees have lots of fun when they see you going around asking one here, coaxing another there to wear goggles. The whole thing seems ridiculous. But doing the impossible is not always as it seems; the only thing worth working for is the satisfaction that the men wear the goggles. The safety engineer or director must be like the

farmer who in the spring anticipates that in the fall he will have a bumper crop. He spends his days and nights working in the shop planning here, encouraging there so that the seed of safety may blossom into a real plant. It is due to the constant unselfishness of the management and the safety committee, who day in and day out are working for the benefit of their fellow employees that there is finally an abundant crop of employees wearing goggles.

Sometimes we get discouraged trying to accomplish the prevention of accidents. Human nature is feeble, but the safety man who plans to save eyes must realize that "something accomplished, something done" is worth striving for. He must always be on his toes, always looking out for the most difficult employees—the old employee who does not believe in the new fangled ideas of safety and never was used to them, the fellow that knows it all, the young lad or lass who needs a helping hand. He must always be looking for the unattained. It may be like Edison trying to light our streets, or Marconi struggling to speak to us from thousands of miles away, or the Wright brothers striving to navigate the air. There must always be present a feeling urging us onward to get our fellow men to take all precautions to save their eyes and prevent blindness. The man who does that which looks impossible to others is the man who is on his toes, ready, willing to meet all emergencies and to make himself useful. His willing alertness, enthusiasm, courage and indomitable spirit fit him for the prevention of eye injuries.

Employees Fall Into Various Classes

Employees as well as all other living things can be put into different classes. Some act one way, some another. But all in accordance with their own philosophy of life. "As a man thinketh, so is he" is one of the most dependable laws of rational living. If he refuses to think or does not have the will to think, he is at the mercy of his own limitations—unless he is looked after by some friend—and this is where the safety engineer has his chance in industry for the prevention of injury. Every man is in a class of his own. Some go ahead and others are slow and do not make a very good job of coming. It is our job to make this class of employee feel that he is a part of a great organization, where all are working for the good of each other and the good of all.

I read where Roger W. Babson has investigated industrial plants and other business concerns to find out why so many men miss the mark of success in life, and it is his opinion that they do not get hold of an idea in their early years. Getting an idea is like sitting down on a chestnut burr—it should make you jump up and make you feel like doing something. Eastman got the idea that he would like pictures of where he traveled. The result—the kodak. Edison got the idea that the human voice of great speakers and singers could be heard in the homes of the people—what great joy that would bring?—and he invented the talking machine. All progress comes from ideas. Some have better ideas than others.

Now, safety engineers, you have your problems in your plant. Sit down, think, and get an idea of your own. The start of getting men to wear goggles in our foundry was made by the man whom I had taken to the hospital. Safety men, get an idea of what can be done and when you get that idea the most important thing is to hold on to it. Holding on to it is not the easiest thing in the world when you have managers, superintendents, foremen and employees not wanting to protect themselves. At times life becomes so monotonous and commonplace you almost lose your grip—and lose all. These are my personal ideas and inspiration for action.

Some men can be won by fear, for fear is an instinctive inheritance given to human nature for the protection of life. Fear and lack of courage have been man's deadly enemies. Fear is found in the life of everyone and interferes in business. There are quite a number of men in industry who can be won by fear. They are

afraid of darkness although fear is always groundless and unreasonable. This then is one way you can preach the gospel of safety. Getting the employee to choose for himself is another idea. Some men want to reason it out. Encourage them in their thoughts. The safety engineer must be a man who is willing to give all for safety. You cannot be a safety engineer unless you believe in it. You will never get results in your plant by being a lukewarm, halfhearted, go slow safety man. Benedict Arnold had it within his power to become one of America's greatest patriots and he missed the halo of a great man in American history. Why? Because he was *just almost a loyal general*. Two parts hydrogen, one part oxygen when united under the proper conditions form the water we drink. They always combine. There are no accidents in nature's laws and the safety engineer who is not fully convinced that he has the greatest job in saving human lives should get out of it for he will never stop eye accidents until he can go up to a man and tell him of his danger from the depths of his being. A real safety man will accomplish what he wants by keeping after the employee.

No Employee is Penalized or Discharged

Now I realize that a safety engineer talks a great deal about discipline. Gentlemen, we have never in our safety work asked the discharge or penalizing of our employees for not wearing goggles. There has never been an employee brought before his superintendent or foreman and been reprimanded. Discipline is a great word but men are only children grown tall. Hearts don't change much, after all. All my fellow-workmen are like myself; we are only human beings, with our faults and failings; and for the safety engineer to set himself up to be able to judge when and where an employee should be punished is not safety work. A man or woman is only the product of what they were taught in childhood. You cannot discipline a man who has had no discipline when a child. We all realize we want to do what we please. Yes, but if we teach the habit of concentration, that our bodies are only on loan to us and that our eyes are the mirrors of the soul we will get results. We don't preach discipline. We sing "author of liberty;" that is a glorious thought.

When each man realizes his success is tied up with the success of others, discipline has to be taught at the mother's knee. Safety engineers, it's your job and mine to build men, not fire them. If a man is not playing square, you are not his judge. What we want in America today is the development of our national thought toward the value of the human body. I'll tell you why so many men and women are injured in America. They spell that glorious word "liberty," L-I-C-E-N-S-E. That's what you have to watch—when a man thinks he can do what he pleases and spoil all the good that is done in the plant by the safety committees. But for a safety man to talk about discipline to me is all foolishness.

O gently scan your brother man,
And gentler sister woman,
Easy it is to go awrong,
To err is but human.

Business is a two-fold process. Something produced, then sold. The farmer grows a crop of wheat, then sells it to the grain dealer. Ford makes cars, then sells them to local agents distributed throughout the country. There are two processes, one independent of the other, advertising and salesmanship. We have our bulletin boards in our plant, but salesmanship is the most important part of selling eye protection. There are all kinds of salesmen in the world. What are you offering for sale? It is a question you must answer. Labor and capital spend the time fussing with each other, cities are destroyed and fields are devastated by war because the people of nations have the wrong ideas of human rights. Are you selling the safety idea? We need more safety men, eager to sell the idea of

fair play, good character and honesty to their fellow workers. A safety man must be honest and fair with his fellow men with them and away from them.

We find great success in our work is attained by getting the young employee lined up for safety. We make it a point to see the young fellows wear goggles and I just want to pay tribute to our young employees that they are the folks to work with. With the old veteran and the foreman who think that they know all about eye protection, it is slower going. The enthusiasm of the young folks soon tells our veterans and foremen "Get your goggles on." Lindbergh crossed the Atlantic—YOUTH! So you will get your eye accidents settled if you can get the young folks with you. They will solve the problem of wearing goggles in any plant.

We use only the posters supplied to us by the National Safety Council in our plant.

The safety man who is planning for success in preventing eye accidents and all other kinds of accidents must be just as enthusiastic about the success of his young employees as of his old. Successful safety men are always interested in the achievements inside and outside the plant of young employees.

In closing, why do we try? Have you ever put that question to yourself? You will be helped if you do. You will find out a lot of things about yourself that you never have thought of before. You know, a mule pulls the plow because he is hitched to it. People, like the mule, wear goggles because they are afraid of the boss. There are more ways of making a person wear goggles than I have mentioned. It is not always the person that drives another to do something that accomplishes his object. There are people like you who try for reasons quite different than that of the mule. Their drive is on the inside where no one can see. They alone know that it is there. They themselves cannot see it with the eyes that they use in looking at flowers and reading books.

Most Men Are Willing to Display Reasonable Faith

I call it faith. It makes no difference by what name it is called. It is always the same and it causes people to try. Suppose you have never seen Niagara Falls. How then, do you know there is such a place? You never saw George Washington. How do you know there ever was such an individual who led the army at Valley Forge? You say you are certain because you have been told by friends and read it in your histories. The thing that we call faith which makes you try to reach out for the unattained is nothing more or less than your own conviction that you will be successful in preventing eye accidents. Faith in our fellow employees acts like radium—radiates many different wave lengths of force. It gives us our ideas, ambition, the spirit of courage, self sacrifice and a glorious outlook that something better is just ahead. We have our electric lights and victrolas because of the faith of Edison. We would not be flying if it were not for the faith of the Wright brothers. It is because of hope and faith we are meeting today in this room, and because of it we will go back encouraged to our plant and work harder for prevention of all accidents.

Hold steadfast in your faith in God and in your fellow-man. A man is lost when he loses his faith. I have read that a circle is the emblem of eternity. When Fawcett ran for the nomination as Mayor of New York, he took off his coat—the place being warm—and the people were insulted. He lost the nomination. When Premier Baldwin was in Montreal lately he took off his coat and made quite a hit with the people. Gentlemen, if the circle is the emblem of eternity, let us all take off our coats when we get back to our plants, and get all our employees into the circle—that circle which you and I are working for when there will be every man working for his brother's good. The circle of love, truth and fellowship. That is my idea of how industrial plants will get their employees to take care of their

bodies and prevent accidents. My philosophy may not suit you, but it works in our plant where we are all working for the best that is yet to be.

CHAIRMAN DUNNEBACKE: Mr. Campbell, that was certainly very fine, and I wish every one of the fellows in this room, including myself, could feel as happy and content as you are about conditions back home. You are certainly to be congratulated on your record of this year.

This question of prevention of eye injuries is too serious not to be discussed. I think you will agree with me that Mr. Campbell is a better talker than reader, and if any of you have any questions, you will find him only too willing to answer your questions.

MR. FOUAGY (Willys Motor Company): Mr. Campbell remarked that all the hammer operators in his drop forge department wear goggles, notwithstanding the fact that they sweat a great deal and, perhaps, have a great deal of difficulty wearing them. I would like to have him tell us how he is successful in getting these hammer men to wear goggles under the condition they have to work.

Essential to Have Personal Interest in the Worker

MR. CAMPBELL: Gentlemen, it is like everything else, you have to have a personal interest in the workers. I know every worker in the Union Switch and Signal Company, and there are seven or eight hundred.

In the forge shop, when they are working with the drop hammer, I have a little band to put across their foreheads, and that stops the sweat from coming down. Then, we put a little soap on the goggles, and between the heats, they dry these goggles off and have a couple of head-bands they put beside the furnace, which they use each time. That is how they wear the goggles in the forge shop, a little band across the forehead under the hat will stop the sweat from going into the glasses. Then, too, they have the habit, and they know that the eyes are the most valuable things they have. I have not had an eye accident in the forge shop this year.

CHAIRMAN DUNNEBACKE: The question of sweat has bothered all of us. Somebody else may have something different, to get away from that sweating condition, and we would be glad to hear of anything specific which you have tried and found useful.

MR. NEWCOMB (Tichenor Corporation, Cortlandt, N. Y.): I would like to ask Mr. Campbell if he fits each man's eyes with a prescription lens?

MR. CAMPBELL: No, sir; we do not fit anybody. Our company has the frames. If a man's vision is poor and he cannot work in the forge shop, we give him a set of frames, send him down to a physician, he makes a prescription out and the man pays for his own prescription. We do not supply an individual with glasses, that is, a prescription lens.

MR. NEWCOMB: One other thing, you spoke of spectacles: Do you furnish ordinary protective spectacles, without the side screen, in some cases?

MR. CAMPBELL: Yes, I use all these without the rim or side on shapers. I have a big glass, big spectacle, that I ask every man to wear on a shaper, in the tool room and every department.

CHAIRMAN DUNNEBACKE: In that connection with prescription lens, while I do not want to do any advertising, I noticed in the exhibit, yesterday, a new goggle which takes care of prescription lenses. Any of you interested, might stop at that booth and look at it.

MR. THALMER (Buick Motor Company): I was very much interested in what Mr. Campbell had to say regarding discipline. I would like to have Mr. Campbell tell us how he handles a man who refuses to wear goggles on any job.

MR. CAMPBELL: Gentlemen, we are not bothered with that now.

CHAIRMAN DUNNEBACKE: What did you do with them when you had them?

MR. CAMPBELL: As I said, keep eternally after them. I do not believe in running to the boss. I think the great success in my work is that I visit the hospital and visit the sick, and I get in touch with the family and, in that way, you get to know the family condition, and the man knows you are interested.

I had difficulty at the start, when the men did not want to wear goggles, but if you get an injury, let them all know about it. Take that fellow in the foundry, four years ago, he got an injury to his eye and we had to take him to the hospital. When he came back, we made a great advertisement of it. The fellow went around and told how he had to go to the hospital, and they got the goggles on and everybody was tickled to death, because they did not want the same injury as the other fellow got. Every man wears goggles and I have no trouble with them.

Just keep after them and give them a pat on the back. As I said, it seems ridiculous to start to tell men to wear goggles; you have to coax one here and encourage one there, and you have to tell them that blindness is a terrible thing. That is what I meant when I said "Fear"; if a man is afraid, you can talk fear.

I find in my work that the Italian is a fatalist, and he is the only man I have to watch, but I have them so they wear their goggles, although they don't understand why they wear them, sometimes. They have just got the habit now; come down, and you will see every man wearing goggles.

MR. THALNER: This man might not have been injured in the foundry, if a little discipline had been put into effect. Why let that man work until he loses an eye and then use that as publicity to put your goggle rule into effect?

Effect of the Accident Was Far Reaching

MR. CAMPBELL: I said, four years ago. There was a piece of orange in the chill box. The hot metal flew up and struck him in the face. Why discipline that man? He could not help that, he was the one who suffered. What we want to do is clear our chill box and get new ones and take care of the chill boxes. When they saw that injury to that man, and we bought the goggles, everybody wore them because they did not want the same thing. The discipline was to see that the chill box was kept clean; that is where the discipline was necessary, not for the man who was hurt.

MR. THALNER: There is an element of discipline enters into the problem some place, in having men wear goggles.

MR. CAMPBELL: It may be as you say. In my work, I do not look for discipline, that is not my job; my job is to encourage men to wear goggles and start them when they come in the gate. There is no use giving a man a job and then, seven or eight weeks later, bringing the goggles to him.

The great success in the Union Switch and Signal is in the young people. I have about 600 boys and girls, from the age of 16 up to 21, and everyone of these young folks is starting to wear their goggles. You know, as the years go around, we have a better standard of people wearing goggles.

It is a great question, Mr. Thalner. I am not orthodox in my way of getting the men to wear goggles. I do not believe in discipline. I never go to a foreman. If a man starts to "skin" on me, I go to him, myself, and have a talk with him. I keep it to myself, in a good humor. I never let them get away with murder, but they can give me all the stories they want about the Scotch.

That is my record there, this year, 11 lost days and there were 3 of them we did not need to count. All we did was to keep eternally after them.

CHAIRMAN DUNNEBACKE: I heard a good one last week. A fellow in Detroit gets results in this way: He got the wife of one of the workmen to go through the plant, and, in the last three or four weeks, he has had six or seven wives, of

workmen wanting to go through. Take the wives to the first aid room and show them the goggle, and when the workman gets home, he gets it from his wife.

G. A. KUECHENMEISTER (Dominion Forge and Stamping Company): When he takes the women through, does he put goggles on them?

CHAIRMAN DUNNEBACKE: Yes, every person, regardless of who it is, the minute they pass the office door, puts on a pair of goggles. Has anyone else a question?

MR. BURNS (Reo Motor Car Company): I would like to ask, if an employee wears glasses and puts them inside the goggles, how do you prevent fogging?

MR. CAMPBELL: There is a special goggle you can get to fit over the glasses.

MR. BURNS: It does not give them the vision.

MR. CAMPBELL: He can put his own lens inside the goggle.

MR. BURNS: We tried putting the glasses inside the goggles, but had trouble with a substance leaking down on the lens. How do you get away from that?

MR. CAMPBELL: To what substance do you refer?

MR. BURNS: I don't know. In the heat treating department. We don't furnish glasses now, we send the men uptown, where they are charged one dollar and seventy-five cents, and two dollars and twenty-five cents, for bi-focal lens, to set into the goggle.

Problem of the Fogging of Goggles

MR. CAMPBELL: Do you have a medical examination of your men?

MR. BURNS: The optician does.

MR. CAMPBELL: When you hire a man, do you give a medical examination?

MR. BURNS: We do not.

MR. CAMPBELL: We do, and if they are not fit to work in the forge shop, we do not put them there. It is all right to put one man on a grinder and give him goggles, but you cannot put a man with a fourteen-sixteen vision in the forge shop.

MR. BURNS: You have that all through your shop?

MR. CAMPBELL: The men who wear spectacles have that other goggle that fits the lens. I have had no trouble.

CHAIRMAN DUNNEBACKE: How many have a condition more or less similar to Mr. Burns', fogging between the two lenses?

MR. CAMPBELL: You must have heat there.

MR. MILLER (Chevrolet Motor Company): I believe, by analyzing your welding goggle and comparing it with the regular goggle with a lens set in, you will find the way to get away from your fogging. In a welding goggle, as you know, with the protective lens, you put a washer, fiber washer or something of that nature, which separates the two lenses; there is an air chamber and you get away from any fogging between the lens. The same thing should be true with the clear vision lens, with the protective lens on top.

GEORGE S. THOMPSON (Detroit Insurance Agency): It seems to me that we often, in our goggle problem, deviate entirely from basic principles. Now, there is a reason why you obtain a film between a slip-on goggle and a pair of glasses. I know that, because I wear glasses, and if I put on a pair of goggles and go down into a heat treating plant or forge shop or some place that is warm, it is only a matter of time before I get a film in between there. But why allow the film to remain there? Why not drill a couple of holes in the top and bottom and let the air take it out? That is merely a basic principle.

You would not expect a chimney to draw, if you put a board on top of it, because the smoke would come out through the house, and you can create a ventilation through your goggles as easily as you can by taking the board off the chimney and letting the smoke go out. It got in there, and it got in through the perforation, and if you want to let it out, make the perforation large enough to allow a circulation of air to pass through the two glasses, and I do not think you will have any trouble.

MR. BURNS: The goggles are already vented. If you put too many vents, you are going to have small particles flying from the lathe coming in. It would not keep them from fogging, because they are already ventilated. They would not fog if you remove the lens, but then you have your eye uncovered.

MR. THOMPSON: I do not think the gentleman gets my idea perfectly, because of the fact that the ventilation of the goggle is on the side, and you will find little ventilation on top and bottom. Heat rises and so does smoke, and if you want to get it out, you are going to get it out from the top, and the amount of perforations you have to put in there, are so small and so few that you will not get any chips in, and you will not get any weakening of the lens.

CHAIRMAN DUNNEBACKE: Gentlemen, I am going to close the discussion now, but this is the spirit I want to develop in these meetings. The program is pretty heavy this morning, and I do not want to have too much discussion, but, tomorrow, I want as much of this spirit as possible. If we come here and get into discussion, we are going to get some good out of these meetings.

We are told in our safety meetings that we can only prevent 10 per cent of our mechanical accidents through mechanical guards and the balance have to be prevented through education. If that is true, it means we have to spend 80 or 90 per cent of our energy on educational lines, and I do not know of any more powerful factor than the use of employee publications. Companies are more and more interested in house journals, and I think one of the biggest weaknesses in America, in safety, today, is that these house journals are not being used as they should, for the elimination of accidents.

There is, however, one company that has made an outstanding success of it, that is the Buick Motor Company. They have done some wonderful work through their house journal in eliminating accidents, and we are fortunate in having, this morning, Mr. Forrest W. Boswell, who is chairman of the Plant Publication Section. He has left his section to give us his paper.

The Employees' Publication in Accident Prevention

Forrest W. Boswell, Director, Personal Service Department, Buick Motor Company, Flint, Mich.

The employees' publication is recognized more and more as a potential factor in accident prevention. Editors of employee publications who have failed in this regard are missing a great opportunity. The same also can be said with reference to safety engineers who have access to employee publications and have neglected to use them.

It is not my purpose to make a long dissertation upon this subject. I expect to let a few pictures tell the story more effectively and conclusively than mere words.

The value of the printed word and illustration is recognized today more than ever before in the history of the world. A very common expression which is heard today as we meet folks in one place or another is—"I see by the paper"—that this thing or that thing has happened. There is a certain amount of weight attached to what appears in print, especially the daily newspapers and particularly so if the story is illustrated.

The employee publications are the newspapers in industry. Sometimes I am led to conclude that the copy which appears in employees' publications carries more weight than that in the daily newspapers. My reason for such a deduction is due to the fact that the men of the shop know the personnel of the employees' publication. They are about as close to the personnel as members in the same family. It is in reality a big family. Consequently the

publication is known as "The Family Paper." We have formed the habit of referring to the employees of the Buick Motor Company as "The Big Buick Family" and of our employees' publication, the Buick News, as our "Family Paper." This makes for closer intimacy and consequently greater confidence on the part of all concerned.

Hence, stories and illustrations whether they be on the subject of accident prevention or otherwise, are accepted for their face value and the opportunity of driving home a real message is of incalculable worth.

Any stories or illustrations that are used in accident prevention must be prepared from the standpoint of news if they are to be of any particular value.

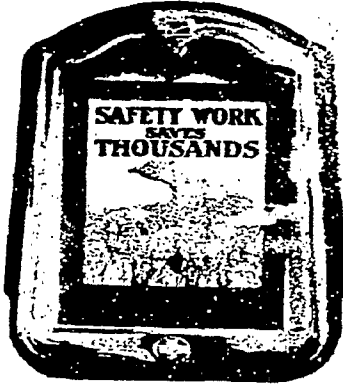
Buick Radiator Shells to Carry Safety Messages Into the Plant

Plain Bulletin Boards Replaced by Newer
and More Attractive Ones

By R. F. Thayer

AMONG the many types of automobiles being sold today to the public, there is not one that is built with more consideration for safety than the Buick, which is being built in this shop. Every precaution has been taken, by the Buick engineering department, to make motoring in our product as safe as it can possibly be made. Four-wheel brakes give the driver a feeling of security that comes from knowing that when the occasion requires he can make an unusually quick stop; and the strong, sturdy construction of the car throughout, together with the added advantage of controllable headlights, makes riding both safe and comfortable.

Not only is safety embodied in the operation of the car but it is also practiced in the manufacture of this product. Mechanical hazards are being done away with and an



(Continued on page four)

Clever type of home-made bulletin board.

Frank Crane, in his syndicated material in the public press, said that news means something remarkable or something that attracts attention. He says a story in the newspaper—that a dog bites a man—is no news, but if a man bites a dog, that is news. This illustration, of course, refers to the curiosities of news stories. Great care must be exercised to avoid the prosaic and the platitudinous. As much thought and care must be given to the dress-up of the article as to the subject matter itself.

The term "Safety First" has lost much of its real significance because it has become so commonplace. The same is true of the word "Health." The medical profession has recognized this and are therefore resorting to other terms to attract the reader to matters of interest regarding his health. They couch it under such terms as diet, hygiene, what to eat, the value of play, exercise, et cetera, et cetera. The editors and safety engineers must be as adroit and clever in employing the proper captions as are the moulders of thought and opinion in the American Medical Association.

It is generally conceded that by far the great majority of accidents are pre-

The Buick NEWS
Published in the Interest of the Entire Buick Family

Vol. 6 Flint, Mich., Thursday, June 25, 1936 No. 24

Factory 4 Works Entire Month for Third Time in Half a Year Without a Single Lost Time Accident; Record Remarkable

Thirteen Other Buick Factories Have No Lost Time Accidents During May.

By E. F. Thibaut

A very noticeable feature of the safety

Prevention Safety in All Times

Everywhere we go in the only place that we must pay no attention to any safety in a safe and sound condition, and in respect to those with whom we work day in and day out, it is

(Continued on page 25)

Buick Makes Perfect Score in 10-Day Run Over Western Road

The Buick was the only one of its class to set a perfect score in the 10 Day Road test conducted recently. This run which attracted national attention was open to all owners of Buick, Oldsmobile, and Pontiac, and Buick's outstanding record was achieved in the 10-day run conducted under the auspices of the American Automobile Association.

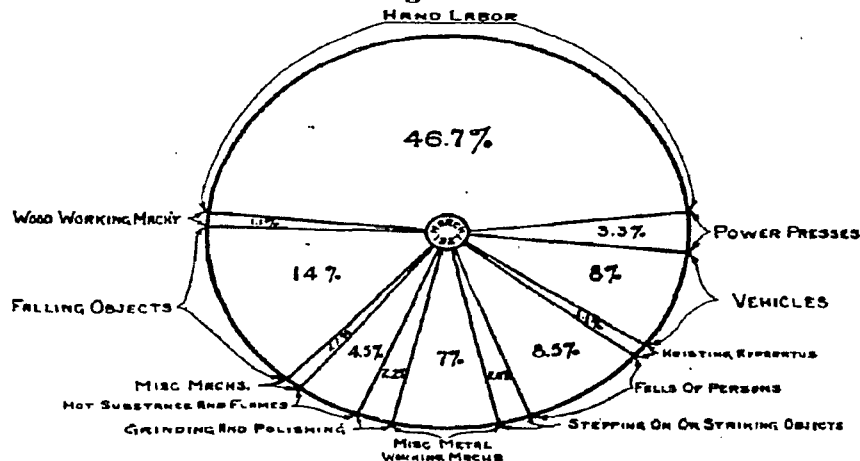
(Continued on page 25)

Praising the factory with a good record.

ventable, which means an involvement of the human element. It is therefore a natural inference that if the right approach and appeal is made to the minds of the workers, there will be a reduction in the number of accidents. Educating the worker to work and think safely is the biggest job of the safety engineer. The employees' publication should and can be the most valuable aid in this educational propaganda. At least, these are the conclusions which we have reached at the Buick Motor Company, and I am going to present to you some pictures in support of our contentions. Some of these I will dwell upon more than others.

My first picture shows the new form we use in displaying the posters of the National Safety Council. We use the radiator shell of the car—some are a little

Chart Showing Accident Causes



A chart that every man can understand.

old or may be a little imperfect—and we have four or more of those placed throughout the shop. In this connection, you will notice that R. F. Thalner is the editor, particularly of these safety stories, and he is a member of our staff. Right here, I would like to impress that every industrial concern, whether you are industrial or what not, if you have an employees' section, make your safety engineer a member of your staff. I want to say very frankly that, when Mr. Thalner started out, he was far more crude than he is now after a few years in editing articles along this line, and that is something that you can well afford to do, in your program of accident prevention.

The next picture shows that Factory No. 4—which is a wood-working factory, with all the machinery that naturally would be placed in such a factory—worked an entire month for the third time in a half year, without a single lost time accident.



Negative—yes, but it gets across the message.

The next picture is a chart. Our first speaker spoke about hand labor, hand tools and so forth. I think he said 43 per cent; we showed 46.7 per cent, and all around, as you cut pieces in a pie, you can see the number of accidents on other jobs. I will not take more time on this picture. The safety experience of the past month shows need of all-round improvement.

The next picture is one of a negative type. Perhaps there are very few here who would understand it. We all know that a full hand beats three of a kind or two pair, and so, in the story, it will show the man the importance of keeping his full hand rather than trying to work with two or three fingers.

The next picture really speaks for itself, and I understand that you, in your section, have been giving a great deal of stress to the importance of the strength of chains and so on. One of our inspectors saw a chain piled up and his eye accidentally happened to see those two links as they were exposed, badly worn, and immediately the thing was repaired.

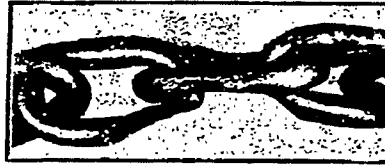
The next picture makes us think of the talk you heard on the importance of wearing goggles. In the story, of course, we call attention to the importance of having two good eyes rather than one good eye and one glass eye. The glass eye may look good, but a man cannot see with it. This picture illustrates how six eyes were saved

Chain Inspection in Fact. 31 Reveals Weak Links and Prevents Accident

Precaution Prevents Two Mishaps of Serious Nature in Plant in Few Weeks

By R. F. Thaler

The August 7 issue of Buick News carried an article regarding a chain which was found in defective condition in Factory 28. Due to the alertness of the man who was going to use that chain a discovery was made showing that this chain had been filed or worn. Last week in Factory 31 a similar incident took place. One of the foremen went into the tool crib to get a chain to hoist a fly-wheel which weighed approximately three or four hundred pounds. In an endeavor to make sure that the chain would carry the



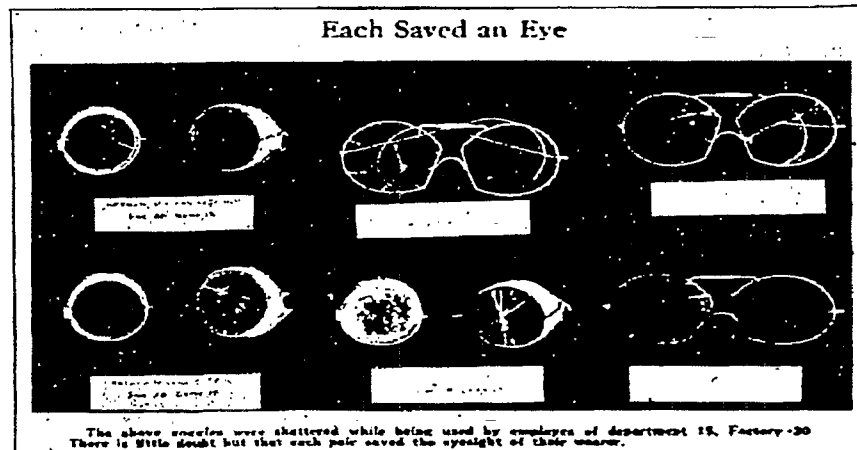
LINKS OF CHAIN ALMOST SEVERED
Four-fifths of actual size.

Any man can recognize the dangerous point.

as the result of wearing goggles. A lens in each pair has been fractured because of some article flying against the lens, shattering it, and yet, at the same time, protecting the vision of the man.

We have another picture where a man was supposed to wear his goggles, but, like some folks, had them misplaced, had them up on his hat. He did not lose his eye, but he came so near it, because of severe burns from a lead bath, that he was taught a life-long lesson. He had to wear a bandage on his eyes for some time. Of course, publishing this, broadcasting it through the shop, teaches a very effective lesson to all the other men.

The next picture is a full two page spread of safe die construction, excepting down in the center we have some tongs displayed. I wish to say, in this connection, that in every instance where we have had dies changed, sometimes inverted, it has always resulted in increased production and greater safety to the operators concerned. It seems to me that is a very vital factor that everyone should bear in mind.



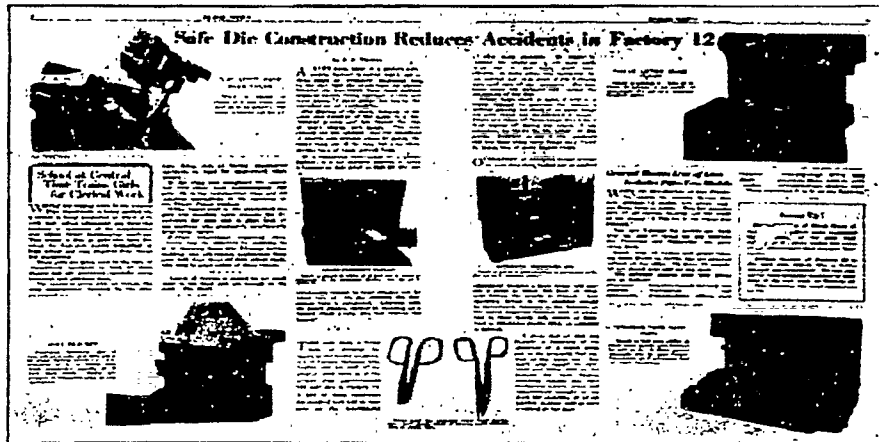
Showing the goggles that saved workmen's eyes.

We have made a number of studies to determine whether these messages and illustrations have put across the thought in mind. In other words, whether they have produced results. We have quizzed foremen, superintendents and the workmen, and the consensus of opinion is that men have been taught to work and think more safely because of our campaign in using stories and illustrations through the medium of the employees' publication, the Buick News.

Before closing, will refer to a test which we made to determine what disposition the employees made of our publication. We had certain persons stationed at the various distributing centers throughout the entire factory. One of these stations was occupied by myself. Everyone was instructed to be on the lookout for two things—

First—What the men did with the papers when they received them.

Second—Whether there were any who refused to accept the papers.



Type of page display that teaches its lesson.

A meeting was held afterwards of all concerned and reports showed that practically every man folded his paper and put it in his pocket, and in some instances in his dinner pail. There were no papers refused by employees.

Another step in this study was to observe what occurred on street cars and busses as the employees were on their way home on the evening of distribution. In practically every instance, every employee aboard these vehicles was perusing intently his copy of the Buick News.

We never find them thrown away on the floor of the shops or along the streets traversed by the men on their way home.

We have, therefore, concluded, and we believe with good evidence, that the great majority of the papers find their way into the homes of the workmen, which serve as an effective impetus in accident prevention because the wife and mother sees and reads what is happening at the shop and intuitively and instinctively admonishes husband or son to think, act and work safely.

CHAIRMAN DUNNEBACKE: We have just five minutes left, before twelve o'clock, so if anybody has any particular question on plant publications, let us have it now, before we adjourn.

MR. MILLER (Chevrolet Motor Company): I do not want to ask a question, but

I want to verify something Mr. Boswell said in his talk, and I will revert back to the Michigan State Conference, a short time ago, and a remark made to Mr. Thalmers. I asked him why he did not put me on the mailing list for *The Buick News*. A few days after that, I got a copy and in it was a write-up about selling to the man the idea of safety, and pointing out a picture of a man who had nearly lost his eye, showing a pair of goggles shattered. I took the privilege of clipping that and showing it on a homemade bulletin in our factory.

A few days after that one of our men came into my office with a pair of goggles and said, "If it had not been for that bulletin you had out there, I would have lost my eye. When I saw that, I got a pair of goggles and, this morning, the head of a rivet blew off and hit me in the eye." I think *The Buick News* has helped the Chevrolet Motor Company.

CHAIRMAN DUNNEBACKE: I want to thank you for your attention, and I want to ask you all to come back tomorrow. We have not as long a program, so there will be much more time for discussion.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session of the Automotive Section was called to order at nine-forty-five o'clock, by the chairman, A. F. Dunnebacke, safety director, General Motors Corporation, Detroit, Michigan.

CHAIRMAN DUNNEBAKE: Gentlemen, the first order on the program, this morning, is supposed to be the report of the Nominating Committee, but I guess they are having some battle, selecting a good slate for us, and I do not see that the chairman of the Nominating Committee has come in.

The officers, in arranging the program for this year, saw fit to build a program around the human body. In other words, we divided the body into three or four principal parts and assigned subjects to men who would discuss those parts of the body; how frequently they were being injured, how serious the injuries were, and then, knowing what was causing the accidents, to prescribe the proper methods of eliminating them.

The first paper this morning was assigned to Mr. George W. Starling, of the Harrison Radiator Corporation, Lockport, New York, but Mr. Starling, unfortunately, could not be here, and our friend, Mr. L. E. Averill, who is safety director of the Packard Motor Company, of Detroit, consented to take the subject and handle it for us. Mr. Averill has, perhaps, had the longest experience in safety work of any man I know of; he has been in several units of the General Motors Corporation, he is handling a plant employing 12,000 people, and is chairman of the Engineering Section of the Detroit Industrial Safety Council.

Hand and Arm Injuries

George W. Starling, Harrison Radiator Corporation, Lockport, N. Y.

In going over our accident experience, both minor and major, for the past eighteen months, we find that 69 out of every 100 cases reported to the hospital was a hand or arm injury; 60.2 per cent being hand cases and 9.03 per cent arm cases; and 43.31 per cent of all lost time accidents was a hand or arm case; 37.16 per cent being hand cases and 6.15 per cent arm; 21.34 per cent of the severity was caused by a hand or arm case; 19.04 per cent hand and 2.3 per cent arm.

I think this is one of the most important subjects in accident prevention work, and one that can be greatly eliminated from an engineering standpoint in seeing that your machines are properly tooled, and that your material is easily conveyed to the machine. I am sure that this subject should be given more earnest thought than is the case by most of us. These injuries result primarily from two causes: handling material, and machine operation. I think that you will realize the importance of this in the above figures. Hand and arm injuries are more frequent, due to the fact that the hands and arms are more frequently in the danger zone than any other part of the body.

Punch Press

Picture a punch press operator turning out 300 pieces per hour, 2,500 pieces per day. His hand and fingers enter the danger zone at the point of operation

5,000 times a day or 1,500,000 times per year, in placing and taking out the stock, if he is not using pinchers or a slide feed. In taking our punch press division's experience for the past eighteen months we find that: 86.27 per cent of their cases were hands or arms; 72.93 per cent being hands, and 13.34 per cent being arms. In making a comparison of the first eight months of 1926 with the first eight months of this year, you will note a decided reduction in hand and arm injuries both in frequency and severity. Two hundred and ninety-four in the first eight months of 1926, as compared with 162 in the first eight months of 1927.

In the first eight months of 1926 we had 11 lost time accidents in this division, against five in the first eight months of this year. This was due to the following: Cooperation in designing dies that were safe; installing slide feeds wherever possible, and on the old dies cutting out the upper or lower die where the fingers entered the danger zone; changing the layout of the presses, putting the small presses in a line and tilting them at an angle so the pieces drop into a chute and slide into the container. In case we do not have a slide feed on the die, operators use either a pick, tweezers, or pliers.

Milling Machine

There are several ways to help reduce hand and arm accidents. Take an Ingersoll Mill where you are facing cylinder heads or crank cases and see that your cutters are properly guarded. We have had some bad cuts on the hands and arms on these operations, due to two reasons: First, table of the machine was set to stop when the pieces were too close to the cutters; second, when the operator was loosening up the clamps his hand would hit the cutter, or the wrench he was using slipped and cut his hand against the cutter. We have installed in all of these departments conveyors to carry the stock from one machine to another, and at each machine we have a hoist to lift the stock from the conveyor to the machine or reverse.

Fly-Wheel

Our fly-wheel department is handled in practically the same way as in our crank case and cylinder block department, with the conveyors and hoists allowing one operator to run a battery of four machines.

In our crankshaft department we bring the shafts in trucks which are constructed to set the stock on end. They start in at one end of the route and are taken from the trucks or racks and placed in the machine with the block and tackle and removed the same way. As these trucks become full they are moved to the next machine.

Drill Presses

On our multiple drills we have different kinds of guards. If it is a spot-facing job, we have a guard running around the lower parts of the drills, leaving a clearance of one-half to three-quarters of an inch from the ends of the drills. On others we have a guard on the same principle, except they have hinges working along the same lines of the hinges in some elevator gates. These guards are placed on drill press operations where we have the ends of the drills completely covered, and the ends of the drills penetrate several inches or through the stock. On the others we have an automatic shut-off which, when the drills are raised to a certain point, automatically shuts off your machine. When lowering your drills to the point of operation, your power is automatically turned on. Since installing this device on these machines we have not had an operator's sleeve caught in one of these revolving drills.

Since installing this device, we have not had a hand or arm accident on these multiple presses. We had several of them before, but we have entirely eliminated that by putting those guards on; they are very simple, they are easy to construct and easily operated.

On some of the other machines, we have an automatic shut-off, so that whenever you raise your drills out of the stock, your drill presses automatically shut off; and when you bring it down to a certain point, your drills automatically start, and that has eliminated a lot of bad accidents.

Shaper

We have been experimenting for some time to design a shaper guard that is practical, and at last we are sure we have succeeded. This guard actually works; the operators really like it; it is simple in its construction. I have some still photographs and also a motion picture of the same in operation, which will be shown in the Woodworking Section. Also there are some very good planer and saw guards on the market which can be installed on these machines.

Bear in mind that we do not allow any of our operators to use canvas gloves around any revolving machinery.

Handling Sheet Metal

In the departments handling sheet metal of all descriptions our employees use both the reinforced leather glove and wristlets. Some of our wristlets are leather reinforced, while others we make up of heavy canvas. These wristlets reach from the hand to above the elbow. In some instances where the backs of the hands are not in danger of becoming injured we use the reinforced hand pads.

In the foundry we equip our men who are pouring metal with fireproof canvas gloves, leather faced, with tight wristlets.

In checking over a report received from the Michigan Department of Labor and Industry, covering their compensable accidents in Michigan industries from July 1, 1924, to June 30, 1926, I find the following facts which I think will be of interest:

Injuries resulting from pulleys, chains, cogs, etc., comprised about 1½ per cent of all the accidents reported.

Injuries sustained by carrying or moving heavy, sharp or rough objects, coming under the classification of "Handling Objects" comprised about 25 per cent of the total accidents occurring.

It would appear from the above information, that the matter of guarding belts and pulleys has either been so well taken care of that such accidents are extremely rare, or else these injuries are not particularly common, even though most factories do not completely guard their machinery, as you and I know. I think the latter conclusion is probably closer to the truth.

I also notice that 45 per cent of the injuries occur to the fingers, hands, shoulder, arms and wrists.

I do not believe in having anyone around molten metal using a gauntlet glove or glove loosely fitting around the wrist, because the metal is liable to splash or explode and come down on the inside of the glove.

In our punch press division, before I went there, they were having lost fingers, one, two and three a week, sometimes, and on our small punch presses, we have lost the tip end of only one finger in sixteen months. We have had three fingers lost in our stamping division in the last sixteen months, due to two freak accidents, one of which might be interesting or of benefit to you.

In one of our toggle presses, we have electric motors for lowering or raising the

head, so that when you let your outside die come down on your stock, it is controlled by these two electric motors. In the old type of electric machines, they had holes and used to run them down on a bar. On the side of this press, we had our control buttons, one for raising and one for lowering, and one for the emergency stop.

While we were changing a big die in one of these presses last fall, one of the men reached around the corner of the machine and put his thumb on the button that releases or lowers the head of this press. With the noise in the room, no one heard this motor running, and it takes about six or seven minutes to run this twenty inches down out of the head. One of our men had crawled in under this press and was doing some work in there and just got out, while another one of our boys, helping him, took a one inch eye beam, and, as he shoved it in, the head of the machine dropped down and took three fingers, less than a minute after the man had been under that press.

It was very easy, after this accident happened, to eliminate this hazard. We just went to work and reversed the button, so that as long as you hold your finger or thumb on the button, your motors will raise or lower the head of your machine. If you take the finger off, it automatically stops. That was a simple device, it took about four hours to change all our presses in there, and we have never had any trouble since then.

Education

I think one of the most important phases of our safety work is educating our employees; making the men on the job safety-conscious is the greatest phase of accident prevention. A guard is useless unless the workman is sold on the idea of using it. There are several ways of accomplishing this; by the use of posters, and by posters I mean of a type which will catch the eye of the employee, and be interesting enough whereby he will stop and read and absorb its contents; another way is by using pamphlets with good suggestions covering the hazardous points of the different kinds of operations; but I think the greatest of all is periodical talks in the departments where you are having the most trouble. It is a recognized fact that the foreman on the job must be thoroughly sold on safety, giving constant supervision and cautioning his men to practice safety at all times. The saying, "The best safety device lies above a man's ears," is the truest axiom in safety work. There is another important item which we are apt to overlook: The help we can give each other in exchanging ideas, particularly on new safety devices and safety kinks which we have worked out and proved successful in our own work.

For illustration, a little over a year ago, just before the National Safety Congress in Detroit, we put on a 90-day campaign, and we took the worst departments that we had. By that, I mean, the departments having the most accidents. You would be surprised, as I was, that but one of those departments had a lost time accident during 30 days, after we got into these departments and gave these men and girls a talk. This shows that if you get the confidence of your employees, they are surely willing to listen, if you can show them that you are working to their interest.

In other departments throughout the plant, we have had a great reduction in our hand accidents in the last year, practically the same as in our stamping division, but I just took that as an illustration.

There are so many things that I would like to bring out, because I feel I am talking to a bunch of men who know as much or more about it than I do. We have our own problems. There is one thing I would like to bring to your mind, that I think would be of great help to us. We do not exchange our ideas as we should. We do not give the other fellow the benefit of our experience in accident

prevention work, where we have had some difficult problems and have taken the kinks out of them. If we would only give the other fellow our experience, if we would only exchange ideas with each other, especially when we get some good guard up, would spread the news around to the other fellow we could be a big help in solving the accidents in each plant.

I know I never feel any better in my life than when some fellow calls up and says, "Say, we have something good over here." I always appreciate a fellow who has a bad accident in his plant and who calls me up and says, "We had an accident happen over in such-and-such a department today, in such-and-such a way, and our man lost a hand or arm, and I am just going to tip you off so you can prevent your own employees from becoming injured the same way."

A Peculiar Accident on a Cincinnati Mill

CHAIRMAN DUNNEBACKE: I think you will remember that Mr. Averill stated that between 60 and 70 per cent of their accidents were hand and arm accidents. Personally, I am analyzing the experience of a corporation that is employing over 100,000 men every month; and every quarter of the year I analyze our accidents, setting up about 20 causes of accidents, and it has been my experience, in the corporation that I represent, that about 30 per cent of our severity is accounted for in press accidents. So, you see, if we will get after the hand and arm injuries, I think we will do a great deal to lower the severity and frequency of our accidents.

Now, the chief value of a paper like this lies in its discussion, and I know Mr. Averill will be glad to answer any questions. I am not very keen for long, written papers, or talks, but I am very keen for everybody, in an assembly like this, to get up and contribute something to the subject matter. We came down here to find out something to enlarge our safety experience and to get something that we can take back home with us. I do not think there is a man here who has not something he would like to know more about. This is the place to open up and get your information.

MR. MILLER (Chevrolet-Motor Company): I haven't a question I want to ask, but I do want to call attention to an accident that occurred in our plant this month, and when I left the plant day before yesterday it was the only lost time accident we have had so far. It comes right along the line of accidents that can be eliminated, and we thought we had the cause eliminated sometime ago.

It was on a Cincinnati rigid mill, milling a key-way in a rear axle shaft. We had some accidents, through the fellows getting their hands between the water supply feeding over the cutters on to the point of contact, and, as a consequence, we took the water pipe and moved it up, so there was about three-quarters of an inch clearance between that and the cutter, figuring the fellows had brains enough to keep their fingers out of there.

In this particular accident, due to the slow flow of the water or something, the chips coming up and the water being practically shut off, this man put his hand in to close one side of the pipe, hoping the pressure would bring it out on the other side, with the result he had two fingers amputated.

In analyzing, we found that, by increasing pressures, we would not have any clogging up in the water supply; and by taking the water pump pulley off and increasing the size three times, we increased the pressure of the water coming through the pump to the source, between three and three and a half times over; some did away entirely with the cause of clogging, and there is now no reason for anybody putting his hand in there. You can't guard that point, but there is a condition that you will run into on a milling machine the same way.

Another thing, Mr. Dunnebacke spoke about the majority of accidents coming out of the punch press division. A few years ago, we found the value of meetings,

and last year, the latter part of the year, we went into the punch press division. I want to say, my management has not been so much in favor of letting the men off to hold departmental meetings, and I tried to prove to them it would be of value to hold these "pep" meetings. We went into the punch press division, and for six months we did not have a lost time accident. By meeting down there and peppering the fellows up and telling the story, we went through six months without a lost time accident. Then we discontinued it for four months to see what the accidents were, and butchery began again; so, a little more than five months ago, we started our meetings there. We hold these meetings twice a month, at which time somebody talks to the men; and we have now gone five months without a lost time accident in the punch press division.

CHAIRMAN DUNNEBACKE: Those of you who saw the new film produced by the National Safety Council know that the story hinges around the fact that the man was injured because he left the guard off. In my experience, I find that a lot of injuries to arms are due to the fact that the guards are taken out. Recently, we had a death; one of our engineers lost his life because the guards were taken off a set of gears. I think the question of guards and their removal and not replacing them is very serious. I see Mr. C. B. Auel here. Mr. Auel, what have you in the Westinghouse Company on the question of removing guards? Can any man remove a guard?

Too Much Insistence Upon Mechanical Safeguards

MR. AUDEL: There was a remark made by the speaker and I would like to say a word on that. Of course, we have nothing to prevent a man removing a guard, but our accidents, due to the want of safeguards, are so trifling that we have absolutely ignored them. We do have accidents, but those accidents are accidents away from the machine tools, and that applies to every department of our large works, so that the problem has become a very complex one with us.

Together, eye and foot injuries total about 50 per cent of all we have, but the speaker made a remark which hits me in a very vital spot, and that was this: He did not think it right for the Department of Labor and Industry to continue to insist on the guarding of machine tools, and I feel exactly the same way about it.

My reason is that every industry, or every concern in industry, which has given this subject of accident prevention any attention for a number of years, is in about the same condition as we are. Accidents continue, but they are away from the point of operation. You have a regular program laid out, and it is not right for an outsider to walk into your plant, step around the place, and go out and leave you orders on what to do. Many seem to think that their duty is not fulfilled unless they do leave you some order.

We all have a certain amount of money to spend on accident prevention work, and when we are compelled to spend that money on things that do not prevent accidents, we have less money to spend on educational work where our greatest job lies. So, to the extent that they compel us to spend money on things that do not prevent accidents, they are the cause of a continuance of our accidents.

My suggestion is that every Department of Labor and Industry—and they are constantly complaining of a lack of inspectors to cover their territory—have a preferred list of customers, we will say; when they make an investigation of your plant, you tell them the whole story of what you are doing. I do not mean to say that we should stop guarding machines and tools; by no means; but I say that we should place less emphasis on the guarding of machine tools than we have in the past. When one of their inspectors comes into your plant, let him make a complete round of your department. You tell him the entire story of your safety program, and if he thinks you are measuring up to his idea of a preferred cus-

tomer, let him put you down on the preferred list and go away and leave you alone.

Then, let him come back, if you please, at the end of a year or a year and a half. If you continue to measure up to his idea of a preferred customer, let him put you on the preferred list again, and again go away and leave you alone to carry out your regular program.

Mechanical Safeguards Reduce Accidents 25 Per Cent

Now, it is a fact that if you have not done any work whatsoever in the guarding of a plant and are having 100 accidents a month, and you put in every known mechanical device that you can think of, you will not reduce your accidents more than 25 per cent. In other words, your accidents will drop from 100 to 75, or in that proportion.

The next step in further prevention of your accidents is to form your departmental committees, and they must be real departmental committees, full of pep. I do not mean a paper organization; but if you do that in the way it should be done, you will again simply reduce your accidents another 25 per cent, or say from 75 to 50; and your last 50 can only be eliminated by educational work.

The average Department of Labor and Industry knows nothing beyond the mechanical guarding of machine tools, so they are continuing to force you to spend your money on the lesser phase of this accident prevention movement, and taking away your money from the educational program, along which lines it should be spent in greater proportion than we have been spending heretofore.

CHAIRMAN DUNNEBACKE: Mr. Auel, I certainly admire the frankness of your remarks, and apparently you have the crowd with you. I think you are on the right track. For instance, last June, we had the first Michigan Industrial Safety Congress, sponsored by the Michigan Department of Labor and Industry, at Ann Arbor; and, in the course of those meetings, the chairman of the Bureau of Labor and Industry, frankly told us that one of the objects in calling the Congress was to build up efficiency of his department. He admitted that we, in the factories and industries in Michigan, knew more about safety and accident prevention than his own inspectors, and his idea was to coordinate his department and our industries, in order to build up a more efficient corps of State factory inspectors. I think that bears out your statement.

I notice the chairman of our Nominating Committee is present now, and I am going to ask Mr. R. F. Thalner to submit the report of the Nominating Committee.

Report of the Nominating Committee

I am not the chairman of the Nominating Committee, the chairman was detained at another Section, this morning, so he asked me, as a member of the committee, to submit the report of the Nominating Committee.

We have followed out somewhat the precedent set in the past, and have deemed it advisable to nominate for the officers for the ensuing year the following:

We have advanced the Vice-Chairman, Mr. A. M. Williams, to be nominated as chairman of this Section. Mr. Williams is with the Chrysler Corporation.

The former Secretary, Mr. E. H. Cotcher, we recommend for the vice-chairmanship.

The Secretary's position—which, of course, is the bottom rung of the ladder, in which the new blood is injected—we have given a good deal of thought to. It requires a great deal of concentrated effort and work during the year, on the part of your secretary, and, in casting around, we have decided on the nomination of Mr. H. L. Sain, of the Delco Light Company, of Dayton, Ohio.

In addition to those officers, an Executive Committee consisting of Messrs. L. J.

Parrish, of the A. O. Smith Corporation, Milwaukee; F. J. Corbett, of the Chandler Motor Company; H. J. Mellum, of the Nash Motor Company; Charles J. Kolb, of the Pierce Arrow Company; E. H. Complin, of the Ford Motor Company of Canada; and the two most recent past chairmen as ex-officio members of that committee.

As chairman of your Program Committee for the ensuing year and the next Congress, we wish to nominate Mr. O. J. Olson, of the Fisher Body Company, of Detroit. Engineering Representative, Mr. R. F. Thalner—I do not want this job all my life, but we have this job for the research on annealing of chains, and as soon as that is over, I will ask to be succeeded by someone else. Statistical Committee, Mr. W. S. Smith, of the Ford Motor Company. Posters and Slides, Mr. H. Bunting, of the Olds Motor Works. Membership Chairman, Mr. L. J. Parrish, of the A. O. Smith Corporation. News Letter Editor, Mr. E. H. Complin, of the Ford Motor Company of Canada. Publicity Committee, Mr. H. L. Fracher, of the Detroit Steel Products.

This comprises the complete slate for the Automotive Section, and the nominations are submitted for your approval.

Selection of the New Officers is Unanimous

CHAIRMAN DUNNEBACKE: Gentlemen, what do you wish to do with the report of the Nominating Committee, as to its acceptance?

MR. MILLER, (Chevrolet Motor Company): I move that it be accepted.

(Motion seconded)

CHAIRMAN DUNNEBACKE: It has been moved and supported that the report of the Nominating Committee be accepted. This, however, does not preclude any nominations from the floor, and I want to give you an opportunity to submit further nominations. Are there any nominations for any of these offices, that you care to make from the floor? If not, the chair will entertain a motion that the tellers cast the ballot of the meeting, for the slate as submitted by the Nominating Committee.

E. L. Hewitt (Detroit Industrial Safety Council): I so move, Mr. Chairman.
(Motion seconded.)

CHAIRMAN DUNNEBACKE: It is moved and seconded that the slate submitted by the Nominating Committee be accepted as the officers for the ensuing year? Are you ready for the question? All in favor, signify by saying, "Aye," contrary, "No."

(Motion carried.)

The secretary will report that the tellers report 115 votes cast for the slate submitted by the Nominating Committee.

I am certainly very glad the Nominating Committee has taken the stand they have. I have worked with your new officers for the past year, and some of them for two years, and, in every case, they have been tried and true. They have been very efficient in their work, and have helped out in the program, and I doubt that the program would have worked out as smoothly as it has, without the assistance of these men.

Going down through our analyzing of the human body, as to its danger of injury through accidents, we have set up another subject, that of leg and foot accidents, and in casting about for a man to handle the subject, we have asked Mr. Elmer Hewitt, manager of the Detroit Industry Safety Council, to speak.

I do not know of anything in safety organization that has worked out so efficiently and well as the Detroit Industrial Safety Council. We attempted something a few years ago, which met with some success, but last year it was re-organized. Without going into the details of the organization of the Detroit Industrial Safety Council, I want to say that its great success is due to the untiring efforts of Mr. Hewitt. He has certainly made a success of the job, and is

bringing real safety into the Detroit industries. We will ask Mr. Hewitt to give his paper.

What Price Feet and Legs?

Elmer L. Hewitt, Manager, Detroit Industrial Safety Council, Detroit, Mich.

Do you suppose that your factory manager or superintendent would be interested, if when you return home from this Congress, you could tell him how he could cut his production cost on the average of \$6.02 per car? Do you suppose that he would be willing to spend a dollar or two to accomplish such a reduction?

The automotive and allied businesses are being conducted in a highly competitive field. Many companies have gone to great lengths to effect savings of a few cents per car. And yet some companies have not realized that leg and foot injuries alone have placed a self-imposed burden on the automotive industry which, considered with our newly produced 4-to-1 ratio for the indirect cost of industrial accidents, ran in excess of 27 millions of dollars for the year 1926 alone. This 27 million dollar cost spread over the four million cars produced in 1926 means that every time a car comes off the line an average of approximately \$6 has been added to its cost because of leg and foot injuries. I do not intend to bore you with the arithmetic of that conclusion. (You may refer to the appendix to this paper.)

What part then, of the automotive safety engineer's problem do leg and foot injuries represent? Do they represent 25 per cent of your cost or are they of such minor importance that your principal interest might better be devoted to more fertile fields for reductions?

What type of accidents are causing injury sufficiently serious to legs and feet to make it necessary to classify them in the safety engineer's graveyard—the home of lost time accidents?

What can be done in the way of education and engineering revision that will reduce the number and severity of this type of injury to our workers?

These are the questions which you have probably asked yourself about every type of injury in your plant. They are the three fundamental considerations in the analysis of any accident situation.

I am not going to bore you with statistics, because I know that you would promptly forget 95 per cent of them, as I would. I do, however, want to give you some general conclusions in regard to the relation of this type of injury to the problem as a whole so that you may govern yourselves accordingly in the allotment of your time and interest.

An analysis of the experience of three of our representative automobile companies shows the following:

First—That the frequency rate of lost time leg and foot accidents was 6.7 for the plants considered as compared with a total frequency rate of 19.6 for these same plants for the same period. In other words leg and foot injuries are causing 34 per cent of the lost time accidents in the automotive industry.

Second—That the severity rate of leg and foot injuries was .072 as compared with a total severity rate of .747 for these same plants for the same period. Leg and foot injuries are causing 10 per cent of the lost time in your industry.

Certainly types of accidents involving such a large proportion of frequency and severity are worthy of your earnest consideration.

Next comes the question, "What injuries constitute the major portion of these accidents?" Further analysis of the experience of these same plants shows the following:

First—In relation to frequency of the lost time accidents of this general group of leg and foot injuries:

Foot accidents cause 73% of the lost time cases.

Leg accidents cause 21% of the lost time cases.

Ankle accidents cause 9% of the lost time cases.

Second—In relation to severity:

Foot accidents cause 68% of the lost time.

Leg accidents cause 21% of the lost time.

Ankle accidents cause 11% of the lost time.

The answer to these figures is obvious. Correct the conditions that are causing injuries to the feet of your workmen and you will reduce the frequency rate of lost time accidents in your plant by 26 per cent and the severity by 7 per cent.

How are you going to do it? That question is always the easiest to ask and the hardest to answer. My little survey has indicated to me that the old question of "Falling Objects" represents at least 25 per cent of the answer and that the equally antiquated classification of "Dropping Material" scores a decisive victory for second place. I suppose that we should not be surprised that many of our foot and leg injuries are the result of "trucking" and that running into stationary objects should result in many injuries to the legs of your employees. Burns to the legs and feet caused by both hot metal and hot water have shown themselves to be factors worthy of your consideration. Let me give you briefly, the causes of leg and foot injuries in the order of their importance as determined by my survey of these types of accidents.

- Falling Objects
- Dropping Material
- Trucking
- Metal Burns
- Stepping on Objects
- Collision with Stationary Objects
- Falling
- Mechanical Defects
- Stepping on Nails
- Water Burns

It would seem unwise to attempt to go into all of the details involved in the prevention of accidents of this type, but inasmuch we have diagnosed the case the least we can do is to prescribe some general tonic for the ills.

Engineering Revision Could Correct Many Conditions

There is no question but that engineering revision—and by engineering revision I do not mean mechanical guarding, but the rearrangement of processes to eliminate inherent hazards—could correct many of the conditions now responsible for injuries to the legs and feet of our workers. What I have in mind might be typified in the installation of conveyors and hoisting equipment, obviating the necessity for handling material and trucking operations. Equipping your workmen with foundry shoes, protective leggings and similar equipment is to my mind but one of the revisions which might prove helpful. I personally know of one Detroit plant of about 10,000 employees where a reduction of 20 per cent in foot cases was affected by the promotion of the use of safetoe shoes.

This is the sort of thing that engineering revision means to me—and in it, I believe, is the answer to many of our leg and foot injuries.

I was impressed in looking over some 227 cases of injuries to legs and feet that the cause would be eliminated if the fundamentals of good plant housekeeping had been impressed upon the men through the medium of education.

I realize that it is dangerous to draw conclusions from too little data, but one impression of mine has been strongly confirmed in my little investigation. One of the three plants surveyed had a general experience considerably lower than the

other two plants. This was also true of the types of injuries we are considering. The figures show that the foot and leg injuries in that plant bear about the same relation to the plant's total experience as the foot and leg injuries in the other plants bear to their total experience. My conclusion therefore is this—that aside from the engineering revision which may be obvious in any plant, a strong general program of accident prevention, incorporating in it all of those factors with which you are so familiar, is perhaps the best remedy in our efforts to eliminate leg and foot injuries.

There is really little more that can be said generally about leg and foot injuries in your industry unless we attempted to go into details which would be interesting to but a portion of this group.

All I have hoped to do in these few minutes is to present to you certain high spots of the subject in the hope that I might be able to stimulate some interest which would result in action when you men return to your respective plants. If I have been able to accomplish that much I shall feel well repaid.

In conclusion, I just want to present to you in review the essential points of what I have tried to say.

First—That leg and foot injuries in the automotive industry represent such a considerable part of the experience as a whole that they are worthy of your special attention.

Second—That foot injuries include about seventy per cent of the problem in the class of accidents which we have been discussing.

Third—That "Falling Objects", "Dropping Material" and "Trucking" cause two-thirds of the injuries to legs and feet.

Fourth—That in addition to definite engineering revision such as I have suggested a well-rounded plant program seems to be the best answer to the problem.

The other day I heard a definition of the word "cash" as it pertained to a commercial organization. It appealed very strongly to me and I have attempted to adapt it and interpret it from a safety man's point of view.

To me the "C" stands for Certainty—Certainty in the ultimate success of accident prevention. The "A" means Accuracy—Accuracy of thought and action. The "S" in such a scheme can mean only Sincerity—the Sincerity of purpose. The "H" stands for Humanity—our ability, by virtue of our work, to make this world a better place in which to work and play. I'm sure that the large percentage of safety engineers in this group have a creditable surplus of "cash" in the bank.

APPENDIX A

The 1926 Statistics report of the National Safety Council shows the following figures for the Automotive Section:

No. of Employees.....	1,020,917
Man Hours Worked.....	2,445,341,085
Days Lost	2,860,025

The National Automobile Chamber of Commerce 1927 report shows 3,365,281 persons were employed in the automotive industry in 1926. This, based on the National Safety Council report would mean for the industry in 1926:

Man Hours Worked.....	8,068,500,000
Days Lost	9,438,000

Analysis of the experience of three typical automobile plants indicates a severity rate of .072 for foot and leg injuries, or approximately 907,500 days lost in 1926 due to leg and foot injuries.

Then with an estimated cost:

\$ 6.00 per day direct cost
\$24.00 per day indirect cost

\$30.00 per day total cost

907,500 (Days) $\times$ \$30.00 (per Day) = \$27,225,000

Total Money Lost due to Leg and Foot
Injuries in 1926.

National Safety Council Reports shows 4,428,286 cars and trucks produced in 1926.
Therefore, cost of leg and foot injuries per car produced was \$6.02.

APPENDIX B

General Experience of Plants Surveyed

Plant	No. Lost Time Accidents	Days Lost	Man Hours Worked	Frequency Rate	Severity Rate
1	421	18,633	17,140,569	24.6	1.087
2	62	1,043	9,634,929	6.4	.108
3	179	5,472	6,870,702	26.1	.796
TOTAL	662	25,148	33,646,200	19.6	.747

Leg and Foot Injury Experience of Above Plants

1	160	1,784	17,140,569	9.3	.104
2	25	230	9,634,929	2.6	.024
3	42	425	6,870,702	6.1	.062
TOTAL	227	2,439	33,646,200	6.7	.072

APPENDIX C

Experience of Three Plants Surveyed by Cause

	No. of Lost Time Accidents				No. of Days Lost			
	Foot	Leg	Ankle	Total	Foot	Leg	Ankle	Total
Falling Objects.....	79	4	6	89	761	12	65	838
Dropping Material.....	32	6	2	40	367	78	25	470
Trucking	19	10	1	30	155	132	20	307
Burns—Metal	12	2	—	14	140	62	—	202
Stepping on Objects....	6	6	3	15	78	53	56	187
Collision	—	9	4	13	—	109	56	165
Falling	2	3	3	8	8	32	43	83
Mechanical Defects....	4	1	—	5	65	4	—	69
Stepping on Nails.....	10	—	—	10	67	—	—	67
Burns—Water	1	1	1	3	19	14	18	51
TOTAL	165	42	20	227	1660	496	283	2439
Percent of Total.....	73	18	9	100	68	21	11	100

CHAIRMAN DUNNEBACKE: Detroit being in the heart of the automobile industry, Mr. Hewitt has been able to get some good dope out of Detroit, and what he has given you is based on experience.

Is there anybody here who has any questions on foot and leg injuries?

MR. COMPLIN (Ford Motor Company of Canada): May I revert to the previous speaker's subject? We have a large number of small drill presses in the plant, where the man will take a piece, place it on the fixture, bring down the drill and put it to one side. We are having a great deal of trouble through the backs of the men's hands being burned by flying chips, and I would like to get the experience of

the members as to how they prevent that. Do you put long metal guards along the front of your drills, or what do you do to prevent this?

MR. MILLER (Chevrolet Motor Company): May I answer Mr. Complin by telling about something we have recently adopted? We have had a wide experience along the same line, in using small parts on small drills. Recently after thrashing the thing around and not being able to get anything in from our own head or the foreman, I happened to go into one department. Going past a six spindle drill press, I noticed a guard, home-made, crude, rugged, but the man had taken a piece of sheet metal about three inches long, formed in the shape of a spiral, hooked it to the bed of the fixture, and let it extend around the lower part of the operating point on the drill as it is engaged with the piece, then had cut a piece at the feeding point, so he could slide a piece in under and drop his drill on it.

It gave him a ready view of the piece and operation, kept his hand away from the drill itself, and the piece of sheet metal working around there had the effect of breaking off chips and also kept them from flying out on his hands.

CHAIRMAN DUNNEBACKE: I do not want to forget to speak about this guard that Mr. Averill talked about. We all know that wood-working operations are perhaps the most dangerous in our industry today. Everybody is looking for good shaper guards. A lot have been developed and cast aside, but we believe, in Detroit, we have something now that is all right. They have been built, they have been attached and are running satisfactorily, and many safety engineers in Detroit have gone to the Packard plant to inspect this shaper guard and cannot see anything wrong with it. So, if any of you want a good guard for that, do not fail to see Mr. Averill and get his picture or go into the wood working section and see this one hundred feet of film, showing that guard in operation.

Employee Suggestions Have a Particular Value

H. L. SAIN (Delco Light Company): It has not been my intention to have much to say at these meetings. However, I am wondering if what Mr. Averill said is not true; also, what the gentleman here just illustrated by a safety device for the drill. If you allow the workman to suggest certain things, he is more apt to use them than if you try to put something on the machine, of your own design or from your Engineering Department; although the designs the workmen give you are crude, no doubt you will be able to work out something worth while.

The thing I had in mind was this: If I were to decide from my own conversation and interviews with the different safety engineers present here today, I would be convinced there are no more accidents throughout the country. I will say to a certain fellow, "How are they going at your plant?" "Just fine. Just fine." That is a whole lot of information. My thought is the exchange of ideas by the different safety engineers, as to what their experience has been along the line of certain accidents.

I think every concern, every management of a concern, would be more than glad to pay a man any amount, he could name his own salary, if he could earn what I term as the "W. E. Degree". A lot of us have been to college and we have earned the degree of A. S. S. E., or Mechanical Engineer, or possibly a doctor with the M. D. degree. What do we mean by the "W. E." degree? Possibly it would be right for me to tell you that this "W. E." degree is the "waste eliminator." I think you will all agree that if we could win a title or degree of "W. E." our company would be willing to pay us any price.

We could scrap the entire waste of a department, haul it out on the scrapheap tomorrow morning, and a new work order could be placed in the department and soon replace every piece of that scrap. But I think our greatest work is the elimination of human waste, which cannot be replaced. A man might hop around on a wooden leg, but it is hard to see out of a glass eye, and the thing we should

do is to take up the subject of waste elimination from the standpoint of humanity.

I hear a lot of fellows say, "Well, we take care of that in our plant through education." We do, also, in our plant. We have safety classes of the workmen, right down from the machines, from the assembly benches, we bring them in and have a general discussion. We have the conference type meeting, we allow the men to tell us what is wrong in the department. We do not make any attempt to tell them what to do in the department to make it safer to work in; we allow them to tell us what is wrong and we try to correct it.

One of the greatest things I have in mind is to let a man know what his job is worth to him, and if we had enough time, I might tell you of our plan of trying to tell the men what their job is worth to them; what the labor they sold to our company is worth to them; how they can deposit that labor in our company and draw, in terms of wages, interest on that labor.

I think it is early yet, a good while before lunch; let us have some discussion, and I would be glad to hear from some of you as to how you handle your educational work.

CHAIRMAN DUNNEBACKE: Is there anybody here who is developing a well planned program along educational lines?

A Safety Plan That Convinced the Manager

MR. LIPPINCOTT (Manufacturers Association of Erie): I have had a very interesting experience in one of our large foundries, with the safety engineers. They had a total in lost time accidents for the first six months of 1926, 56 serious ones; this year, they started in early, right after the Congress last year, on an educational plan.

The management had never been interested, he had a safety plan of his own, and I, as an outsider, would come in and he would say, "Bunk!" So, I asked this gentleman if he would take a chance with me and go to the Congress, and he did. He went to the Congress and was there one day; he was in your meeting, he heard the ideas of education; he came back and said, "Now, go to it!"

The plan was for the foreman. First, we had the manager come out and get the foreman, and he hit on him in the usual way, and then he said, "Now, it is up to you Lippincott, go to it!" I didn't know what to do. I took a plan of having the nurse give me every man from every department who came into the hospital, no matter whether it was a scratched finger or a leg off.

On this plan, I worked with the foreman to the extent of, every month, sending them a letter, telling them the number of accidents they had in their department and citing the cases. Where the men were numbered, I would say to this foreman, "Here is Sixty-five, he was in four times this month, what's the idea? Is he tired? Something wrong at home? Just what is the trouble?" It so enthused the workmen that they began to climb aboard immediately. They like to kid me a lot and they did, as I went through the plant; but the whole idea of the educational plan, in my belief and what I have proven this year, is through the foreman. I told you the total last year was 56 accidents; we have lowered it this year to 11, and in the month of March, this plant went the entire month without a lost time accident; which was something they had never done in the history of the company.

I laid these figures before the manager at the end of six months, and now he is working on a bonus plan. If it is a compensation carrying company, explain to that foreman that when the fellow gets hurt, it isn't out of the insurance company, it comes out of him, out of his department. We brought that around with a bonus system, of which there are many plans, but the idea is entirely the education of the foreman.

There is one instance which is outstanding, but it has happened in six different instances in my little town of probably 150,000.

I see Mr. Reamer here, from the Cadillac Motor Company; can't you add something to this discussion?

S. H. REAMER (Cadillac Motor Company): We have gone from September 3, 1926, up to last Saturday morning, when I left, without an accident, on 78 presses.

Supplementing the remarks of the gentleman who just spoke, Cadillac charges every lost time accident back to the department; that loss is charged the same as scrap, it is a cash proposition, it is charged against production. I think that might work out in your case; it seemed to work out very well in ours, and we have cut our accidents in the last year.

Pictures Tell a Story Anybody Can Understand

ALFRED VOX STARR (Corning Glass Works, Corning, N. Y.): The educational literature can be distributed, but very few of the workmen can read English, and a good many of the foreigners cannot read their own language, so even if you translated it, you are blocked there.

We would get a fact picture of stuff like that, where the fellows had a good laugh, street cars running over people, Charlie Chaplin pictures, and we actually thought that was good work; but I do not think it helped very much. Then we put on a show, ourselves, and capitalized on our own accidents, had pictures actually taken of our own accidents. We put up on a bulletin board, "Frank Banten broke a leg." Everybody knew Frank Banten. We even went so far, (and did it under protest of everybody), if a fellow lost his finger, we put that finger up on the bulletin board. There were a few reported losses of appetite for a couple of days, but there was more safety taught than ever before.

CHAIRMAN DUNNIBACK: I think there is too much talk around the country of doing away with the gruesome poster. I know it is pretty hard, but the thing that started me in safety work was a study of four or five gruesome posters. I think it certainly drives it home.

I see Mr. Averill here, who is assistant to the vice-president of the Chrysler Motor Company, and, in Detroit, Chrysler has been doing some fine work along safety lines. I would like him to tell us what is the main point in his safety program.

MR. AVERILL: You are right on the Averill part, but I am with Dodge Brothers, and only indirectly do I know of safety work. Mr. Carson, our safety man, was unable to get here.

The way I get progress in our safety work is through the compensation end. We are self insured, and, of course, are interested in safety, so far as it reduces the compensation loss. I mean in my own department, I was very much interested in hearing the Cadillac man state they charge it back to the foreman and to the department. We have tried that also, and found it very successful.

CHAIRMAN DUNNIBACK: You think the management will respond quicker to safety work when it is up to them in dollars and cents?

MR. AVERILL: Very much, because that is the main objection on the part of the production man, the fact that it is not worth the time it takes the foreman from the job to have their meetings; and if you can show them there is an actual dollars and cents return, they warm up immediately, because they want to get their cost of production down as low as possible.

CHAIRMAN DUNNIBACK: I know, in the General Motors Corporation, up until two years ago, we presented our accident experience according to frequency and severity, but, since then, we have put it up in dollars and cents, and we have gotten more support and cooperation through the management than ever before.

MR. WALTERS (General Electric Company): We are working along both of those

lines. Our employees are on one of the incentive systems, and as you know, that means "hop, skip and jump." The second point of that is that the foreman shares in the incentive. They have got to stand the waste, and he has to stand the human waste. In other words, the cost of accidents is charged back to him. If he can go below his allotted accident cost, it is to his benefit; but if he goes above that, he is out of luck.

We work it another way: We have the employees representing the plant. An employee with a complaint can go to his representative or he can go to his gang leader; he cannot come to the safety committee, direct, unless he has made use of one of these sources.

The foreman is directly responsible for the physical condition of his plant, so that, entering with a complaint of the physical condition of his plant, of an operation which he considers unsafe or any condition not to his liking, will go either to his representative or his gang leader, and, in either case, this report reaches the foreman. We, therefore, concentrate the largest part of our efforts on our foremen, and are securing such cooperation that we have reduced, with 2,400 employees, from 48 accidents last year and up to this date, 34 per cent. In other words, with a severity rate, last year, of two to the hundred, we are now down to 1.4.

Safety Talks During Working Hours Were Permitted

CHAIRMAN DUNNEBACKE: Mrs. Cramer, I am going to ask you to get up and say something. Mrs. Cramer is industrial nurse of the Continental Motors Corporation, and I am going to ask her this question, inasmuch as our program is built on hand and foot injuries: Is there more chance of infection from injuries resulting from the feet and legs than from the hands and arms? Have you noticed anything in your work that would lead you to believe there was more?

MRS. CRAMER: We rarely have an infection from the feet.

CHAIRMAN DUNNEBACKE: The infections from the hands are because the hands are more in contact.

MR. AVERILL: Mr. Dunnebacke, speaking of education on the lines we have carried out, I told you in my talk a few minutes ago about departmental talks. I have heard many fellows say their company would not allow them to go into a department while it was working and take the men off the job and give them a talk. In the 73 talks that we gave, in some of our different departments last year, we went during working hours the "big boss" gave us permission.

We started with the assistant foreman at one end of the building and the foreman at the other, and I told them to pull all the employees off the jobs, and have them meet me in the center of the room, that I would not take them off their work for more than ten or fifteen minutes, and would try and give them a seven or eight minutes' talk.

I went to the majority of the foremen after we got through with these talks—and, by the way, we worked on a bonus system, so you know they do not like to lose very much time—and asked these foremen if they had noticed any reduction in their production, by pulling their whole department off for fifteen minutes. You take a department of 200 or 300 employees, and fifteen minutes means quite a lot of lost time. They said, "No, we have not noticed a bit of reduction in our production;" and, in the majority of cases, they had an increase that day on their schedule. They thought it was because the employees in the plant thought if the company was willing to grant them the fifteen minutes off from their work for this talk, that it meant quite a lot to them and to the company, and they would buckle right into their work when they got back and catch up their schedule before the day was over.

So, if any of you boys have that experience about your manager saying, "We cannot spare the men," you can cite them to this fact; and I am sure if you will

follow it through, you will find you will not lose a bit of production on the ten or fifteen minutes' time.

MR. FOUAGY (Willys Motor Company): I wonder how many of the members here are self insurers?

CHAIRMAN DUNNEBACKE: All those whose companies are not carrying compensation insurance, who pay their insurance claims out of their company finances, raise your hands.

(About twenty hands were raised.)

MR. FOUAGY: As a safety educational program, I think all these men whose concerns are carrying their insurance will testify to the fact that that is the best safety educational plan that they have encountered. I know it is so with our concern. Up to the time we started carrying our own insurance, our accident frequency and severity was very much greater than at the present time. As soon as the effective force of our organization learned the fact that the company was paying the cost, that the management was directly responsible for the expense of accidents, we saw a decided change in the whole attitude of our personnel.

All Employees Realize the Money Cost of Accidents

Probably this is not very encouraging to the insurance company representative, but it, nevertheless, is a fact, that the men in the organization realized that they have a very important part to play in the matter of expense in connection with the company's business, and when accident costs are put back to the operating force in the way they are with the self insuring company, I do not think there is any question about it at all. It is the finest means of getting safety across to your operating force that has ever been encountered. I would like to hear more from some of the companies that are self insurers, to find out if that is not true, and if they have had the same reaction we have had.

CHAIRMAN DUNNEBACKE: I know in our own corporation, the fact that every manager realizes that when he has a compensation loss he has to put his hand in his company funds and this has a very good effect.

C. B. AUEL (Westinghouse Company): Mr. Chairman, you are looking for something novel, you might be interested in a matter we carried out this past year. As perhaps many of you do not know, the United States government, for the past few years, has made an appeal to the country at large, principally through the Chambers of Commerce of the leading cities of the country, to devote the last week in October to the elimination of waste. They call it "Management Waste", and we have used this as our reason for entering into this campaign. But instead of confining it to the last week in October, we have taken the entire month.

We find that our employees have absolutely no conception as to the cost of materials or tools that they are using, day in and day out, and breaking. So, we have put it up to some 25 or 30 departments, in which our East Pittsburgh Works are divided, to prepare traveling exhibits. These exhibits are ten or more feet long and five or six feet high, consisting of inverted "V" shaped boards, mounted on industrial trucks, so that they can be moved about from place to place throughout the various departments. On these boards we put broken drills, broken chisels, hand wrenches, milling cutters, saws, that are ruined in that particular department, together with the productive material with which they work; and alongside of each, we set down the cost to us of those ruined tools and those ruined materials.

We do not quite stop there, but we also put down the consumption of various expense materials, like soap, paper toweling, brooms, a little statement as to the cost of compressed air, and so on throughout the plant.

We immediately follow that exhibition of waste with a "No Accident Cam-

paign", showing that human waste is greater than material waste; and that "No Accident Campaign" covers the month of November.

This month, we are doing something a little further, and I think particularly novel, in that we are adding one more board to these various traveling exhibits, and that board will have on one side of it a statement as to how production has increased in various lines in all of the European countries, among which are, of course, our leading competitors. On the other side, we have collected some 30 or 40 items that can be purchased in the American markets, but which are made in Europe and Asia. I have already collected, for example, paper flowers made in Germany. I have a bottle with cement, showing that our cement industry is being knocked sky high in the Atlantic and Pacific Coast, due to inroads from Belgium and Denmark. I have a big canned ham from Denmark, I have a brick from Germany. I have silk shirts that I had made to order and sent to this country from Japan, which only cost three dollars and six cents. I have hand-wrenches from Germany, electric light bulbs from Japan and Germany, and so on.

A Month Devoted to Campaign to Eliminate Waste

At the top of this exhibit is a sign something like this: "Foreign goods are being imported into this country in ever increasing quantities, made possible because American wages average about four times as high as European wages. Let us keep them there. One way to help do this is to eliminate waste."

As I say, we give the whole month of October to a consideration of the elimination of material waste, and we have the factory in a particularly receptive condition. We follow on through the month of November with the elimination of human waste, the greatest of all wastes.

Getting back to visual education, I think the Westinghouse people are doing a job that we should all appreciate, not only in selling safety, but in value in economic education, and the fact that it is visual puts the thing across in a wonderful way.

But what I wanted to picture is this: in connection with leg and foot injuries, I think our planning department at our Highland Park plant, where we have better than 6,000 men employed, has done one of the greatest jobs in safety that I ever heard of. They are responsible for receiving, transporting and shipping all material; all movement of material comes directly under their supervision. They split the plant a short time ago into eight divisions, split geographically, and it parallels the line of organization.

Each general foreman in the planning department is responsible for the condition of his plant. There is a banner that goes out on a monthly basis to the man who keeps his stock in the best condition. The white lines are now maintained, maintaining aisle-ways, each man is taking care of that automatically, the crates are piled and the skids are shoved back at right angles. We find, instead of a congested condition, we have ample room now that we have the orderly storing of material, the orderly moving of material and the safe piling of material. Instead of having a plant crowded with material and wondering where we would have to build more buildings to make room, we have ample room to carry as heavy an inventory as we carried before.

The general superintendent made this remark, "We are having practically no foot injuries." Why? He had not been through the plant, he was not familiar with the safety job that had been done, and it went back to the orderly, systematic handling and storing of material. Each one of these general foremen had sold the foreman, and each foreman had in turn sold each employee, so that when the "jitney" driver came in and brought his skid and placed it, he took an extra second or two to place that skid squarely. So competition can be worked in plant housekeep-

ing, and I believe that plant housekeeping is one of the big answers to the subject that we have had this morning.

MR. COMPLIN (Ford Motor Company of Canada): I would like to say a word or two about this new thing that has come upon us since the last session, that is the four to one ratio advocated by Mr. Hendrick, of the Travelers Insurance Company. I think that is one of the biggest selling factors we have, if we can put it across right. I found it worked very beneficially.

The theory is this, that the incidental cost of accidents is four times the actual compensation cost. I took the article and read and marked it, cut out some stuff I did not want, made it into a short memo form and shot that to the management for their enlightenment. They had never looked at it that way and it was hard to believe. I was called in to explain if that was so, and we went into the thing very thoroughly, and we decided it was so, and you could notice a remarkably different attitude on the part of the management when they realized that instead of the twenty-odd thousand dollars accidents were costing them, you could really say it was about one hundred thousand dollars.

You can use that on your foreman. I do not know whether you have foremen's meetings or not, but we do, and before you use it, get it into proper shape and do not quote Hendrick's examples. I am not saying they are not right, they are, but you cannot quote a far away example to the men in your own plant. Sit down, get together with the proper men who have the cost of operation, hiring, etc. and figure that thing up for yourself; arrive at your own examples, and then put it up to your foremen. I did that, and I think I opened their eyes. They never thought of it in that light, and I did not go so far as to make the ratio four to one, because I rather suspected they would find it hard to swallow, but three to one was quite within their range.

When I went to the foreman and told him his accident cost in the past as it was on paper, and that if we charged him with five hundred dollars, he could look around somewhere in his department for a production loss of fifteen hundred dollars—that went across big. It made a whole lot of difference in their attitude, and I would recommend that you gentlemen give that serious thought and, in future, give it a try out.

MR. FOUAGY (Willys Motor Company): I wonder if I may say a word in connection with the remarks Mr. Auel made, with regard to the State inspectors and this preferred class of companies.

We, in New York, have the reputation of paying more for compensation insurance than in any State in the Union. I do not believe anybody will contradict me. In connection with that problem, we have as severe inspection rules and regulations as any other State has, but I would like to see something done in connection with the remarks of Mr. Auel, and see if it is not possible for this Section to go on record in connection with some kind of resolution or action, something done in connection with a movement of that sort. I think it would be very valuable to all of us, if it were possible to take the concerns that are doing something in connection with accident prevention and get some consideration with the State Department of Labor, instead of having these orders placed, year after year, on things that are really inconsequential, things that do not mean anything—for instance, guarding belts that, while they are within the code, actually do not prevent accidents. I wish something could be done. I hope this Section will not adjourn until some definite action is taken in connection with that.

CHAIRMAN DUNNEBACKE: If anyone cares to prepare a resolution for presentation tomorrow or Friday, we will be glad to accept it. If not, I will be glad to recommend this as a thought for consideration for your new officers.

ADJOURNMENT

Thursday, September 29, 1927

The third session was called to order at ten o'clock, by the Chairman, A. F. Dunnebacke.

CHAIRMAN DUNNEBACKE: It is always my belief that it is well for the members of the Section to know something about their new officers, that they get a line-up on them and really get acquainted with them. This morning, instead of conducting the meeting, I am going to ask our new vice-chairman to conduct the session. I have pleasure now in introducing Mr. E. H. Cotcher, The Murray Corporation, Detroit, Michigan, who is going to act as chairman.

(Vice-Chairman Cotcher took the chair).

VICE-CHAIRMAN COTCHER: The session this morning is going to consist of one paper that has been prepared, and the balance of the time will be devoted to a round table discussion of any subject brought up in our meetings, or any subject of any importance to the automotive industry. So while you are watching the paper that is being given, that is, watching part of it and listening to part of it, you can be thinking up questions you may want to ask or suggestions you may want to make.

We hope that this discussion will be really the most important and interesting feature of our whole series of meetings this year. As the opening of our program this morning, we are going to be privileged to listen to and see an illustrated paper delivered by a man most eminently fitted. The man who is to address us this morning is not only a distinguished industrial surgeon and one of the most distinguished in the city of Detroit, but he has been recognized and honored by his Fellow M. D.'s, by being elected a Fellow of the American College of Surgeons. If you know very much about the medical profession you know that that honor is not bestowed except for really exceptional and brilliant work. He is not only a good surgeon, as demonstrated by his experience and the honors heaped upon him, but he is what we would describe along about three a. m. as a jolly good fellow—he really is. I think we are going to be given a very interesting talk. It won't be extremely dry, I am sure of that, and I think we will all appreciate very much the honor of hearing the words and seeing the pictures prepared by Dr. T. E. Mullen, Industrial Surgeon of Detroit.

Head and Body Injuries in Industry

T. E. Mullen, M. D., Industrial Surgeon, Detroit, Mich.

Obviously volumes can be and are written on each and every portion of the human body. Each part today has its own field. I will touch only the more superficial portions as they relate to industry, and as they relate to safety, in the estimating of results following injury and the production of economic waste. We are beginning to see light, and hope that in a short time the specialty of industrial surgery will include all measures bearing upon health, social and working ability of employees; and we are witnessing today one of the most important movements for human conservation.

Physical health being man's greatest asset, the capitalizing of it should become a consequential factor in all industries. The success or failure of a health campaign or safety movement depends largely on the personality of the plant surgeon. "Obviously this is not a function which can be measured by instruments of precision nor encompassed by a mathematical formula. Yet personality is a force so powerful and definite that all the world is painfully aware of its distinguishing presence

at every human contact. It is the most difficult quality of man to comprehend and in most descriptions its subtle essence is quickly lost."

The subject of lost time from work on account of illness, injury and other causes is being continually related to the man's productivity and earning capacity and in this way the physician's knowledge of medicine and surgery becomes a factor in economic life. The industrial surgeon is not only concerned with the immediate injury of the man in the plant hospital, but he looks beyond to the hazard of his job, the monotony, even to his home surroundings and he instills into the men the thought that absence on account of preventable accident, through lowered production, is adding to the cost of living.

Consider for a moment the technical work of the industrial surgeon; he is called upon to treat all types of injuries, from minor lacerations of the fingers to depressed fractures of the skull, interspersed between these are the intra-abdominal injuries, such as tears of the intestines, lacerations and puncture wounds of the liver, and he becomes expert in the treatment of fractures of every variety. Infections are his fort.

Injuries to the Worker's Brain Tissues

The subject of "Head Injuries" should really be "Brain Injuries," for it is with brain injuries that we are concerned more than skull or scalp injuries. The mortality resulting from brain injuries is very high. During the period from 1900 to 1910, the mortality figures at three of the large hospitals in New York ranged from 48 to 68 per cent of all cases of brain injuries. The U. S. Department of Labor, Bureau of Labor statistics, reports in 1925 slightly over 1,700,000 accidents, with 10,500 fatalities. These accidents occurred mainly in industries and railroads. Other statistics show a steadily increasing rate of head injuries.

Stewart in 1921 reported 6,135 head injuries with 617 fractured skulls in New York City.

The clinical symptoms and signs are varied and at times were confusing. In many patients the more extensive the fracture of the skull, the less seriously is the brain injured and, on the other hand, the most dangerous of brain injuries are frequently not even associated with a fracture of the skull. As is well known, the fracture in these patients is possibly the least important part to be considered in the treatment; whereas the presence of a marked increase of intra-cranial pressure with and without a fracture of the skull, the advisability of early operative treatment should be seriously considered. For the successful management of symptoms and complications arising from injuries to the brain, either with or without fracture of the skull, there must be a clear understanding of the principles involved, an accurate mental picture of the symptoms following different conditions, such as depressed fracture, meningeal hemorrhage, different phases of intra-cranial pressure and a logical classification from the standpoint of pathological physiology.

The condition of the brain and its coverings are being taken into consideration rather than the obsolete classification of the different forms of fracture of the skull. In cranial injuries, however, and well illustrated in the more severe forms of so-called "concussion" there occurs frequently a mild edema of the brain—that is, there is a slight increase of the intra-cranial pressure. The effect of a prolonged increase of this pressure is an increase of neuroglia connective tissue. This latter tends to prevent normal functioning of the brain cells and causes many of the so-called "post-traumatic neurosis," following brain injuries such as persistent headaches, dizzy spells, indefinite pains in the head, changed personality to one of emotional excitement and irritability or to one of depression, general nervous instability, fainting spells and even epilepsy. Psychoses are at times troublesome, many will eventually clear up but there is that percentage which will show permanent mental impairment. Especially in the cases of compensation settlement the surgeon

finds great difficulty in differentiating between organic and functional disturbances.

The outline of the proper treatment for acute brain injuries has not only served as a general topic for discussions among surgeons but also has more recently assumed an important place from the standpoint of industrial safety.

Our patients are from our shops and the question of the ultimate return to economic and emotional normalcy is a consideration of great importance not alone to the patient and his family but also to his employers, and one can readily imagine the yearly losses sustained by the families of the improperly treated injury, and what burden is placed upon the state, social and other organizations; so the importance of proper treatment of this type of injury becomes more immediate and momentous. The question of saving life is not the all essential one in the treatment of brain injuries, for what benefit is it to the individual if his life be spared if he has not been returned to economic normalcy? The treatment of these cases should be directed towards the return of the pre-injured workman.

Skull fractures are grouped into direct and indirect, linear fractures of the vault, fractures of the base and depressed fractures, each may or may not be associated with common intra-cranial lesions such as hemorrhage, cerebral edema, contusion and laceration. It is important to bear in mind that the fracture itself, excepting the depressed types is of little consequence in the ultimate of the patient. Whether a fracture aside from depressed fracture is present or not, is not of material consideration in the treatment of brain injuries. The presence of a linear fracture, as has been pointed out, is of great benefit to the individual suffering from head injury, in fact it is compensatory to life and is a natural method of decompression and prevents brain compression.

Many Injuries Also to the Abdomen

Sub-temporal decompression operation is indicated where the usual palliative methods have failed and in cases of progressive hemorrhage due the ruptured blood vessels or in cases of subdural clots. Suboccipital decompressions are indicated where fractures exist with rapidly forming compression of the medulla. The two contraindications to operative treatment are shock and medullary compression.

The acute traumatic abdomen is a fairly common injury in the automotive industry. The patient is struck by shaper-blade, a block of wood from a saw, a handle of a machine. He is in extreme shock. We have found that if these cases are operated upon during the first 8-hour period, an extremely large proportion will be saved; the mortality rate rising in a direct proportion to the time elapsing after this period. We have found that most of these cases show very little evidence of injury on the skin of the abdomen, possibly a slight abrasion or even a slight redness of the skin, but operation reveals multiple perforations of the intestines or rupture of the urinary bladder or other abdominal viscera.

Included in this category is rupture or tear of the urethra—which usually occurs by falling from a height and straddling a pipe or wooden frame. Traumatic rupture of the bladder and urethra is relatively rare as compared to injuries in other parts of the body—less than one-half of one per cent of the total number of accidents. However, since the advent of the automotive industry such injuries are more common. Early diagnosis and treatment has reduced the mortality from 88.7 per cent to less than 40 per cent. But like the previous injuries these are productive of economic waste.

Another type of accident that is very common and expensive in the automotive industry is fracture and dislocation of the bones of the wrist. The surgical importance of a well defined knowledge concerning traumatic conditions of the wrist is obvious. An early diagnosis leads to early and appropriate treatment on which cure so much depends.

Injuries about the wrist joint received much more attention in the recent litera-

ture than formerly was the case. Fractures of the radius or the radius and ulna are by far the most common.

Usually they are caused by a fall upon the palmar surface of the hand; a crushing injury to the wrist, or the falling of a weight upon the wrist.

Anatomically, the carpus are arranged in two rows:

(A) Proximal, comprising from without, inwards the scaphoid, semi-lunar, cuneiform and pisiform.

(B) The distal row comprising the trapezium, trapezoid, os'magnum and unsiform.

When the carpal bones are articulated together, they form a bony mass, the dorsal surface of which is convex from side to side, and anteriorly present a concave surface. This is further emphasized by the forward projection on the inner side of the pisiform and back of the unsiform, while externally the tuberosity of the scaphoid and the ridge of the trapezium help to deepen the furrow. To these four points the anterior annular ligament is attached, which stretches across and converts the furrow into a canal through which the flexor tendons, the nerves and blood vessels to the hand pass to reach the fingers.

Various Types of Fractures Discussed

Dislocations of the semilunar never occur without more or less severe trauma to the bones entering into the wrist joint, and it seems impossible to apply sufficient force to luxate this centrally placed bone without serious damage to the ligamentous and bony structures which give the wrist its strength and flexibility. The soft parts are much traumatized and local post-operative reactions will occur.

Damage to the median and ulnar nerves and blood supply to the dislocated bone would seem inevitable. Dissections of the wrist joint in the cadaver prove this danger an ever present one.

It seems reasonable to believe that most dislocations of the semilunar start as dislocations of the os'magnum backward. As the force is continued, the os'magnum drives the semilunar from its pocket in the carpus and itself resumes a more normal position in the wrist.

Dislocations of the semilunar are frequently undiagnosed because of the failure to make a thorough physical examination with proper radiographic interpretation in every suspicious injury to the wrist joint and because of these incomplete examinations, marked disabilities have resulted.

Fracture of the semilunar is a condition of comparative rarity. The ordinary traumatic lesion, generally the result of great violence occurs occasionally, and of fractures of bones of the carpus is second in frequency to those of the scaphoid.

At the hospital of the University of Pennsylvania, there were seven cases in over 10,000 fractures of all bones, or .07 per cent.

In Mullers' Clinic, at Rostock, out of 1393 fractures, there were five cases, or .39 per cent.

Keinboch's disease is the name given to a lesion characterized by a fracture of the semilunar bone. Usually comminuted, the important feature is the absence of history of trauma, violent enough to account for the severity of the lesion; indeed in many cases no history of violent trauma can be elicited. The diagnosis is made with the X-ray. The exact diagnosis obviously is made by the use of roentgen ray. Any injury to the wrist should be examined fluoroscopically, and films made as quickly as possible following the injury, for our prognosis is in a direct ratio to the time elapsing before treatment is instituted.

Relating to the treatment, so much depends upon early reduction, let it be dislocation or fracture, that point is again emphasized. In dislocations of the semilunar, immediate closed reduction under general anesthesia is the ideal method.

Reduction in early cases is not difficult, and gives excellent results. Late reductions are very difficult and sometimes impossible.

A certain amount of disability can be overcome in the young. It would seem that complete fractures of the scaphoid in a majority of cases remain ununited, although fusion of the fragments has been observed, while the incomplete fracture tends to unite without disability.

At Harper Hospital, Detroit, we endeavor to reduce this dislocation under fluoroscopic control.

If the fragments cannot be replaced, they should be removed. A palmar incision is preferable for the semilunar, and a lateral one for the scaphoid.

Cases treated by operative reduction give the poorest end results as to function and power. Late cases treated conservatively or by excision of the fragment give fair results. The after treatment consists of immobilization in moulded plaster dressings for about two to four weeks, with early active motion and early physiotherapy.

Flying Parts of Equipment Cause Skull Fractures

Fractures of the skull in the automotive industry occur largely from falling materials or flying parts of equipment. These may be guarded by the safety engineers' forethought and skill in providing necessary protection to the employees. The spirit of safety for the employee should be in the mind of the layout engineer of the plant, and designer of tools and dies, so that when the machinery for manufacturing is finally released for operation, these executives should confer with the safety engineer to the end that the best possible safeguards be provided before the power is turned on.

Fractures of the wrist may occur from the same cause, but the operator is more responsible in various ways for the wrist accident by lack of "thinking" or exercise of "presence of mind" and by having his hands become engaged. This would apply to the arms and limbs as well. We must bear in mind that in addition to all the forethought possible on the part of mechanical engineers in their designing, plant engineers in their layout, safety engineer in his oversight of these and other installations, there still remains the great necessity of education relative to the responsibility of each individual to himself to care for their fellow employee and society.

One can by taking thought readily grasp the necessity of thinking "safety," as so much is dependent upon the mental alertness. In the process of gaining the desired end and constructing the mind to safe practice, the human tendency is to take the short cut, which is generally destructive because more can be destroyed in a minute than can be constructed in years of patient toil. Therefore, energy of mind, as well as physical energy, is required to safeguard employees from injuries of the head, arms and limbs.

Quoting F. A. Besley, who says relative to "Accidents and Industrial Surgery":

"Progress and advancement in human endeavor and achievement have been accomplished only when the necessity for improvement is recognized and plans devised to bring a change. A survey of the situation in that branch of surgery known as industrial surgery in America would indicate that the circumstances surrounding the care of a large proportion of injured patients, are influenced by the business methods of the insurance companies carrying the financial risks of the various corporations and there has been little or no concerted effort made to improve the method in the care and treatment of the injured.

"It needs no wordy brief of profound argument to justify the conclusion that the methods of caring for the injured are a great economic waste when the increased number of days of immediate disability and the more or less permanent disability that may occur is considered. True, much has already been accomplished and yet the efforts of the few have not been crowned with unqualified success.

"A campaign of education must be inaugurated which will stimulate a broad in-

terest in this important subject, such propaganda for enlightenment must originate in the larger surgical societies, and must reach the industrial insurance companies. The logic must be such as to appeal to their sense of the economic advantage that must necessarily accrue to them in the better care of the injured patient, and in consequence the lessening of the number of days of disability."

VICE-CHAIRMAN COTCHER: It appears to me that we have listened to a very excellent paper. You fellows know what happens when the usual doctor tries to talk. He gets so interested in technique of his profession that he overlooks the application to the safety movement. It strikes me that one important thing that Dr. Mullen did was to ask us a question. He said, here are cases the way they come to me. What are you fellows going to do to keep them from coming to you? He has somewhat elaborated on the remarks Mr. Auel made yesterday when he brought out the fact that we should perhaps educate some of our inspectors to the fact that mechanical safeguards are not the principal function of the safety movement. Perhaps you want to ask Dr. Mullen some questions. Perhaps you would like to offer a suggestion, to answer some of his questions. The meeting will be thrown open for discussion.

H. R. WHITNEY (The General Industries Company, Elyria, Ohio): I should like to know if this tannic acid can be used on all kinds of burns, steam burns or dry burns, or whether it is safe to use on acid burns.

A Case of Psychology Suddenly Developed

DR. MULLEN: In acid burns we have used a base to neutralize the fire, then make the application of tannic acid. We have used it with very gratifying success. It is a very cheap product and very useful. The only expensive thing about it would be your spray. I have used an ordinary little atomizer. A lot of firms have evolved a little pumping station. It isn't poisonous. You can cover the whole body with it. We are turning our burn cases over to Dr. Davidson of Detroit, of the Ford Hospital, in the last few weeks, and the application of tannic acid is made to them.

H. E. MILLER (Chevrolet Motor Company, Detroit): I should like to ask the doctor to go into one part of the talk this morning, particularly the brain injuries, and cite a specific instance, and I ask for his thought as to the cause.

Recently we had a man fall from the top of a machine probably 12 or 14 feet, landing on the forward portion of the head on the base of a ladder and causing a fracture or indentation. The case was diagnosed and disability estimated as a matter of some eight weeks. The man was taken to one of the Detroit hospitals and was apparently on the right road to recovery. A matter of ten days or possibly two weeks had elapsed and the recovery was very pronounced, but in visiting him with the plant surgeon one afternoon the man asked the question, "When will I be able to leave the hospital and go home?" He was advised that he had another two weeks probably in the hospital before it would be safe to leave; realizing the home conditions and so on, the doctor judged it best to keep him there. The following day there was a noticeable relapse or change in the man's condition for the worse, which continued over a period of practically ten days which was only offset by the visit of his own people or family physician who reiterated that it was essential for him to stay there. Following the family physician's say-so the man seemed to be satisfied with it and started to recover again.

I should like to ask the doctor if he can throw any light on the case of that.

DR. MULLEN: Those are what we call psychoses, they are real lesions. I mean they occur in the site of the brain that has to do with the mental conditions, tears in that particular part of the brain. That may be permanent, but it is real injury, a real pathological condition. A man is mentally wrong because he is injured, the association fibers there are damaged. It may take place even in scar forms without any impairment, but you can't tell what percentage will remain permanent or how

much functional impairment we have, and the surgeons in the compensation department have a hard time studying the claim. The old railroad spine accidents are never settled until the money is handed over to the patient and then cure takes place.

J. RUSSELL (Public Service Corporation, Newark, N. J.): I should like to hear something about the use of picric acid.

DR. MULLEN: I have no criticism of picric acid, but we believe it is not quite as good, in recent work I personally have liked tannic better. I can show you men who like picric better. I think they are all coming to the tannic acid. That is the best thing we have at the present time.

A. F. DUNNEBACKE (General Motors Corporation, Detroit): I was interested in your showing so many slides of the fractures of small bones of the wrist. In these were many falls from tracks, slipping on pavement, tripping, just the body falling down and the arm reaching out. Will a glove on the hand minimize the effect of that any? Could you save any of the small bone fractures with a glove on the hand?

DR. MULLEN: I should say offhand, no. It would depend a lot on how well padded the gloves are. I brought out those wrist injuries especially on the oily floor.

Various Suggestions About Slippery Floors

VICE-CHAIRMAN COTCHER: Was it last year somebody told us the best process to use on the floors? If I remember correctly he said to get sal ammoniac, and if that were applied to the steel plates on the floors it would put a surface there that would not take the oil, would not be subject to an oil slip. Isn't that the answer? There are some other rather interesting questions that Dr. Mullen brought out where he asked us a few questions.

R. E. NEWCOMB (Brewer-Tichenor Corporation, Cortland, N. Y.): Does the sal ammoniac work on cement floors?

VICE-CHAIRMAN COTCHER: Metal ones.

MR. NEWCOMB: Has anyone any suggestion for a concrete floor other than dry cement? I mean the sprinkling of dry cement on the oil to absorb it.

H. E. MILLER (Chevrolet Motor Company, Detroit): I saw something on that yesterday; down here in the cafeteria in the Stevens Hotel, I noticed the girl going along with a box of Morton's dry salt, throwing it on the floor to keep it from being slippery.

J. RUSSELL (Public Service Corporation, Newark, N. J.): Muriatic acid on cement floors tends to eat out the cement and leaves a rough sand finish. That will rough up your floor so that the oil lies below the particles of sand.

VICE-CHAIRMAN COTCHER: I notice for instance on the cleaning decks in body plants you never slip on the cement after they have used their cleaning solution a while which is made up of various acids and so forth. We all know that acid will roughen up the cement. Perhaps some of you gentlemen have a question you would like to put in writing and have it discussed. If so, we have a regular question card we use, if you have something which perhaps may take a little digging to settle.

H. R. WHITNEY (The General Industries Company, Elyria, Ohio): I should like to ask him what experience he has in what is termed nickel-itch in the plating room?

DR. MULLEN: I have seen several cases of it. They occur most often on the forearms and wrists. It is a dermatitis, the mere little pimples with pustular heads on them. The only cure for that particular man, (and I sometimes think he is more or less susceptible to that particular thing) is to get him off the job. The same thing applies with regard to oil, and a person who has oil boils and oil in-

fections. Now it comes about that this skin rash, dermatitis, whether in copper or in oil, is due to the pigment; the irritating agent is not the oil, or the nickel, it is the pigment in the oil and the irritation of the nickel. There was quite a paper given to that by the dermatologists not long ago. In my experience they do come up in the forearms.

MR. WHITNEY: What would you suggest as a treatment?

DR. MULLEN: Remove the man. Change him from the job. Certain men in the work never get it and other men step right in and get it.

MR. RUSSELL: One of the plants in Newark is using a bucket of water with about a half pound of alum in it, and the men working around the oil soak their hands and arms in the alum solution, and also at noon and at night before they go home. This seems to toughen up the skin so that it is less susceptible to this trouble.

DR. MULLEN: That gets away from nickel, but oil is our pet subject. Over at the Chrysler plant we are now using a preparation of ointment to put on the men's forearms in the morning and the hands also, which fills in the pores. The oil is irritated by virtue of the pigment in the oil. This is the thing to get across to you.

MR. RUSSELL: Wouldn't the alum close the pores?

DR. MULLEN: I believe it would. We have been using a simple little basic ointment, which prevents the pigment going into the hair follicles. The pigment is what causes the irritation.

MR. DUNNERACK: There seems to be such a large development recently in the application of the chromium process of nickel plating doing away with nickel plating on radiators, lamps and so on, and a lot of the companies are putting in the chromium processes. Have you any alarm about that or do you feel it will be a safe process?

DR. MULLEN: McCord and the Chromium Process Company have it and your firm has it but I haven't had any experience with it. It is too new. I don't think it is any different from nickel, probably. It might be.

Treating the Troublesome Skin Infection

W. H. LINK (West Disinfecting Company, Detroit). In our experience with these oil boils, as well as nickel-itch and dermatitis, we have made quite a research, and we found that the only way to overcome it was to have the workers wash their arms with a soap which was medically treated. The oil boils and also breaking out of a rash from cutting compounds was treated through mixing a very strong disinfectant directly into the compounds in very small quantities. The research work in that has been gone into very deeply and we found that not only our own disinfectant but that any disinfectant, has to have a very high coefficient to be effective. The best one found so far is disinfectant of a coefficient of around seventeen. It can be mixed into the oils and the compounds with the compounds at the rate of 400 to 1, and for oils at the rate of about 200 to 300 to 1; it has worked out very well in the largest plants throughout the country and has cut down the pus infections to a minimum. This research work is still going on and I am very deeply interested in that subject and we are going into it further now, even getting into the grease used on presses, which is made of animal fats which go rancid and affect the men very largely. I am sorry that I am not able to give much on this as we are just getting into it now, but I would be very willing at any time to give information to anybody who wishes to know more, after I get into it further.

L. E. AVERILL (Packard Motor Car Company, Detroit): I think Mr. Link is rather modest in his statement for the past eight years, and I see one of the men over here that I guess is using the same thing, two of them in fact. The disinfectant we have used in our cutting compound has more than paid for itself in life of the compound, extending the life of the cutting compound anywhere from seven to ten days, especially in the hot weather, and cutting our infection cases at least

90 percent. So I think it would be well worth your thought and time to make a little experimental work among cutting compounds and oils, especially in the summer and spring when the infection cases are more numerous.

MR. DUNNEBACKE: I think Mr. Reamer has some good dope along those lines. I think we might hear from him.

S. H. REAMER (Cadillac Motor Car Company, Detroit): We have gone into this disinfectant quite extensively. In the start it was only in the experimental stage and I placed it in a couple of departments and it wasn't long until I found that employees from other departments were coming down and helping themselves to the cutting oils and compounds in these departments. That, of course, certain foremen didn't like, and we extended that to the other departments. At the present time we place this disinfectant in the cutting oils when it is received in the receiving department. A certain percentage of the preparation is put into the barrel. By moving the barrel from the storage department (all our oils are delivered in barrel lots to the department), I think it is thoroughly mixed. At the present time and in fact for the past year, we do not know what an infection case is where we are using cutting oil or cutting compound. I cannot recall an infection case in over a year. In the cutting compound, we treat that every morning in the mixing barrel in the different departments. We are certainly well sold, and I think it would be well to run tests on it; we find that our cutting oil and compound is really in the best of condition and we use it of course twelve months in the year.

By the way, you will notice a very peculiar smell in your compound, especially in the summer time. We have eliminated that completely.

Spraying With Disinfectant Decreased Infections

H. E. MILLER (Chevrolet Motor Company, Detroit): I feel that we will have some real information through the research of the West Disinfecting Company on this subject within a very short time. Recently we went into the subject and through the use of a disinfectant we have eliminated practically all of our troubles. Still we have a case or two crop up here and there that might cause an epidemic. Recently I called on the West Disinfectant Company to make some laboratory experiments for me. Dr. Drake refused to make a long distance diagnosis. He came from Long Island City to go into the situation and requested samples of practically all of the different conditions that were found existing there. I am assured by Dr. Drake that they will have some reports on that in a short time. I think the results of that information will be of value to all of us.

S. H. REAMER (Cadillac Motor Car Company, Detroit): About a year ago in March, if I remember rightly, we had quite an epidemic. In fact, we called in all the specialists we could think of and could not determine the cause. At last it was suggested that we use some disinfectant and we sprayed our plant completely. As we sprayed the plant from day to day, we could see the infections decreased. Now we use this disinfectant in our scrub water. We have a regular scrubbing gang that works every night, and fortunately we haven't had any recurrence. Of course we make our solution very strong for scrubbing, but it is working out fine.

VICE-CHAIRMAN COTCHER: I am told that Fred Steinhilber, of Jackson Steel Products, is here. I have never met the gentleman. I am told if we will ask Mr. Steinhilber how can a personnel director do good safety work, that he will probably give a good answer.

MR. FRED STEINHILBER (Jackson Steel Products Company): I think that if he does it exclusive of everything else he will probably do a good job.

I am not a safety man altogether. I try to watch the thing from a humanitarian standpoint entirely, and with the aid of the foreman we feel that the Jackson Steel Products Company is directly responsible for its men as well as materials. I have been interested to follow the trend of the discussion at this meeting. The foreman

is the man who is, after all, responsible and to substantiate that at a meeting of personnel men, safety men and employment men and executives last week, that same thought was brought out, the responsibility of a foreman for his men as well as for the machinery and product and materials. In looking over the picture I feel that it is the personnel job, and where the personnel director can't give all his time to safety, where he has employment, compensation and first aid, a good deal of the moral supervision, if he looks at this safety problem from a strictly humanitarian standpoint, the suffering entailed, time and money lost—he will do those things. He will be led to do those things which will eliminate this waste and also eliminate the causes of waste and hardships which men suffer.

I was talking with our new secretary a while ago. It is a peculiar thing, just to cite our own experience. We had last month 15 lost time accidents and had 60 days lost, and the month before we had 17 and lost 67 days; and I have been gone the greater part of August and September and I think we have had three lost time accidents with a loss of seven days. I think I had better stay away altogether. I don't understand it. We are just running along as we always do, with the same number of men, the same amount of work, and here we go for a month and have just a few accidents. I wish somebody would explain that. Just why is it? I don't understand it except that I think maybe our present experience is a result of some hard work previous to this time. You can't let up, you have to keep at it all the time.

An Outline of Safety Activities

VICE-CHAIRMAN COTCHER: I think that is a contribution to the discussion. I heard a safety man recently that had an accident in his plant. He said, "What is it? Just as soon as I go away. If I had been there it wouldn't have happened." I am inclined to subscribe to Mr. Steinhilber's remarks that it is the work you did some-time ago in getting foremen and superintendents and others interested. That appeals to me as being pretty much the answer—how much you are able to get the organization to work. I have been given the names of several gentlemen who are here. Is Mr. Dewey of the Delco-Remy Company here? Have you anything to offer? I am told that you have given considerable thought to it, Mr. Dewey.

MR. DEWEY (Delco-Remy Company, Anderson, Indiana): I have been on this thing about a year and a half and have tried stunts of different kinds. When I began our production started to increase, and our force increased from about 3,500 people to right around 6,700. We had five plants. In the first place we put it up to the foremen, which is more or less an easy way. We did a lot of cautioning, don't do it again, and so forth. We are going a little better than we were the previous year. We had no safety department before that. We changed the set-up, got a little more hard boiled with it. We have no definite rules in the platform. Every foreman understands, is supposed to understand, it is put to him in that way, the right way and the wrong way, and it is up to him to tell the men and hold them responsible for what happens the same as in production. We haven't that proposition fully sold, and I don't know whether we ever will have, but we are still trying it. It takes, I find, about two or three months after you start a new scheme to see whether things are going to work or not. I don't mean to say that we are eliminating all the accidents, we are not doing that; and it would be pretty hard to tell you men why I feel we are getting a little better; but knowing the conditions and our increasing production and increase in employment, I feel we are doing some good.

The most interesting thing is a scheme we have started this month. It is not a new idea along the safety line; we may handle it just a little bit differently. In our five plants we had a safety flag. This is a green flag with a white border, and in the large end is a white circle and inside of that is the white cross, similar to the one on the badge except that it hasn't got "Universal Safety" on it. At the large

end it is five feet across. The total length of the flag is ten feet and is in pennant shape. We got up a letter and made it as simple as we could to get it over to the foremen so the workers could understand it. The way we worked it, we started out the twelfth day of this month and ran it in our shop paper. The flags were mounted on the flag poles.

In addition to that each production department had a poster made, I call it a poster, some call it a pennant. It is made out of beaver board one-quarter inch thick that is twelve inches square. It has a black background with white letters and numbers with a white border about one inch wide around the thing. That has the department number. Hanging on the bottom of that is 12x16 inch board, which has a green background with white letters. It hangs in the center of the department. These posters and flags stay up every day and every night. We have quite a night force. Practically 75 percent of the departments run at night. Those stay up all the time and come down only when there is a lost time accident. We consider lost time accidents as those wherein the men didn't finish out the balance of the shift. We don't wait to see whether the injured man comes back the next morning. If he can't finish out the balance of the shift it is up to the foreman. We have assistants to the foremen, as we call them. We have group systems, the premium system, and one man has charge of the men in the group. It is up to the foreman or one of his group leaders to scale the ladder and take down the poster when he knows it is a lost time accident. He also notifies the watchman to pull down the plant flag. They both stay down twenty-four hours, providing no other accident happens in the department.

Last month we had 25 accidents out of 3,625 workers. That doesn't include the whole force, of course. We have around 7,000. But we had 25 accidents, 638 days; one finger was lost in that, and up until last night, including this month, we had ten accidents, and offhand I would say around 100 days. I would say that this had a lot to do with it. How long that is going to last I don't know, but the competition between plants is pretty strong on anything undertaken, in athletics or whatever it may be; we seem to be getting quite a kick out of it.

J. RUSSELL (Public Service Corporation, Newark): Suppose he has a man injured on the machine. If the man can go out and work a broom in the hall does that figure in the accident or not?

Teaching the Foreman the Need of Human Interest

MR. DEWEY: Here is the thing that is done. It has been a hard job for me to get the foremen interested in a man that is injured. If it amounts to anything at all I go out and get him and bring him in. I don't care how busy he is. If I can get hold of the superintendent I bring him in. We have a general superintendent, and in plant one where there are about 3,600 employees, we have another superintendent. We have many departments, and have five superintendents beside the general superintendent. Of course each other plant has the superintendent. I get that fellow. I can't always get him, but I do so where I can. If it is a job we take him to the hospital or to his home and he is there for a few days. I take him out so that I can see the condition of the home, the family, and what he has to go through. If he has to be operated on at the City Hospital, I take him over there, keep him right with me. But here is the thing that is done. The man gets hurt now and the foreman notifies me within just a few minutes and he is right there after me; and the first thing he wants to know is whether he is going to have to go home or not. We don't want anyone kept at work when he is suffering or if it is painful for him to work; but if he is not in any pain and the doctor thinks he can work, we want him to stay. Of course we have a first aid in the plant. It is up to the doctor to say whether that man is able to work. He can go back and do another job; if he is

100 per cent on it we will let him work. If he is not 100 per cent we don't let him work.

VICE-CHAIRMAN COTCHER: Don't think because I started calling on some of these gentlemen that it is the desire of the Chair to shut off spontaneous discussion.

J. R. ANDERSON (Continental Motors, Detroit): I should like to ask Dr. Mullen how far the industrial doctor should go in medicine in the plant? I know the doctor is in a position to answer this question, because I used to work with a doctor twelve or fifteen years ago and we used to have things in common. I sat in a meeting Tuesday with about 50 industrial doctors and that question was argued pro and con and they were divided on how far they should go. I know a doctor who started his practice on the outskirts of Detroit in the industrial district, and some seemed to be of the opinion that the doctors in the plants should be ignored. One of the plants in the city of Detroit doesn't want to get into that condition. Another plant does, and the local doctors say we are trying to corner the market on treating employees for everything.

How Far Should Industrial Medicine Go?

DR. MULLEN: The problem is up in front of us all the time. We can't ignore the neighborhood doctor, and if the plant assumes medical risk, not compensatory, all well and good, we will take care of the sickness cases if the plant has arranged that with the employees. Ordinarily the plant has not arranged that. In the plant that has not arranged such a condition when a man comes in with a cold in his chest and wants a headache pill or physic pill, and says, "Doc, give me a dose of salts," we instruct our nurses never to do that.

We send the man to his family doctor. It keeps me better satisfied. The cheap-skate comes in and wants everything gratis. You men see that every day in your lives. We try to send them to their family doctor. He is pleased, for that is the way he makes his living. The firm is better satisfied. When the nurse comes on and opens up a boil against a surgeon's advice and he isn't there, she slips a knife in. If infection sets in and the man dies, and what are you going to do? It is a non-compensable case, no accident, just a boil. I think a shop should have a suit of liability. If the man dies anyway, no matter what the treatment is, it is a common thing that the wife comes up and says, "You know my husband scratched himself where the boil took place." She wins out. Why? Because the nurse who assumed that responsibility and the surgeon above her are directly responsible, whether they are or not. If she opened the boil and the man died I think the firm can be held for it. I think the best idea is not to treat medical cases in the plant.

They might say, "You can't let the man go out and not give him a pill." It is best not to give medical treatment in a plant. I send them to the family doctor and everybody is satisfied. There is no argument. The medical authorities are better off and the patient is better off.

A. F. DUNNEBACKE (General Motors Corporation, Detroit): Last year, if you will recall, the National Safety Council sent out a questionnaire to all the members asking them to name a number of subjects that they would like to have the National Safety Council sponsor research on, and one of the subjects was the question of annealing of chains. Later on we noticed that the Council did not take any action on it but approved the sponsoring of other things. We passed a resolution in which we asked them to reconsider their decision and see if they could not find ways and means for sponsoring the research of annealing chains. The National Safety Council did reconsider that, and Mr. Thalner, from this Section, is doing considerable work on watching the research development. Inasmuch as he is here I think it would be better to have him speak to us on it.

R. F. THALNER (Buick Motor Company, Flint, Mich.): For the benefit of those who were not in the meeting of the A. S. S. E. Engineering Section yesterday after-

noon, I want to inform you that the progress report which was briefly given in that section yesterday afternoon will be discussed this afternoon at the same sectional meeting.

The work is progressing and rounding into shape. The committee membership has been appointed and we have men on that committee of national reputation. The Carnegie Institute of Technology is doing the actual testing work at Pittsburgh, Pennsylvania. The plan of procedure has been outlined by Professor Daniels of that institution and we hope when the next Congress rolls around we will have something definite to give you as to whether annealing is or is not beneficial to chains. It has been an oft-discussed question as to whether we derive any benefit from this process. Some of us are doing it and some are not, and some of us are heating to one temperature and cooling in a certain way and others are using a higher temperature and using an entirely different process of cooling. The research which is being conducted will endeavor to enlighten all of us on this situation which has been in a sort of muddle for the past ten years.

We would like to have you in there this afternoon if you are interested. We have received comments on the plan of procedure from most members of the committee and they are favorable. We also sent a copy of the plan of procedure to the British engineers of Teddington, England, who are conducting research on the causes of chain failure; and they sent us a very fine letter, extremely instructive, and I think from their experience we are going to be able to benefit in our own work.

Outline of an Accident From Falling Scaffold

H. L. SAIN (Delco Light Company, Dayton, Ohio): I had one experience in our work at the shop which I should like to mention. The doctor spoke of what we are doing to stop certain accidents such as falls, which result in a good many cases in back injuries, or fractures of the skull. We felt sure that the man in charge of our maintenance department had made a good inspection of all scaffold boards. In fact, he kept me informed at all times. In our plant when we are running under normal conditions we have in the neighborhood of 7,500 men and we have three plants in different sections of the city. It is pretty hard to cover the territory with one man, so I must depend on the supervisors of the different divisions. I had questioned the scaffold boards because we were repainting the whole building in plant one, where we have a saw-tooth building, where a man getting on top of that to spray or paint is about 25 feet from the floor. He told me the scaffold boards were all A-1. But about four-thirty in the afternoon on the last day of February, I heard a terrible noise, and I got the chill that runs over the shoulders and the back of your ears. That is a thrill that I don't want very many of. I heard the man carrying on and hollering at the top of his voice, and in they came. You could hear the scrape on that cork linoleum in the medical department. Whenever I heard that scrape coming in I think of the stretchers.

The scaffold board had broken and he fell 25 feet on top of a grinder. We called the ambulance immediately and took him to the hospital and had some specialists come in. Our doctor doesn't care to take all the responsibility himself, so in cases like that he calls in other specialists and we made all the examinations of the man that were necessary. They didn't find any bones broken nor any internal injuries. He was still hollering as loudly as he could at eight o'clock. The minute you would leave him he would start. It seems as though it was a nervous shock.

The man stayed in the hospital two days and they didn't seem to want to release him. He just got up and put on his clothes and walked home. He lost a couple of days from the shock and is back at work now getting along fine. But that was a lesson to us. We stopped all work in all three plants and banded all of our scaffold boards with angle irons and since that time we have had no more injuries

pertaining to our scaffold boards breaking, but up until that time we had had several serious injuries.

H. E. MILLER (Chevrolet Motor Company, Detroit): We have had some jollity, we have had some serious things this morning. We have had some thoughtful messages and so on, but I believe at this time a matter should be called to the attention of this section and some action should be taken. This morning the safety engineer of Chevrolet Forge Co. was notified of the death by drowning of his wife yesterday. I believe, Mr. Chairman, that this section should rightfully express our condolences and for that purpose I make a motion that the chair appoint a committee to draft a resolution of sympathy and condolence to Mr. Kroger.

(The motion was seconded.)

VICE-CHAIRMAN COTCHER: It has been moved and seconded that a committee be appointed by the chair to draft a resolution expressing our sympathy to Mr. Kroger for the accidental drowning of his wife.

(The motion was carried.)

VICE-CHAIRMAN COTCHER: I presume that the committee properly should be appointed by the newly elected chairman, Mr. Williams. But I will appoint Mr. Miller of the Chevrolet Motor Company, Gear and Axle Division; Mr. S. H. Reamer, Cadillac Motor Company; Mr. W. H. Link, West Disinfecting Company, Detroit.

We have five minutes more and if you don't mind I should like to use that to make some announcements unless you have something of consequence. There is a matter that has been brought up in another section. They say, "May I suggest that your Section vote on a resolution addressed to the Executive Committee of the Council as follows:

"Whereas, The National Safety Congress is more efficiently and economically held in its headquarters city, and

"Whereas, the cost of sending delegates is as low as, if not lower when the Congress is held in Chicago, and

"Whereas, the city favored by the Congress when moved from point to point gains only at the expense of the delegates and their employers, be it therefore

"RESOLVED, That this Section is in favor of holding the Congress in Chicago regularly during the last week of September each year."

Respectfully submitted,

GEORGE F. PRUSSING,

The Union Oil Company of California,

Chairman-Elect of the Petroleum Section."

I suggest a motion to refer that to the Executive Committee unless you want to take action.

H. L. FRACHER (Detroit Steel Products Company, Detroit, Mich.): I think that is a matter for the Executive Committee to handle. I make a motion that the resolution be referred to our Executive Committee for action.

(The motion was seconded and carried.)

The meeting adjourned at 12 o'clock.

ADJOURNMENT.

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Power Press and Automotive Joint Session

Friday, September 29, 1927

THEO. O. MEISNER, Chairman Power Press Section
Manager, Central District Safety Division, American Can Company,
Maywood, Ill.

A. F. DUNNEBACKE, Chairman Automotive Section
Safety Director, General Motors Corporation,
Detroit, Mich.

The joint session of the Power Press and Automotive Sections of the National Safety Council was called to order at nine forty-five o'clock, Mr. T. O. Meisner, manager of the Central District Safety Division, American Can Company, Maywood, Illinois, representing the Power Press Section; and Mr. A. F. Dunnebacke, safety director of the General Motors Corporation, Detroit, Michigan, representing the Automotive Section, presiding as joint chairmen.

CHAIRMAN DUNNEBACKE: As you know, this Safety Congress is the first in which there has been a division in certain interests. For years conditions have been working up where it has been thought advisable to separate certain activities connected with the Automotive Section, and last year there was organized a Power Press Section. That the move was advisable is shown by the attendance at the Power Press Section this year. I think we all realize that about 70 per cent of the accidents are caused by punch presses and naturally there are a lot of fellows who wish to know more about punch press accidents.

However, we did not wish to conflict with the interests of the Automotive Section, and with the approval of both sections felt it would be advisable to have a joint session where one might have subject matter in which both are interested. Therefore, I think the program this morning is going to be of a great deal of interest.

When a man gets up to talk he likes to know the type of man he is talking to. It aids so much in what he says and how he says it. So I have been asked this morning to present a little picture of you people who are here.

I am going to ask those men to raise their hands who are strictly safety workers, safety engineers, safety directors, or safety inspectors—the men down in the shop doing actual safety work. (Forty per cent). How many men here have charge as personnel directors of organizations which have safety as a part of their activities? (Fifteen per cent). How many men here are superintendents, foremen or executives, either managers or heads of divisions or heads of departments, but who are actually engaged in the operating and production processes? (Sixty per cent). That is a very fine representation. I am glad to see it.

The first thing I am going to ask this morning is if there are any reports of any

committees or any resolutions to be submitted. Mr. Miller of the Chevrolet Motor Company has some resolutions to present and I am going to ask him to read them.

H. E. MILLER (Chevrolet Motor Car Company, Gear and Axle Division, Detroit, Mich.): Yesterday the committee was appointed to draft a resolution on the death of the wife of one of our Automotive and Power Press members.

"Whereas, While in Congress assembled the Automotive Section of the National Safety Council has been notified of the tragic accidental death of the wife of one of its members, and

"Whereas, God in His infinite mercy has seen fit to remove one who is highly respected," and

"Whereas, We deplore accidents of any kind and particularly those whose results are so tragic;" and

"Whereas, Our heartfelt sympathy goes out to our fellow member in this time of tragedy and sorrow; therefore be it

"RESOLVED, That this Section offer their deepest sympathy and condolence to this member; and be it further

"RESOLVED, That a copy of this resolution be forwarded by our secretary to our bereaved member, Mr. M. A. Kroger, of Detroit, Michigan, and that a copy of same be placed in the minutes of this Section."

CHAIRMAN DUNNERACK: This makes us realize that we never know who will be picked for an accident and we never know when it is going to strike. We have a very efficient member of this Section, a member giving his presence to this convention for three days, attending the sessions, and all at once he gets a telegram that an accident has taken his wife.

E. H. COTCHER (Supervisor of Safety, The Murray Corporation, Detroit, Mich.): I move the resolution be passed.

(The motion was seconded and carried).

CHAIRMAN DUNNERACK: For our first subject this morning, "Training Foremen in Accident Prevention," we have selected Dr. Harry Myers, of the Delco Light Company and Frigidaire Company, of Dayton, Ohio.

Throughout the whole range of life there are certain fundamentals governing man's every day contract. Dr. Myers has delved in and has grasped a wide range of that activity. He not only knows the philosophy of it, the esthetics of it, but he knows from actual shop operations, from actual work in factories and shops, the different links that connect these steps in our society. As personnel director of the Delco Light Company, he has been doing a very extensive work in foremen training, foremen development, and I know that he is going to give us a very interesting talk.

Training Foremen in Accident Prevention

Harvey Myers, M.D., Personnel Director, Delco Light Company, Dayton, O.

I asked Mr. Dunnebacke to take the census this morning that we might feel a little more acquainted with each other; a little more friendly perhaps; because I think these talks should be very, very practical, very personal; and certainly if we know each other better the result will be better.

I am sorry it has been my misfortune to be absent from the convention during these days. I know you must have had great sessions and I know now as you round out the closing day, you should be having an intense feeling of the need for action of some kind. So if you will allow me, I am going to get onto one of my pet subjects, which is that unless you carry this stuff back to your plants, into your work, and put it in operation, you have been a useless expense to your company. I want you to appreciate the seriousness of that problem. I know you will if you think it all over.

What are you going to do about it? What are you going to do about these things you have heard? Whenever a class leaves any of our rooms I wonder to myself, "What are they going to do about it?" Is this particular thing we are talking about going to show up in the plant in the next half hour, the next day, and so forth? Is this going to show up in your plants soon after you get back? Are your plants going to take on a different aspect because of your being here? That is the practical side of it, and folks, that is where most of us fall down. Some way or another we stop short of doing the necessary thing. One of the favorite questions I like to ask is this: What per cent of the things which you have heard or seen or read, that you have admitted would help you on your job and make you a better success in life, have you really done? I wonder.

Mark you this, of the things that will be said here this morning, the things you admit you can do and should do in the interest of your company and in the interest of yourselves, most of them you will forget. That is one of the reasons why they always take up the collection in church with soft music while you are still sitting, still in the atmosphere. They would never risk it after you get into the hall, because most of the people lose the atmosphere before they get out in the hallway.

How long can you hold an atmosphere? I wonder if you have read Elbert Hubbard? We have asked all our Delco people to read what he says about initiative. You have all seen that the world bestows its big prizes, both in money and honors, for but one thing, and that is initiative. What is initiative? It is doing the right thing without being told; but next to doing the thing without being told is to do it when you are told once. Hubbard divides the world into three classes of people: those who do it without being told at all, and to them go the prizes of life; those who have to be told once; and those who have to be told more than once. The successes of life lie in the first two classes.

The Measure of the Failure Class

When you have to be told more than once you are in the failure class. Is that logical? Watch yourself. Watch yourself in regard to anything that has been said in this convention that has been of new interest, anything in this whole convention about which you have said to yourself, "Yes, I am going to do that." Watch and see if you do it. Check up on yourself.

The first man we have any real record of having checked up on himself was Benjamin Franklin. If you have not read the autobiography of Benjamin Franklin, you should read it. We have sold over a hundred copies of that to our foremen in the Delco Light Company. Benjamin Franklin tells how he checked up on himself and made himself do the things that he should do. I recommend that book most heartily to anybody who, after he gets away from this convention, still finds himself not doing the things he promised himself he would do. You read that autobiography and I believe it will help bring the action that is necessary.

Here is another great big law that ties right in with Elbert Hubbard's talk on initiative, and that is this: My value is governed entirely by the amount of supervision I require. That is why the world bestows its big prizes on the people who don't have to be told at all, who need no supervision. That is why the man who can still do things when told once is a success. It means the least possible supervision. That is why those who have to be told more than once are in the failure class because they require the greatest amount of supervision and it is too costly; they fail. I am saying all this in a fond hope that the things which you promised yourselves you are going to do after this convention, you will do when you get back. Nothing could mean more to your plant, nothing could mean more to your personal success in life.

I am addressing a very mixed audience. I think 40 per cent are safety men. I wish I knew right now what your relation is to the foremen back in your depart-

ments, back in your shops. Then we would have a basis from which to start. I am talking now particularly to the safety engineers. I wish I knew how the foremen regard you. I wonder, because it would be entirely how you are now regarded in your organization as to how we must talk to you about training those foremen in safety work. I wonder if they are now interested in it; I wonder if they now look on you as the man actually helping production; or I wonder if they look upon you as a hindrance and hate to see you come into the department! The general managers who are here know what I am talking about.

I am wondering if the safety man in your organization is very popular. I am wondering if general managers here have an unpopular safety director. If so, he isn't a good one; and what is apt to make safety directors unpopular in their own organization is also apt to keep them from getting along well with the productive forces. You and I produce only indirectly. The employees get the stuff out. The foreman who directs getting the stuff out is making the money that is paying the wages, and I am wondering how you and I are regarded by the productive forces.

If you are not popular in your organization, I will bet I can point out one of the reasons. Did you every stop to analyze the difference between work and play? What is the essential difference? We say in Delco Light we are working on two big fundamental things, trying to make work a pleasure and trying to help people do well in life. One of the things which makes work distasteful, and the deep difference, I think, between men at work and men at play, is the question of authority. And I will say to the safety directors here, if you are not popular in your plant, ten to one you have used your authority unwisely. The very fact that you know you can stop a machine if it isn't fixed up with a safety guard, is a bad thing for you.

An Indication of Solid Character

That is one of the things which will keep you from being unpopular and unworkable in your organization, or wherever else you are. Nothing discloses real character like the use of power. It is easy for the weak to be gentle, but if you want to know what a man really is, give him power. This is the supreme test.

It is to the glory of Lincoln that having almost absolute power he never abused it except on the side of adversity.

Now when you go back and are inclined to talk hard to a foreman, knowing that you have the authority to close his machines down if he doesn't do what you want him to do, if you are going to get hard, nasty and unfriendly, just say those five wonderful words to yourself: "This is the supreme test." Just remember you are not measuring up under the test. How many thousand times I have said that to myself. I was going to lay somebody out because I had the authority to do it, but I caught myself and supervised myself, and I didn't.

What I am trying to say is that this is one of the ways not to teach foremen, by the authority you have. You can't train people by teaching if you don't know the fundamentals of good teaching. Most of the scrap back in your departments today is due to poor teaching, poor instruction. That is absolutely true. I will never forget the first meeting I had in the Delco Light. I was talking about the great need of better instruction; and the boss, Mr. Ketering, came into the room. If you know him you know what a marvelous man he is. The boss listened for a while, then he got up; and he told me more about my own job than I had ever known.

He outlined three fundamentals as only Boss Ketering can. He said, "Instructions degenerate and do not propagate." That is why it is so hard to teach. Instructions run out, they stop. If I tell a man a certain thing and it passes through four hands, you know what happens. Instructions do tend to degenerate, they don't propagate. They don't develop, they run out. That was the first thing Mr. Ketering laid down. Instructions tend to degenerate, they don't propagate, and for that reason you have to be so definite in what you say.

Mark the next, too. He said, "You are poor instructors because you are poor actors. You don't like to do your stuff again and again in an interesting and entertaining way." He said, "Last night I went to see Ed Wynn. He is doing the same damn fool stuff that he did three years ago when I first saw him, and yet I sat there and laughed my fool head off; and then I thought: What has it cost Edwin to still keep doing that in such an interesting and entertaining way at the end of three years? Just the other day I saw his salary is something like \$5,700 a week! Why? Because he can do a thing over and over again and again and for years, and you like it."

Ketering said, "I am positive that most of your men want to do good work if you are smart enough to show them how in an interesting and entertaining way." Do you get that? Not with authority. Although it is true that most of our instruction in our organizations, in our plants, is given in the way of command. But are you interesting and entertaining? Take Ketering's word: "I am positive that 95 per cent of your men want to do good work if you are smart enough to show them how in an interesting and an entertaining way."

I believe that the foremen of your organizations will be interested in the safety movement if you are smart enough to take home the inspiration of this convention and give it to them.

Any Leader Has to Be "Smart Enough"

If you are going back in the same dill pickle state you came away in, if you have been anything but friendly and so forth, anything but pleasant and agreeable and cordial in your organization, and if you can't carry back from this convention this inspiration to your foremen, then you are not as good a safety director as you should be, and Ketering will say you are not smart enough.

Notice, he didn't say how smart; he said, "if you are smart enough." It simply means this, that if you are smart enough, if you can carry away the inspiration of this meeting, then I believe that your foremen are going to be interested in having you come in their departments on this question of safety; but if they are not interested, if they would rather have you out of that department when you come in, then, folks, you are defeating yourself in your project.

There was a third thing that Ketering said: "You are poor instructors because you are apt to teach the last thing you learned and not the first; so that poor devil is learning it from the wrong end." If there is some man in your department who is not as interested in safety as you are, just know that he hasn't the grasp of it that you have. Try to remember how dumb you were, how little you once knew, what first created an impression and interest in you. If you will start there and get that over to your foremen, I honestly believe that you will have interested them, and that is the first thing for you to begin with. If your foremen are not interested in safety I am very, very sorry for you. I believe that you can have interested foremen in this work, this marvelous work, if you will obey those things that Boss Ketering laid out. It is all in the teaching, and to get that started you must first have an interested group of people.

I believe, folks, that we go far afield when we consider safety something apart in itself. I have seen so many people do that, just as they have considered personnel a thing apart by itself. It is all a part of a big work, the development of the healthy, intelligent, interested working force and organization. The fundamentals that go into making safe departments are the fundamentals that go into making good foremanship. Good foremanship means safety and safety means foremanship. What are the fundamentals of good foremanship? When you go into a room do you say to yourself, "There is a good foreman"? When that department is clean and when it is in order, isn't that true? And right now when you go back, start the first thing to have a clean and orderly department and start the biggest thing for safety in your plant that you could ever mention.

The plants that fail are dirty, disorderly plants; the plants that succeed are the clean, orderly plants. Is that true in your experience? Can anybody dispute that? Have you ever seen a safe department that was a dirty department? Did you know that order, absolute order, is the first process of life? We approach the average foreman and the department is dirty and all disorderly. When you ask him about it he says, "I know why; they took one of my janitors away from me." Oh, what a mistaken notion of order. They are thinking in terms of order in janitor work. They don't think of order in the life process. We have all our foremen repeat this and mean it, "Order is the first step in production and if I can't manage the order of my department, I can't manage the department." Do you believe that?

The greatest step in low cost production and good production is order. We firmly believe in Delco Light that unless we can get a foreman interested in the question of order we can't get him interested in any proper question of manufacture. We go to great length. One of the little definitions of order is interesting. Order is a place for everything and everything in its place. In our definition of order we say, "A place is in order when there are no unnecessary things about and those things that are necessary are in their proper place." "No" in that sentence means not any, not even one. There comes the bite. Not even one. If you want to see how this is worked, come down to the Delco Works.

The Safety Movement Inspires Better Foremanship

I just want to make another point in conclusion. The whole safety movement means better foremanship; better foremanship means safety. The best foremen you have in your place are the safest foremen. Why? Because underneath the whole thing we know that the thing which makes for safety and makes for foremanship and makes for the better things of life, is the elimination of carelessness, and that is what is wrong with most of us. That is why we show such a low per cent in accidents. That low per cent most of you would have if you were honest about it. Don't you think that is true? Carelessness in your plants today is not only causing the accidents but is responsible for the poor work that you are sending out.

We know in studying the human side of this question, that the material side is rarely at fault. Most of the things you are sending out now to your customers are right, but not quite all. The big question is why aren't they all right? If most of the things are right it shows that your theories of manufacture, your theories of the fabrication of the articles, are pretty much right. The big question is, why don't they all go out right? Because of the human side—the failures, the frailties of human nature, and the biggest of all is carelessness. We have got a homely little definition for carelessness down there which I want to submit to you. "You are careless if you do not do anything as well as you can." Failure to do your best on anything means carelessness. You think that over, and then just ask yourself this: "How many times am I doing my best on a thing?" Folks, it is not added knowledge we need, it is an added something else that absolutely gets us by the nape of the neck and makes us do our very best.

Here is a little precept of three things that will absolutely eliminate carelessness in your shops and in yourselves: "Be clean, be orderly and have proper working equipment (and by equipment I mean everything that you use) and you can't be careless."

Folks, these things are all tied together. I can't separate them. Safety, accident prevention, is simply good foremanship, good managership, good management all the way through, in shop or in home. I wish we had time for a discussion. I should like to have your ideas. Of course, I am still wondering just as I did when I began to talk to you: What are you going to do about it when you get back?

AUGUST KEMS (Kenosha, Wis): I make a motion that we give this gentleman a rising vote of thanks.

(The motion was seconded and carried.)

CHAIRMAN DUNNEBACKE: While I should like to declare the meeting open for discussion, I hesitate because we have some other interesting talks and we need the time; but I think we will take about five minutes. There may be somebody here who has some particular thing he would like to have Dr. Myers emphasize more.

CAPTAIN FISHER (Illinois Manufacturers' Association): If I am quoting the doctor right, 95 per cent of the men will play the safety game if you are able to put it up to them. I am not asking a question, but I want to say something that will back up that sentiment. I have been doing this work for ten years, talking many times every day, and I get a better hearing in the shops and plants than a preacher does. Why? Because I talk along the lines of the things that interest men and that the men know are for their good; and I am constantly saying to managers, superintendents and foremen, "If you will get enthusiastic along this line the plant will get it." And it is true of my superintendents, like foremen, like workmen. It is amazing how much of the accident problem is due to the lack of enthusiasm among the foremen or the superintendent in putting this safety work up to the men. The men know it is for their good and they catch on and respond.

CHAIRMAN DUNNEBACKE: We will proceed to the next subject. The Fisher Body Corporation has done some wonderful work in safety, and Mr. N. M. Loney is here to tell us how they do it.

Application of a Cash Accident Prevention Bonus

N. M. Loney, Fisher Body Corporation, Detroit, Mich.

Some time ago I was confronted with the desirability of devising some way of bettering the performance in accident prevention in certain rather hazardous departments of the corporation with which I am connected. In order to meet the situation, the existing safety organization was expanded somewhat, the mechanical guarding was considerably improved, and a campaign of education was initiated. A little later, a cash accident prevention bonus system was installed, and as a result of these measures considerable improvement has been shown. I am unable definitely to allocate the improvement in the record to the various measures taken, but I believe that most of it is due to the cash bonus. I do not propose to go very far into the question of the desirability of such a system, but only wish to say that under a given set of conditions it has worked out very well for us.

It is very easy to decide to pay a cash bonus for accident prevention, but I found it quite a difficult task actually to set up the machinery by which this system would be administered. The reason for my appearance here today is that I believe, after considerable effort and experience, we have devised a system which may be of interest to those who may decide that their conditions justify the application of a cash bonus system, and this paper may be of assistance to others who may wish to use such a plan.

The first question which arose was: to whom shall the system be applied? An inspection was made of the records of payments for compensation and medical attention for several years back, and the departments where such payments had exceeded \$5 per year per man were selected as having sufficient expenditures to justify giving a bonus which would be worth while. This \$5, by the way, is the figure which was, more or less, arbitrarily selected as being one which would be large enough to attract the interest of the foremen, and still small enough to leave the possibility of an actual reduction in total cost of compensation and bonus. I might say here that our results have justified us in putting the whole proposition on a cost basis. The humane

side of it has not been overlooked, but we feel that this followed as a matter of course, and we all know that a policy which justifies itself financially is more easily installed and operated than one which has to be placed on an altruistic basis.

As stated above, this figure was adopted more or less arbitrarily after an inspection of the actual experience, but there is no reason why it could not be made considerably less as long as it produces sufficient remuneration to be worth mentioning. Most of the foremen whom we were trying to reach were those in direct contact with the workmen, each supervising on an average of 20 to 30 men, and this figure would produce an average bonus of from \$100 to \$150, which, if earned, would add materially to the foremen's earnings. The department foremen, who supervise the foremen, and who thus, in most cases, are one step removed from direct contact with the workmen, were also considered integral parts of the picture, and their bonus was made dependent upon the earnings of the foremen under them. All rules, of course, require exceptions, so that in order to take care of the exceptions a minimum for any foreman was set at \$20 per year per foreman, and a maximum of \$400 per year per foreman. Between these limits the system, which will be explained later, was allowed to work itself out to whatever it produced.

These limits having been established, the next question that came up was to make sure that the money appropriated was distributed on as equitable a basis as possible. This brought us immediately to the question of the relative hazard exposure of each foreman. Various insurance authorities were consulted, and a study was made of the available hazard ratings. None of these seemed to break down the hazard to fit the individual operations, and all of them were somewhat difficult to explain to foremen who ordinarily are not very well posted on this subject; I therefore conceived the idea of allowing the foremen to set their own hazard ratings.

Pointing Out the Most Hazardous Occupation

It happened that we had five mills doing similar work on the wood parts, and we had two press rooms and two die-making and maintenance shops. All together, these plants employed about 5,000 men, and the operations were quite similar in all of them; generally speaking, the hazard exposure in each was about the same. Small groups of these foremen were called together, and were asked, "What do you consider the most hazardous occupation in your plant?" In the case of the wood mills, the usual reply was that hand jointers, wood shapers and mitre saws were all quite dangerous and equally so. We said, "All right; then, we will tentatively assign to these machines 100 points on our scale of hazards." We then asked, "What do you consider the safest operation?" It was unanimously agreed that bench glueing of wood parts was the least hazardous, and we then set this up at 10 points on our scale of hazards. We then took up each machine or operation as listed on the rating sheet, which will be referred to later, and after considerable discussion fixed a rating on each between the above limits. In cases where helpers were employed, if there was a difference in the hazard exposure between operator and helper, this was fixed in the same manner.

Of course, quite serious differences of opinion as to the degree of hazard developed inside the various groups and between the different groups. In cases where the members of the groups differed, the majority was allowed to prevail; and the differences between groups were settled by a committee of superintendents of the various plants who finally adopted the figures used. These ratings were not entirely inflexible, as the safety department sometimes modified ratings for a particular plant or operation where conditions justified

this. For instance, the difference in the surface over which trucking was to be done might very well justify a change in the hazard ratings for this operation in the various plants. A record is being kept of actual experience, so that as time goes on it is hoped that these hazard ratings may be put on a more scientific basis, but since the whole underlying motive of the accident prevention bonus is psychological, we felt that if the men concerned were allowed to set their own ratings, it would be much easier to overcome the feeling that any individual was being unfairly treated.

As time went on, the system was extended to outlying mills, in one case to a saw mill, and also to take in the departments having to do with the preparation of metal (having first started with the stampings alone), and the hazard ratings for each department developed as described above. Attached in Appendix "A" are the following hazard rating sheets that have been adopted and are now used:

Wood Mill, Press Room, Die Shop, Metal Room.

These sheets are used as follows:

Assigning the Amount of the Bonus

A rating sheet is filled out in duplicate for each foreman by inserting in the proper spaces the average number of operators and helpers expected to be engaged under each foreman during the ensuing quarter. The rating for each operation is then multiplied by the number of workmen engaged on same, and the total extended and carried to a sheet total, which latter is the sum of the ratings of all operations under the foremen's supervision. The ratings for individual foremen are then added to get a total rating for the general foreman having several individual foremen under his supervision.

The next step is to assign the amount of the bonus. The theory here is to make the bonus of sufficient amount to be attractive and at the same time rather difficult to get. Considerable experimenting was done to fix a method by which any severe accident would eliminate the bonus for any individual foreman during the quarter in which it occurred, so that we, at this point, arbitrarily set up an allowance which may be said to express the probable normal percentage of time expected to be lost on account of accidents to the total time worked under each man's supervision. Any foreman exceeding this allowance would lose all of the bonus set up, and any foreman losing only a portion of the allowance set up would lose only a proportionate amount of bonus. You will note that the allowance is proportional to the hazard. The allowance is taken as one-tenth of the rating, and the bonus is based on twenty cents per point of allowance, or as a short cut, two cents per point of rating.

In the case of general foremen, the allowance is taken as one-fortieth of the sum of the ratings of the foremen reporting to him, and the bonus is based on forty cents per point of allowance, which, as a short cut, is one cent per point of rating. (Appendix "B" is shown as a typical summary for one plant.)

The allowance and bonus figures are then carried to a printed bulletin sheet, which is posted in a conspicuous place in the plant in a neat glass case, subject to the inspection of all concerned. At payroll periods the total time worked under each foreman is roughly computed, and the percentage of time lost is deducted from 100 per cent, and the result posted in the column shown.

It may appear that computation of the time worked under each foreman would be quite burdensome to the time department, but a little calculation will show that a five or ten per cent variation in the total time worked will only appear in about the fourth place of the bulletin rating, and will not

affect the bonus materially one way or the other. The reporting of the time worked under each individual foreman has been left to the foreman himself or a clerk, who reports to the safety man, who, in turn, ordinarily operates the system; and if the total time reported by the foremen checks within reason against the timekeeper's records of the total time worked, it is accepted as correct.

Here, again, I want to make the point of the psychological effect. It was felt that if the men were convinced that the system was being administered fairly it need not be scientifically exact to accomplish the result desired. Therefore, we accepted the approximation of the time worked, rather than going to the expense of actually keeping a check on the time records. In some departments it happened that the time was already kept as desired for this purpose, and of course where this was the case it was used.

When the ratings are posted at each pay period, there is also posted on the glass of the bulletin board a typewritten summary of the time losing cases, giving the name of the workman, name of the foreman, nature and cause of the accident, the time lost, and usually some warning pertinent to the record.

The Bonus is Paid at Quarterly Intervals

In the above discussion, the system has been referred to on an annual basis; in actual operation the bonus is paid at quarterly intervals, and new bulletins are posted at each quarter, no lost time being carried over from one quarter to the next; so that if a foreman has made a poor record in one quarter, he is encouraged to make a fresh start in the following quarter. At the end of the quarter the amount earned is computed in proportion to the time saved out of the allowance. A cumulative record is carried in successive pay periods so that the last column automatically gives the rating of time saved out of the allowance.

In conclusion, I wish to present some statistics as to the actual results accomplished during one year's operation of this system. It was applied to an average of 5,783 men who were supervised by an average of 215 foremen. The bonus set up amounted to approximately \$28,700 for the year, about \$4.96 per man and \$133 per foreman. The amount earned was approximately \$22,200, about \$3.84 per man and \$103 per foreman.

We had a couple of plants with a rather bad record—one plant in particular having paid during the previous year for compensation and medical service arising from accidents \$35 per employee. This plant employed from 500 to 700 men. In the succeeding year, we paid out in compensation something less than \$8 per employee, and for bonus about \$4 per man, so that there was an actual net saving in the total expenditure of about \$23 per man per year. Another plant paid in the previous year approximately \$40 per man for compensation and medical service, and in the succeeding year only about \$14 per man for compensation and medical, and a bonus of about \$4 per man, showing a saving of about \$22 per man per year.

In the plant in which there was the least improvement, the sum of the compensation and bonus paid just exceeded the amount paid for compensation alone the year before, and statistics indicate that the weighted lost time was reduced by approximately 70 per cent over the previous year in three of our plants, and from 40 per cent to 50 per cent in the balance. The actual net saving in the departments to which the system was applied was in the neighborhood of \$10 per man per year.

I trust that I may be pardoned for lugging these actual figures into this talk, but it again illustrates that any good safety device actually pays.

In the above figures, no allowance was made for the expense of operating the system. This was mostly done by the existing safety organization, and the total expense for this department was very little, if any, greater than it would have been if the bonus system had not been employed. When the system was first proposed, it was feared by a great many of the production men that production would suffer on account of it, but in the whole year's operation no complaint on this score has been brought to our attention, and on the other hand, it has undoubtedly served to increase production since it has prevented the unaccounted-for loss of time which inevitably occurs whenever a serious accident occurs.

In connection with the statistics, it is interesting to note that 35 foremen out of a total of 215 went through the entire year without an accident, but no foreman failed to receive some bonus. It has been found to develop a healthy spirit of rivalry, and the bonus, being distributed quarterly in the form of checks to the assembled group of foremen in each department, it gives the safety man a very good opportunity to review the record of each man during the previous quarter and draw the necessary lessons therefrom.

As we are extending this system to our outlying plants, we are saying to the foremen affected that we feel we have been paying the insurance company or the compensation department money on account of accidents which we would much rather pay to the foremen if they can prevent accidents, and at the same time we expect to make a saving on the total cost. Now that we have the benefit of the experience in the record quoted above, we are finding it very easy to make real safety men out of foremen who were formerly quite indifferent.

In closing, I wish to repeat that I am not advocating the adoption of the bonus system for accident prevention, as such. I only wish to give others the benefit of our experience with it, and in that connection I shall be very glad to answer any questions and to show privately to anyone interested, the actual detailed records which I have with me.

APPENDIX A

Hazard Rating Sheet for Foreman Thos. Caley. Dept., Die Shop. Plant No. 1.

Operation	Operators			Helpers			Miscellaneous		
	Rating	No. of Operators	Total	Rating	No. of Helpers	Total	Rating	No. of Misc.	Total
Stock Saw	25			25					
Mitre Saw	100	4	400	25	4	100			
Wood Turning Lathe	50								
Band Saw (Wood)	60			25					
Shaper—Double (Wood)	100			90					
Jointer—Hand	100	2	200	40	2	80			
Planer—Metal	30								
Planer—Wood	45			25					
Disc Sander—Wood	30								
Electric Welding (Spot)	30								
Gas Welding	40								
Pattern Makers	10								
Template Makers	10								
Apprentice (Pattern Makers)	10								
Emery Wheel	35	8	280						
Filing Machine	10								
Blanchard Grinder	45								
Slotter	35								

Metal Band-Saw—Cut-off Horizontal.....	40								
Power Hack Saw.....	40								
Shapers.....	35	6	210						
Straightening Press.....	20								
Kellar Engraving Machine.....	30								
Heat Treatment.....	20								
Blacksmith Power Hammer.....	20								
Flexible Shaft Grinder (Large).....	80								
Punch Press.....	95								
Bench Hands.....	20	8	160						
Chippers.....	55								
Tool Crib Attendants.....	10								
Cranes—Traveling.....	10	5	50						
Electric Trucks.....	20								
Upright Drill—Single.....	30	3	90						
Upright Drill—1 Spindle.....	35								
Radial Drill.....	20								
Engine Lathe.....	30								
Speed Lathe.....	20	6	120						
Milling Machine.....	40								
Boring Machine—Horizontal.....	30								
Boring Machine—Vertical.....	40								
Surface Grinder.....	35								
Portable Power Tools.....	55								
Machine Repair.....	50								
Maintenance.....	50								
Oilers.....	60								
Sweepers and Janitors.....	20								
Inspectors.....	20	3	60						
Elevator Operators.....	20								
Watchmen.....	20								
Die Makers.....	20	5	100						
Arc Welders.....	40								
Machine Shop Helpers.....				55					
Total.....		50	1,670		6	180			
Thos. Caley.....				Rating					1,850
FOREMAN: ARTHUR BLACK.....				No. of Men					56

Hazard Rating Sheet for Foreman Geo. Fale. Dept., Press. Plant No. 1

Operation	Operators			Helpers			Miscellaneous		
	Rating	No. of Operators	Total	Rating	No. of Helpers	Total	Rating	No. of Misc.	Total
Toggle Press.....	65			70					
Punch Press.....	70								
Double Crank Friction Clutch Press.....	80	2	160	85	2	170			
Double Crank Block Clutch Press.....	95			100					
Power Square Shears.....	35			40					
Rotary Shears.....	30			35					
Metal Band Saw.....	45	4	180						
Buckling Rolls.....	20			20					
Cranes—Traveling.....	10	10	100						
Electric Trucks.....	20								
Upright Drill.....	30								
Radial Drill.....	20								
Auto Feed Drill.....	15								
Auto Feed Tapping Machine.....	10								
Hand Feed Tapping Machine.....	10								
Engine Lathe.....	30								
Speed Lathe.....	20	6	120						
Planer.....	30								
Shaper.....	35								
Milling Machine.....	40								
Vertical Boring Mill.....	30								
Horizontal Boring Machine.....	40	3	120						
Emery Wheel.....	35								
Portable Power Tools.....	55								
Scrap Balers.....	20			40					
Bench Hands.....	10	9	90						
Die Setters.....	50								

Power Press and Automotive

489

Machine Repair	50								
Oilers	60								
Trucking	35	4	140						
Loaders	25								
Sheet Steel Handlers.....	40								
Sweepers and Janitors.....	20								
Die Handlers	25								
Gas Welding	40	1	40						
Electric Welding (Spot and Flash).....	30								
Solder Wiping	40								
Metal Inspectors	10								
Heat Treatment	20								
Die Repairmen	40								
Metal Finish	20	5	100						
Power Hammer	15								
Hand Riveting	45								
Metal Marker	40								
Watchman	25								
Elevator	35	2	70						
Total		46	1,120		2	170			
Geo. Fale				Rating					1,290
FOREMAN: HARRY SMITH				No. of Men.....					48

Hazard Rating Sheet for Foreman Sam Brown. Dept., Metal. Plant No. 1.

Operation	Operators			Helpers			Miscellaneous		
	Rating	No. of Operators	Total	Rating	No. of Helpers	Total	Rating	No. of Misc.	Total
Electric Welding (Spot and Flash).....	30								
Gas Welders	40								
Punch Press	70	4	280						
Milling Machine	40								
Auto Tapping	10								
Hand Tapping	10								
Power Squar Shears.....	35			40					
Metal Band Saw.....	45	2	90						
Upright Drill—Single	30								
Upright Drill—Multiple	35								
Shaper (Metal)	35	6	210						
Power Hammer	15	3	45						
Disc Grinders	35								
Tool Makers	20								
Metal Inspectors	10	5	50						
Turret Lathe	30								
Emery Wheel	35	1	35						
Buffing									
Hand Rivetting	45								
Bench Hands	10	3	30						
Solder Wiping	40								
Solder Torch									
Metal Finish	20								
Metal Market	40								
Screw Machine									
Bench Hands	20	4	80						
Blacksmith									
Scrap Balers	20								
Tool Crib Attendant.....	10								
Painter									
Sweepers and Janitors.....	20								
Metal Inspectors	10	3	30						
Metal Flangers									
Tool Repairmen									
Buffing									
Truckers	55								
Sheet Steel Handlers.....	50								
Total		31	850						
Sam Brown				Rating					850
FOREMAN: P. J. GREEN.....				No. of Men.....					31

Hazard Rating Sheet for Foreman Joe Doe. Dept., Mill. Plant No. 1.

Operation	Operators			Helpers			Miscellaneous		
	Rating	No. of Operators	Total	Rating	No. of Helpers	Total	Rating	No. of Misc.	Total
Stock Saw	25	4	100	25	4	100			
Rip Saw—Self-Feed	40			30					
Double Cut Off	35			25					
Mitre Saw	100	2	200	25	3	75			
Jig Saws	60			25					
Band Saw	60			25					
Shaper—Single	100			90					
Shaper—Double	100			90					
Shaper—Box	100			90					
Tenoner—Single Saw	70	3	210	35					
Tenoner—Knife	60	5	300	25	1	25			
Jointer—Hand	100			40					
Jointer—Self-Feed	35			30					
Boring Machine—Single Spindle	40			20					
Boring Machine—Gang	65	4	260	65					
Boring Machine—Bevel	40			40					
Sticker	40			20					
Planer	45			25					
Linderman	50			50					
Router	40	2	80	20					
Dauber Bell	60			50					
Gainer—Multiple	50			50					
Gainer—Air	50			50					
Cluster Boring Machine	65			65					
Screw Driving Machine	20			10					
Nailing Machine	25			10					
Mortiser—Vibrating	30	10	300	20	5	100			
Mortiser—Oscillating	30			25					
Mortiser—Hollow Chisel	30			20					
Trucking	25								
Sweepers	25	4	100						
Glueing	10								
Saw Filers	35								
Plug Machine	20								
Repairmen	50								
Lock Groovers	75			50					
Portable Tools—Pillar Cleaner	25								
Drop Saw	25								
Stock Piler	25								
Dowell Machine	50								
Dip Conveyor	20								
Pattern Makers	30								
Car Loaders	35								
Stock Pilers	25								
Lumber Stackers	30								
Log Hookers	100								
Derrick Man	50								
Carriage Man	80								
Sawyers	30								
Mill Wrights	75								
Oilers	75								
Edgers	30								
Resaws	30								
Off Bearers	40								
Trimmer Men	50								
Hog Men	50								
Slashers	40								
Laborers	30								
Blacksmith	30								
Log Deck	60								
Slip Man	25								
Tractor Drivers	40								
Inspectors	20								
Stick Saw	40								
Cleanup Men	20								
Tenoner—Double	35	2	70	25	1	25			
Shaper—Box (St. Louis)	70								
Total		36	1,620		14	325			
Foreman: Joe Doe				Rating					1,945
GENERAL FOREMAN: WM. TOWN				No. of Employees					50

APPENDIX B
PLANT 10—MILL

Dept.	Foreman	No. of Men	Rating	Allowance	Bonus
	Popovice	22	220	20	\$5.00
	Bowman	22	220	20	5.00
	Lucier	31	310	30	6.00
	BREFKA	75	750	20	8.00
	Wolnikowski	28	1,655	165	33.00
	F. Elton	19	1,680	170	34.00
	R. Brown	28	2,000	200	40.00
	J. Hicks	26	2,075	205	41.00
RA	FAUBERT	101	7,410	185	74.00
	Harvey	16	915	90	18.00
	Detloff	25	2,090	210	42.00
	Janusch	28	2,135	215	43.00
	Fournier	26	2,210	220	44.00
	Fred. Lutz	32	2,640	265	53.00
RB	SCHMIDT	127	9,990	250	100.00
	Dezelia	6	150	15	5.00
	Beeler	30	750	75	15.00
	Bielaski	31	775	75	15.00
	Joe Okroy	24	780	80	16.00
	Ephofen	27	865	85	17.00
	Luckritz	36	1,170	115	23.00
	H. Rand	44	1,835	185	37.00
	Gerow	45	1,955	195	39.00
RC	VAN SICKLE	243	8,280	210	84.00
	Metzinger	19	1,405	140	28.00
	Rozinski	20	1,435	145	29.00
	Brunner	28	2,180	220	44.00
	Dooley	33	2,170	215	43.00
	Teubert	38	2,245	225	45.00
	Cunningham	28	2,275	225	45.00
	Grahn	41	3,350	335	67.00
RC	LAND	207	15,060	375	100.00
	Lohrman	7	245	25	5.00
	Niewieroski (Sweep)	13	325	35	7.00
	Peller	30	750	75	15.00
	Ruemmele	12	1,560	155	31.00
	W. Jacobs (Checkers)	22	550	55	11.00
	TOTAL	837	44,920		\$1,267.00

CHAIRMAN DUNNEBACKE: There is no question but that the idea of paying a cash bonus to foremen for doing safety work which we generally consider as being a part of the everyday work, is rather revolutionary. However, it is also true, as Mr. Loney said, that any principle or any movement that you want and can put over through a financial means, instead of altruistic ideas, will go over quicker. Now, no doubt there is many a manager who would be willing to pay real honest money for safety work if he knew that he could get that money back. Here is one instance of a company that is doing that. They are actually paying out cash bonuses to foremen for doing safety work, and by doing that they are saving money. It is a business principle. They are not only saving money but back of it all they also get these other things that we get through humanitarian ideas, love of their fellowmen.

For instance, there is one case, Mr. Loney cited, where over the past year they paid \$35 compensation per man in the plant. After they put in the system the next year they paid \$8 and an additional \$4 bonus to the foreman, with a total cost of \$12 against \$35 the year before.

Here is a system, machinery that is all working and has been working for eighteen months. While I am not satisfied in my own mind as to whether we should pay foremen cash for doing safety work, here is a system that is working and actually paying money to the men. As Mr. Loney says, if you are interested in it, and want to go into it, you are absolutely welcome to his machinery.

H. E. MILLER (Chevrolet Motor Company, Detroit, Mich.): I should like to ask Mr. Loney what the reaction has been among the men on the production floor, the

actual producers, on the paying of the cash bonus to the foremen, when they are participating in none of the dollars and cents.

MR. LONEY: I am going to ask Mr. McCarthy, one of the operating men, to answer that question.

M. J. MCCARTHY (Fisher Body Corporation, Detroit, Mich.): Mr. Loney stressed the point as far as the cash is concerned. The cash bonus has gone on for eighteen months, but I want to say that the cash part of it is practically out of their discussions at this time. The bonus affords the plant management an opportunity to see at the end of that bonus period what percentage of reduction has been made in accidents. Consequently, at the end of that bonus period, the whole period for all the foremen, the percentage is worked out. For instance, in one period it might be 78 per cent of the bonus paid. The next period will come along and if the bonus paid is less than the previous bonus period, we have had a greater number of accidents. If the bonus paid is higher, then the accidents have been less, of course. If it is higher, naturally a higher bonus is paid, and if it is lower, someone has to explain why.

The Foreman Sees the Injured Man In His Home

I will mention a welfare point. When a man has an accident the foreman doesn't let it go at that; it is called to his attention by the safety man and the foreman calls at the injured man's home that night to see if there is anything that can be done. He will get him in to work a great deal quicker by showing this interest. Don't forget the cash is some incentive of course. But they all want to get that percentage higher than it was in any previous bonus period. I can cite one shop in particular, the die shop, where in the last bonus period they had 96.6 per cent of the total amount of bonus that should have been paid. An unfortunate accident was all that kept us from 100 per cent.

The bonus is the greatest thing I have ever seen. A lot of people condemn the idea of paying cash to a foreman, but I have worked at quite a few manufacturing plants and it is the greatest thing I have ever seen.

As far as the workman is concerned the cash paid to the foreman seems to have gotten out of his mind entirely. The cash part of it seems to be forgotten. The chart being shown in their plant brings up the percentage. The men in the shop don't mention the cash, but they will speak of the percentage of bonus that was paid. It seems to bring out the point that accidents are being prevented in their department if the large amount of bonus is paid, and the actual cash being paid the foreman doesn't seem to enter into it. I have never heard a complaint about it. But the greater percentage of cash bonus paid in that department naturally makes them feel that they are helping to cut down accidents.

MR. LONEY: I should like to hear from any more of the Fisher Body men here operating the system or in contact with it. Have you ever had any grievance, fancied or real, on the part of the workmen on account of the foremen getting money? If any of you have, I should like to have you speak right up.

MR. MILLER: Our men have never participated in the actual cash plan.

MR. LONEY: The underlying theory is that this foreman, if you want to put it that way, is his brother's keeper in regard to accidents. It isn't the workman's job so much. It is the foreman's job to train the workman to be safe, and the foreman is being paid for his work in training the workmen, and not the workmen. It would be rather ridiculous to pay a man to save himself from getting hurt. The man who trains him, I believe, is entitled to his reward.

O. J. OLSEN (Fisher Body Corporation, Detroit, Mich.): Is Mr. Saborin here? Mr. Saborin is the general foreman over the metal shop; that is metal stampings after it leaves the presses. Mr. Saborin and several others, in my mind, stand out among all the foremen. The first thing Mr. Saborin did was to put his house in

order. That was housekeeping and that is the important part of the whole business in safety. Then he went further and equipped guards on the machines. All right. He wanted to go further than that. There were a lot of accidents occurring in the department. One of them was to a man who was continually going into the hospital for slight lacerations. So he gave the medical authorities a list of his foremen and when any of them had any accidents the first aid attendant notified Mr. Saborin several times a day in regard to them.

By this analysis Mr. Saborin found that a particular man was continually going to the first aid room. He looked into it and found that it could be corrected by putting a little tape on the man's finger; so the man gets this tape on the finger every morning or twice a day.

There is another man in our organization, a foreman in our wood mill, who has about 30 miter saws or table saws. This foreman has gone through 14 months without a lost time accident. The miter saw is a very dangerous piece of equipment.

You talk about the men under the foremen and their reaction to the fact that the foreman is getting a cash bonus. There was some little reaction to that, but it was only in a few isolated cases. I should like to have Mr. Saborin tell you whether in his group of men (I think he has around 250 men) has any experience with that.

Apparently the Bonus to Foremen is Not Resented

S. SABORIN (Fisher Body Corporation, Detroit, Mich.): The fellows don't feel they should be in it because we are keeping them working.

MR. OLSEN: They feel you are keeping them on the job. I think that is a good answer.

There is another man here, in the Press group. Mr. Schnapp, have you heard anything from the men under your supervision about resenting the foremen getting a bonus and they not getting part of it?

MR. SCHNAPP (Fisher Body Corporation, Detroit, Mich.): Not at all.

MR. OLSEN: Mr. Luce has charge of the press shop, is superintendent of it. Mr. Luce, have you heard in your contact with the foremen, anything about it? I know that Mr. Luce is very close to his foremen.

FRANK LUCE (Fisher Body Corporation, Detroit, Mich.): The press room workers are all working on piece work and we find that they like to get the piece work and they don't feel that the foremen are getting too much.

MR. OLSEN: You haven't heard any of the men say that they felt they ought to be a party to it?

MR. LUCE: No, sir.

R. F. THALNER (Buick Motor Company, Flint, Mich.): The testimonial from the foremen is all very well and good, but how many of the fellows come in and kick to the foremen? I think the testimonial you want to get is from the men in the department. They are the fellows talking it over.

MR. OLSEN: Mr. Thalner, I personally have gone down below the foremen.

CHAIRMAN DUNNEBACKE: I am going to reserve any future discussion on this subject until after the next speech. We may then have some time left and may have some more pro and con on the idea.

The third and final paper is one dealing with the question of safety as a part of every foreman's responsibility and the subject is going to be handled by Mr. Art Williams, who is now safety director for the Chrysler Motor Car Company. He has had many years of experience along safety lines with the American Telegraph and Telephone Company. He was last Tuesday elected to the chairmanship of the Automotive Section and I am sure we will get some very good information from Mr. Williams' talk.

Safety—A Part of the Foreman's Responsibility

A. M. Williams, Safety Director, Chrysler Corporation, Detroit, Mich.

I had a very, very nice long formal paper prepared here. I thought a whole lot of it. After Dr. Myers got through this morning I made up my mind I would put it in the waste paper basket. It seems to me that our whole job, before I get down to the subject assigned to me, is keeping this entire safety program and our educational program in very nice balance. What I mean by balance is this: We can start a safety inspector out in the plant and say, "Now, Bill, we have checked our accidents for last year and find that 85 per cent of them could not have been prevented by improved mechanical conditions. Fifteen per cent of them might have been. Therefore, weigh your time and let's go at this 85 per cent."

That is the job that we have to keep uppermost in our minds all the time. Naturally, as soon as he gets down on the floor he runs into Bill Jones and the safety competition is pretty keen. It is over in our place, has been running now for two years, and the management is doing a lot of racing and a lot of rooting. Some are on the carpet for bad records and some for good records, and every foreman is fighting to get his men back; no bonus in it, by the way, but just his own reputation and his own obligation as head of his department; his reputation is at stake. Naturally the foreman says, "Well, when am I going to get that guard on that machine? I put an a.d.o. (as we call them, merely a memorandum) through the maintenance department, asking for a certain machine, day before yesterday, and there hasn't been a darned thing done about it yet. When am I going to get it?"

To get the foreman away from the mechanical side of it and to talk about Bill Jones and Charlie Smith working on a sheeter, with long sleeves, possibly in violation of safety rules, to get him back on the educational side of it, is the big job, because every foreman (I know how they feel because I was a foreman myself for years) looks at the mechanical side of it; he is machine minded, material minded. And he doesn't give enough thought to that third side in the triangle.

I don't know whether we are going to tie a string around the fellow's finger to keep him in balance so that he will have something to remind him or not. If we don't, he is continually being driven right back to the mechanical thing instead of standing on two feet and saying, "Wait a minute, Bill; that thing is going through. I am making a memorandum now and we will see that you get it. But how about these new men down here? You had three new men yesterday. You go over the safety rules with them and see they qualify. They may not be, just through ignorance; they are green here and they may slip. If they do slip your record for the last year and a half without an accident in your department is knocked into a cocked hat."

Naturally when we started this, our foremen asked for help. They said, "If I am going to teach, if my job is partly that of a teacher, what have I got to work with?"

Well, we went through all the educational material we could pick up and you boys have contributed a lot of it. We stole your ideas wherever we could find them, we wrote many of you for ideas; remember the foremen were asking for this information. They were asking for help. We got out altogether six pamphlets, by trades, so that a man could have a first reader in safety to use in teaching the green man about the hazards of his job. We started each one of these with general rules that are common to all of the six.

Then the last part of the book is devoted to the specific hazards of the department that the man is working. "How about these new employees now? We are taking on a great big bunch of men and I can't see all of them. Can't you give us a lift?" the foremen asked.

So we set up a routine at the request of the foremen and when the new employee comes into the employment office and is qualified by the interviewer for the job, he

next goes to the physical qualifier; but before he goes, the qualifier calls his attention to the fact that he is going out on a welding job and there is a book of instructions to welding operators and he will be expected to learn those rules and stand an examination on them. But he doesn't get the book yet. He goes over to the physical qualifier and the physical qualifier notes on the card of introduction that he is going on this type of work. He also, while talking with him and getting his history and writing him up, checks that same angle and says: "You are going to be given one of these books and later you will be examined, because there is a safety campaign on in this plant and if you want to get yourself into ill repute, I don't know any better way than for you to get mugged up in an accident."

He goes back to the employment office and the clerk, after giving him the tools, gives him the book. The man who introduces him to the foreman talks to him on the way out. He is turned over to the foreman and the foreman gives him the final shot and says: "Some time in the next three or four days I am going to get to you and see if you can pass the examination on these rules." In the beginning, the question was whether the men would read the rule books. The question from the foreman was, "Will they read them?" I think they are put across in a friendly way and it brings out one point, if you will permit me to digress. As chairman of the Automotive Section, I am going to submit to the Executive Committee sometime in the next two or three months the plan of standardizing, or appointing a committee on standardizing, safety rules, safety instructions, for use by all of the plants, something that all men who are working in automobile plants will get in the same way, at Packards, at Buicks and at Chryslers. Therefore, when the man leaves your plant and comes to mine he is familiar with these rules, he has been over them and knows what to expect, and what to expect in the way of discipline.

Industry Parallels the Army Organization

I made a few notes here, getting back on safety as a part of the foremen's responsibility.

Industry today tallies very, very closely, or follows very closely the old military traditions of the Army. In fact, when we set industry up in large groups as we have today, we just simply stole the system from military experience; and we should gather this from it, that responsibility and authority always must rest on the same shoulders and cannot be split. There are many safety departments that are made responsible for the prevention of accidents. The responsibility is placed there, and the foremen feel that it is the safety department's job. My job is to get out production. Our job must square with the organization. It must also square with the man in industry as he is. In squaring it with industry, my picture is this, that we must place the responsibility for the accidents back on the same shoulders that carry the authority for the discipline, the authority for the production in each department.

In other words, we can say to the foremen, "There is your safety job right there on the floor, Bill. It is yours, and whatever you do with it, if it is a good record, will be yours; and if it isn't it will also be yours. We are going to help you shoulder it but we are not going to carry it for you. We are going to help you in any way we can. We have a potential malinger in your department which we are going to help you clear up. If you want some help in getting mechanical conditions corrected, we will do that. If you want an instruction book, something that you can sit right down with a man and go over with him, that will simply pin his attention and your attention right down to the high spots that this man must get to keep himself in the clear, we are going to help you.

"We are also going to do this: We are going to put a performance rating on the whole job; we are going to give your department a mark to shoot at and that is going to be determined with the rate of hazards in your department. So that you in

the press room are on an equal basis with the man out here handling material, or the man over here on other machine operations.

"And to get that we have worked out something that we are proud of. It has run a couple of years and the foremen are all sold on the fairness of it, and the man in the press room can compare his department with the man in the other department. We secured the figures from the insurance reports, worked them out and translated them through the wage rates in the different trades, so that it represents the thing in man hours, and the foreman has something in man hours that he can show every man in his employ. He doesn't have to talk to the man in dollars and cents and set up in his mind the thought that the company doesn't care anything about his life, that it is merely a dollars and cents proposition to them. When you talk in hours, that means the hours of time saved, and something of the loss that all of the men will sustain. For instance, here is a report that goes out to the physicians every two weeks. It is a performance rating report. The first is the inter plant, and the next is the intra plant. Each sheet in the intra plant shows each department, the name of the foreman, the number of hours allowed, the number of hours we might expect that we would lose due to accidents; also the number of hours that were actually lost, and then the percentage of hours saved, and they are rated on a percentage basis.

The Original Estimate Very Nearly 'Right

We worked these figures out expecting that we were going to shoot at it at 30 cents per hundred dollars of pay roll rate; and the first quarter that we ran this two years ago we came out almost to a cent. We were only 4 per cent off. This report takes us down to the current quarter, to the tenth of the month. This is the last report I have and there will be one other that will close out the quarter. This shows that, according to the insurance figures, on a basis of 30 cents per hundred dollars of pay roll, we could have expected 39,000 lost hours at all plants—39,000 lost hours. We didn't lose that many; we lost 12,000; so we made a net saving of 70 per cent. That will give you the picture of about what the rate will run for the quarter.

In press rooms (going back for one moment to pin down the 85 per cent theory due to education), we got across to the press operators in our plant this year that our amputations have been reduced 80 per cent. So we can feel we are getting down pretty nearly to the minimum of accidents from the educational side of it, so far as press operations are concerned; therefore, the 20 per cent will be largely the job of better dies and better guarding.

I will wipe the whole slate and bring this one point: If safety is a teaching job we will have to think of teaching and all the fringe that goes along with teaching. In our schools the teacher not only follows the curriculum and gives the student all of the material in the curriculum, but you have the adjustments that that person has to make to social and political life; and there is one big adjustment yet to make and that is the adjustment to industrial life. That is a part of the foreman's job as a teacher, and if in years gone by we had put our teaching on a premium basis or on a bonus basis, I wonder if we would have had the same value and would have secured the same value in this training (as you might call it), that we have secured in preparing young America for the place that he must occupy in social and political life.

CHAIRMAN DUNNEBACKE: We have ten minutes before twelve o'clock and as much thereafter as you wish to take for discussion. I will throw the meeting open to discussion on any of the three papers, Dr. Myers', Mr. Loney's or Mr. Williams'.

E. F. BLANK (Jones and Laughlin Corporation, Pittsburgh, Pa.): I am very much interested in Mr. Loney's paper on this cash bonus plan. It brings up three questions which I would like to ask. First, is not safety an operating problem?

Second, isn't the foreman's job one to prevent accidents or look after the safety of his employes as much as it is to get out production? And third, if this is true, why pay the foreman any bonus to do his duty? Mr. Loney stated that this plan wasn't a panacea for all the accidents. There are a good many other plans. It seems to me there are a lot of simpler plans that will get the same results. I think most of us have ratings and charts in the time and pay roll departments which take less time. It may not be so much work as it appears on the surface.

We are using the competitive plan and think we are reaching the workmen better than we have ever been able to reach them before. I have the same reaction that Mr. Miller had in regard to "Doesn't this react unfavorably among the men themselves?" It is a good thing for the foremen and makes them pay some attention to safety in their departments. I should think a plan which would let the men in would be much better; and as far as getting a reaction from the men themselves, about the only way you can get that is to put some "gumshoe" workman out there and let him find out what the men are talking about. They won't talk to Olsen or McCarthy or to the foremen because they know they are identified with the plan.

CHAIRMAN DUNNEBACKE: Mr. Loney, will you answer that?

Give a Bonus for Safety as Well as Production

N. M. LONEY (Fisher Body Corporation, Detroit, Mich.): If I understand Mr. Blank right, the first point that occurred to him was that this foreman was expected to produce safety as well as production. I am going to ask Mr. Blank an individual question. Does Jones and Laughlin Company pay you a bonus for good performance? The General Motors Corporation does. As you all know, they have a published system awarding every one a bonus according to production. If a man gets a bonus from his production and safety is equally important with production, why not give him a bonus for doing part of his job?

As I said in the beginning, if I conveyed the impression that in my mind this is the only system for securing safety, then I am all wrong, because this is only a tool. We are using all the other tools available. Please don't run away with the idea that we think this is the only way to produce results. As I remember it, the difference between Mr. Williams' system and ours is that we have possibly a little more tangible reward, and the spirit of competition for getting money I think is just as strong as the competition for getting on. I know I am interested in competition for the money I get and I don't doubt that our foremen are interested to know that they are in competition with the other foremen to get this financial reward.

MR. BLANK: Those three questions are pretty well answered. The only thing I would bring out is Mr. Loney's answer with regard to the bonus. As I understand, your bonus is for efficiency and good service. My point is that that bonus should take into consideration the prevention of accidents the same as it does the reduction of scrap, the cutting of operating costs, and it ought to be allied in that same bonus. My thought is that perhaps this scheme is just divorcing safety a little bit from the main event. We try to make safety part of the main event and not a side show.

MR. LONEY: As I stated in my paper, we have some pretty hard boiled production men who fought this system rather bitterly before it was installed. I asked the leader of this opposition, "Do you know of any case where this has interfered with production?"

He answered no; so it has not interfered with production, and the foremen have not sacrificed production to get it. I just want to repeat again that we tell our foremen, "Your job to get safety is just as important as to get production," and possibly we err in over-emphasizing the safety; but some of the departments of General Motors do what you propose. They make a certain assignment, the amount earned on account of safety. As I said a while ago, I believe that if the men

understand what it is all about, you get better cooperation. I don't believe that any manager can go out and explain to his workmen the insurance rating scale which is used in setting up these rivalry systems, which to my mind have this inaccurate feature, that they are somebody's opinion. Here is something that is nobody's opinion except a group opinion. It is a mere matter of arithmetic after you have the group opinion to apply it to the original case.

E. H. COTCHER (Supervisor of Safety, The Murray Corporation, Detroit, Mich.): You might be interested in knowing that the Program Committee of the Automotive Section, in suggesting this pair of papers, had in mind just this discussion that has come out. Psychologists tell us that there are two actuating motives that influence humanity, the financial motive and the vanity motive. As you will note, these two systems take into consideration these two motives and we put this on the program for the very purpose of bringing out the strong points of each of the motives. We mustn't overlook the fact that no individual is actuated entirely by the financial, nor is any individual actuated entirely by the vanity motive; so I have been gratified with the discussion. We deliberately set the stage for it. However, it appeals to me that there is something worth while in both Mr. Loney's proposition and the one that Mr. Williams is conducting, and I think if we follow out Dr. Myers' suggestion and try to dig out what we can from these things for ourselves and go back and see what use we can make of them, we will be doing well.

The Bonus as An Aid to Cooperation

CHAIRMAN DUNNEBACKE: Dr. Myers' talk created a great deal of interest and it just occurs to me there is possibly someone in the crowd who would like to ask Dr. Myers a question on some phase of his subject. I think we still have time for a few words from Dr. Myers if anybody has some particular question he would like to bring up.

H. E. MILLER (Chevrolet Motor Company, Detroit, Mich.): Dr. Myers' message struck me as being so inspirational to all of us, whether we be safety directors, managers, foremen or what not, that I should like to go on record as favoring the printing of his message in pamphlet form. I should like to have a copy of it to keep on my desk as an inspiration for the years to come.

MR. SMITH (St. Louis, Mo.): I think there are two parts to both of these questions that might be well worth considering, and that is the case of the bonus, the fact that the foreman gets a bonus serves as an incentive for the workmen that come under him. In the case of the foreman who does not get a bonus, if he protects himself as a foreman he will get more wages.

CHAIRMAN DUNNEBACKE: The big point for me is, if everyone realizes that through the bonus system his foreman is going to give him more profits and he is reasonably assured that he can work from day to day without accidents, there is his reward. Anything else?

MR. COLE (Acheson Graphite Company, Niagara Falls, N. Y.): During the discussion on this bonus, one gentleman brought out the point that the men were so interested in the percentage that they were carrying this thing on. I believe that this method has been a tool to create interest in safety. I should like to ask the gentleman who made the statement, if he believes now that if they took off the financial payment of this bonus it would interfere in any way with the safety movement in this plant?

CHAIRMAN DUNNEBACKE: That is an interesting question. I should like to know, myself. Suppose you reach your millennium of having no more accidents, or supposing you cut out the cash bonus altogether. Do you feel reasonably certain that the interest in safety would continue?

· **MR. LONEY:** I am sorry I am not able to answer that question. It is a question that often turns over in my mind. All my life I have practiced the theory of not crossing a bridge until I came to it, and we are not anywhere near the portal of that bridge, so I beg to be excused from answering it.

ADJOURNMENT .

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Cement Section

New Section Officers

Chairman, F. E. TOWN, Manitowoc Portland Cement Company, Manitowoc, Wis.
Secretary, A. J. R. CURTIS, Portland Cement Association, Chicago, Ill.
Poster Committee Chairman, R. B. FORTUIN, Pennsylvania-Dixie Cement Corporation, Nazareth, Pa.
Membership Committee Chairman, HENRY A. RENINGER, Lehigh Portland Cement Company, Allentown, Pa.
Program Committee Chairman, R. FRAME, Alpha Portland Cement Company, Easton, Pa.

Retiring Officers

Chairman, R. FRAME, Alpha Portland Cement Co., Easton, Pa.; *Vice-Chairman*, T. F. HALPIN, Marquette Cement Manufacturing Co., Chicago, Ill.; *Secretary*, A. J. R. CURTIS, Portland Cement Association, Chicago, Ill. *Committee Chairman: Membership*, HENRY A. RENINGER, Lehigh Portland Cement Company, Allentown, Pa.

Tuesday, September 27, 1927

R. FRAME, Chairman

**Insurance Manager, Alpha Portland Cement Company,
Easton, Pa.**

The first session of the Cement Section of the National Safety Council was called to order at ten o'clock by the chairman, R. Frame, insurance manager, Alpha Portland Cement Company, Easton, Pa.

CHAIRMAN FRAME: It is a privilege and a pleasure for me to welcome all you men to the Cement Sectional Meeting of the National Safety Council. As you have observed, there are a great many attending the Congress—a larger gathering here in Chicago than we have had for some time. We are grateful to the National Safety Council for giving us these fine accommodations, because they increase our comfort as well as our interest in the meeting.

Everyone here today is vitally interested in the subject of safety. I hope all of you will enter into the discussions. If any questions or any particular points come up I hope you will feel free to ask questions and let us have the benefit of your ideas.

It is not my purpose to deliver an address. We have more important things on the program and we will pass to them rapidly. The Cement Section is to be congratulated on having with it today the chairman of the Committee on Accident Prevention and Insurance of the Portland Cement Association. It shows that his heart is in the right place—he is back of this movement. He has given the very best he has to encourage and to keep the cement industry in the front ranks where it belongs. It is a great pleasure to introduce Mr. J. B. John.

Address

J. B. John, President, Sandusky Cement Company, Cleveland, Ohio.

We are glad to see such a nice delegation here today. The meetings that were held several years ago by this same group brought together about a half dozen men. Our section has grown every year, obliging us to get larger and larger quarters and we hope this progress continues. Last November when Mr. Brown appointed me chairman of the Portland Cement Association's Committee on Accident Prevention, I had several alibis but now I am glad he insisted that I go along with it because it has given me an opportunity to look on the inside and see what is being done. I think it is wonderful the way our work has been accomplished, the strides we are making in such a short time and over such a wide and diversified field. It is amazing with how few accidents we can run our quarries and mills today.

When the association decided several years ago to give a trophy to the plant which had the fewest accidents for the year, one of the plants in the competition had eight or ten accidents a day. I believe they were lost time accidents. The next year there were fewer lost time accidents, but after about the fourth year one of the plants of the Lehigh Portland Cement Co. went through the entire year without a lost time accident. Last year and the year before, I think, two plants went through the year without lost time accidents. The biggest surprise to all of us is that up to to this time this year there are 23 plants without lost time accidents. It is marvelous when we stop to think of it.

Some of the committee are wondering if we will have to buy a factory of our own to make trophies for the mills. They are wondering how we are going to get around to put all the trophies up, but I assure you we will manage it in some way and we would be glad if all the plants could run through the year without lost time accident. Also they would be awarded in one way or another.

This work in the cement industry was started in a small way. It was at a time when we were having many accidents. Many of us felt, as superintendents of the plants, that we knew better how to avoid accidents than some man from Chicago who might come to talk safety.

The job of the delegates and the safety men who came out to help us was all up hill. They were received with the icy stare and obtained only luke-warm cooperation from superintendents and executives. That went on for quite a time. However, things have changed and you would be surprised at the splendid letters we are receiving from the management of the different plants telling us of the great work we are accomplishing. Just last week I received a letter from Mr. Kirk, the president of the Crescent Portland Cement Company, which made me feel that if I hadn't received any more than his letter all the work I have done or can do as chairman of this committee would be well worth while.

Now I want to say to you men here that I know you are receiving the full cooperation of the executives of your companies. However, so far as positive action is concerned, you men are the ones who have to put the work over. You are closer to the employee than we are; you are constantly in and around your plants and you are the

men who must carry on the greater part of the work. But as I stated to you in Cleveland two years ago, if you are doing this work for a salary you have the wrong job—you should request your boss to give you another. To put this work over you must have the welfare of every employee in your plant at heart.

I do hope we can continue our recent splendid improvement. It is a noble work and we have proven beyond a doubt that when we cooperate with one another we can and will accomplish surprising results. I hope all of you will listen carefully to the statistics which very clearly show the remarkable progress that is being made.

CHAIRMAN FRAME: I particularly want to mention Mr. John's reference to the support which is being given to accident prevention work by the executives of the various companies. They have made it possible for us to have this large delegation here and there is every indication that managements throughout the cement industry are strongly behind this movement; more so, in fact, than ever before. I know you were all interested to hear Mr. John state there are 23 plants still members of the Trophy Club. We would like to see every one of those plants win the trophy and those who were wondering just what would happen if they all came through with lost time accidents will no doubt be gratified with Mr. John's assurance that whoever goes through with a clear record will be certain to receive one of these fine trophies.

Next will be an address by Mr. Curtis of the Portland Cement Association, who has been in active charge of this particular activity. The cement industry is to be prided on its plant accident record. Mr. Curtis will tell you in a complete manner what has been done in the past year.

Let me impress upon all of you gentlemen that it is not too soon to start work for 1928. Nineteen hundred and twenty-seven will soon pass away and those who want to go out and join the 1928 Trophy Club could well afford when they leave this meeting to go back to their plants to organize as soon as possible and put new spirit in their work. Get the cooperation of everyone in your plant. Work the hardest you know how between now and January 1 and then you will be certain of having a very fine start. Mr. Curtis.

Report of the Secretary

A. J. R. Curtis, Portland Cement Association, Chicago, Ill.

The Cement Section has at the present time 79 members. It had 70 members last year. During the present year there have been four resignations and 13 new members received. I will read the names of the new members. As I do so you will notice that there is in this organization an increasing number of active concerns that do not manufacture cement. They represent somewhat similar industries which have been classified with us in this section. Here is the list:

- Canadian Johns-Manville Co.
- Fort Scott Hydraulic Cement Co.
- Great Lakes Portland Cement Corporation.
- Hermitage Portland Cement Co.
- Howard Co.
- Lawrence Portland Cement Co. (Maine plant).
- Midland Terra Cotta Co.
- National Gypsum Co.
- Northwestern Terra Cotta Co.
- Standard Sanitary Mfg. Co.
- Valley Forge Cement Co.
- Wilson Portland Cement Co.

It is a dangerous thing to become contented with one's record and I am afraid that to talk about some of our records may introduce a great hazard of contentedness. A good record is worth repeating if it shows up more clearly the necessity and the way to greater progress ahead. Realizing how far we have to go to acquire absolute safety reminds one of the man who studies long years to get an education merely to realize how much he still has to learn.

The improvement of 1926 over 1925 was encouraging. People called it satisfactory. Our lost time accidents were cut from 2,548 in 1925 to 2,174 in 1926. There was a corresponding decrease in the man-hour loss. There was a fine decrease in the fatalities which had previously remained at a relatively fixed rate. In 1925 there were 61 fatalities and in 1926 there were 45 fatalities.

Referring to our June no-accident drive, there may be some thought that an effort lasting only a month is hardly right in principle. But it seems to me if any safety effort ever justified itself this June campaign did. The exhibits in this room demonstrate some of the benefits of the campaign that you might not otherwise become acquainted with. But what are these exhibits as compared with the great exhibits we might bring here of 142 less men injured than during the preceding June? What are these exhibits compared with the five lives as represented by the reductions from the fatal accidents of June, 1926?

Our June record has given us a new basis of comparison. We found we could decrease accidents to 26 per cent of the rate during the preceding June. This was because we all pulled together. I have never seen anything in the cement industry to compare with the way everybody join hands from the presidents all the way down the line. I have heard of only one man who refused to cooperate, and he was dismissed.

Look at the workmen's pledge cards that have been placed around the room on these bulletin boards. You can hardly realize the thrill that came to us as these pledges came in package after package. Several thousand a day came in during June—individual assurances of earnest workmen that they would put the campaign across. That is the spirit that made it possible for us to go through with 26 per cent the number of accidents suffered the year before.

Fifty of the Mills Had a Unique Experience

Superintendents tell us there was the greatest satisfaction in the plants that never before succeeded in operating an entire month without an accident. Approximately 80 mills out of 133 that finished the campaign with perfect records had at some previous time operated a month free from accidents. But there were fifty mills, approximately, that never before had been able to operate a month without an accident. Practical operating men will recognize this as more evidence of the earnestness and hard work which characterized this campaign.

If anyone desires to count the results of such a drive merely in material accomplishment, I might call attention to the fact that the public and press supported the move better than anything else undertaken by the cement industry during the whole year. It is gratifying to know that our sincere and genuine safety efforts are rewarding us handsomely in good-will advertising.

In any study of accident records such as ours there is difficulty in comparing the large plant with the small plant. We have plants in the industry employing several hundred men and others with perhaps fifty. The greater hazard faced by the big mill is obvious. Therefore, I would like to comment particularly on the fine showing being made by the large mills. Some have not succeeded in winning a trophy, as yet, but they are doing fine work nevertheless.

I would like to accord the Lehigh Portland Cement Company that recognition to

which it is entitled by mentioning it here at this time. Everyone of its 20 mills came through June without accident. There are many others, of course, that probably have done as well proportionately but the Lehigh stands out because of a number of mills and man-hours involved.

I spoke of the immediate benefits of the June campaign. You naturally wonder what followed. There were 101 lost time accidents in July as against 50 in June, with no way to account for the increase except "letting down" such as we used to feel, as children, when school was out.

I was disappointed when the report came to me showing 101 lost time accidents for July. However, that was about 50 per cent of the number suffered during the preceding July, which reported over 200 lost time accidents. Cutting in two our July accidents is certainly a record not to be sneezed at.

The August record was also significant. In 1926 we had 220 lost time accidents; in 1927 we had 144. We had six fatal accidents in August, 1926, and only three in August, 1927. As the figures stand at the present time we have had approximately 400 less lost time accidents and 8 less fatalities than we had at this time last year. In 1926 we had 45 fatalities; in 1927, to date, we have had 22.

One great reason why we succeed in our safety activities is that the foundation work consisted of developing a fine system of reporting and recording accidents with their causes and consequences. Great credit is due all of you for the way the reports are sent in. I hope you will continue to see that these immediate reports get into us right away, and also that the finals are sent in without delay. In don't believe there is another section that is able to as quickly and as closely focus on its problems as we are, because there is probably no other section that has the records behind it. An efficient reporting system is the backbone of successful safety work.

Plants With Clean Records So Far in 1927

I would like to read the list of plants that have operated so far this year without accident. These fellows are all entitled to congratulations. There were six plants which had operated without accident up to this time last year, while a similar list this year contains the names of 23 plants. They are as follows:

- Alpha Portland Cement Co., Martins Creek No. 3, Pa.
- Alpha Portland Cement Co., Ironton, Ohio.
- Bessemer Cement Corp., Bessemer, Pa.
- Canada Cement Co., Ltd., Belleville, Ont.
- Canada Cement Co., Ltd., Hull, Que.
- Cowell Portland Cement Co., Cowell, Calif.
- Diamond Portland Cement Co., Middlebranch, Ohio.
- Kansas Portland Cement Co., Bonner Springs, Kans.
- Lehigh Portland Cement Co., Tola, Kans.
- Lehigh Portland Cement Co., New Castle No. 1, Pa.
- Lehigh Portland Cement Co., New Castle No. 2, Pa.
- Lehigh Portland Cement Co., New Castle No. 3, Pa.
- Lehigh Portland Cement Co., Oglesby, Ill.
- Lehigh Portland Cement Co., Ormrod, Pa., No. 3.
- Lehigh Portland Cement Co., Sandts Eddy, Pa.
- Louisville Cement Co., Speed, Ind.
- North American Cement Corp., Hagerstown, Md.
- Pacific Portland Cement Co., Cement, Calif.
- San Antonio Portland Cement Co., San Antonio, Texas.
- Texas Portland Cement Co., Dallas, Texas.
- Universal Portland Cement Co., Duluth, Minn.
- Universal Portland Cement Co., Pittsburgh, Pa.
- Virginia Portland Cement Corp., Norfolk, Va.

To those who represent the plants which have operated so far this year without mishap, I would advise doubling your efforts along every line which you know to be advantageous in preventing accidents. Don't get this far along and then drop out. We have had several sad letters from those who had worked hard, put their time and heart into it and then lost out by some foolish little accident.

The Portland Cement Association is interested in seeing you win this prize. When a group of men as sincere in this work as the portland cement executives are, put up a prize for successful plants they don't want you to lose out. They are anxious I know to give trophies to the 23 who still have perfect record. In fact, I don't know how they would pay for them, but I know many who would be anxious to give 150 trophies. As you will appreciate, it is quite a strain to pay for a lot of trophies which cost about \$600 each. Taking two men to the Spring Meeting costs at least \$200 on the average. On the present list there are several from the Pacific Coast and other distant points. Taking all the necessary expenditures into consideration each trophy award costs the Association well over \$1,000.

But isn't it worth it if we can save lives and prevent accidents and wipe out compensation and other costs of one kind or another? We must also consider the improvement in operating efficiency and morale.

I am sorry to say that there are still a few plants that have a lot of accidents. The trophy contest is most interesting to perhaps 50 per cent of the plants that have the better records, while those who are down in the dumps feel they have no chance for the trophy and the scheme probably does not appeal equally to them. There are about 25 per cent of the plants that don't seem to be making as good progress as they should. One or two are quite bad. One, for example, has had 139 lost-time accidents this year. There isn't any other mill near that. Another has had 65, another 31, another 27, and so on. So one of the things we want to focus our attention on this coming year is the mill who is habitually way down the list and doesn't make comparable progress.

Twenty-Two Fatal Accidents During the Year

There have been 22 fatal accidents so far this year, 4 of them being due to slides. I think two of those slides were coal slides, one was a stone slide and one was a cement slide. In the cement slide the man was blown out of an old type wooden stockhouse by the slide and pushed into a screw conveyor. There were four fatal accidents of the railroad type, due to either men being run over or crushed by cars. There were three fatal accidents due to contact with machinery, two fatal accidents due to screw conveyors, that is, a man stepping into a screw conveyor. There were two burned to death and four electrocuted. There were several other minor shocks and burns but four electrocutions are entirely too many. There was one death due to premature explosion so far, one drowning and one case of a bucket falling on a man. There is apparently more care being exercised in the handling of buckets and in inspection of cables. Bucket and cable accidents show quite a decline. There is apparently less care being exercised in the packing and shipping departments. You probably notice in the list of significant accidents—and it is true of a large number of minor accidents that we don't report—that packing house carelessness is too prominent a feature.

You are familiar, of course, with the winning of the trophy last year by the Mitchell plant of the Lehigh Cement Company, and the Fort Whyte Plant of the Canada Cement Company. The delegates appeared in accordance with the terms of the contest at the spring meeting of the Portland Cement Association and received the formal award from the President of the Association at New York, and then on May 28 the Mitchell trophy was dedicated at Mitchell, Indiana. The Mitchell dedication has made the means of getting a great deal of good will in the community.

The attendance was estimated at 1500 to 2000. The people in the town are learning to look toward the cement plant not as a liability, but as a source of good things to the community.

The school children marched down in costume, and there was an athletic tournament and a barbecue. The company in that case took the winning of this trophy not only as an occasion on which to celebrate a safety record, but also as an opportunity to help the public appreciate the cement mill as a community institution.

The second trophy at Fort Whyte, Manitoba, was dedicated on July 25. Since the plant is reached from Winnipeg only over a mud road and there was some probability of rain the company arranged a guest luncheon at the leading hotel in Winnipeg and later took the visitors out to the plant in cabs. The mill closed down and the employees, with their families and friends, enjoyed a splendid occasion. I presume there were 350 people in attendance at what proved to be a real town affair. The manager of the western lines of the Canadian Pacific Railroad and some of the officials of the Canadian National journeyed a long way to attend. Local officials and industrialists to the number of about 40 were present. We are looking forward, hopefully, this coming year to the possibility of having a great many of these affairs.

One of the outstanding developments of the year was the regional safety meetings. All of them proved successful. The idea of holding eight meetings worked out splendidly. The first one was held at Birmingham. We had the full cooperation of all of the public utilities and industries around Birmingham. There was an attendance of 71 men representing ten cement mills. The next was held at LaSalle on March 21. The attendance included 161 men, representing 13 mills. At Kansas City on April 14 the attendance reached 66, with 11 mills represented. The meetings at Allentown on May 20 was the largest of all, with 235 men present and 29 mills represented.

A regional meeting was held at Detroit on July 12, being the first meeting of this kind there for some time. There were 48 men present, representing 12 mills. At Albany on August 2 there were 91 present, representing 10 mills. We have one meeting of the series yet to be held on October 25 at Los Angeles. All of the California mills are getting together for a fine meeting.

Early Planning for the New Year

We are all much interested in the Safety Trophy Contest of the United States Bureau of Mines. The trophy is donated by the Hercules Powder Company. The cement companies have been winning that trophy quite regularly. There is just one trophy and it has come to the point where there is difficulty in awarding it. Some 14 quarries had perfect records and the judges had a tough time of it trying to make a fair award. The trophy went to the North American Cement Corporation quarry at Martinsburg, West Virginia, which had the greatest number of man-hours of any quarry with a perfect record. It is noteworthy that twelve of the fourteen quarry organizations which came through without an accident belonged to cement companies.

The thing which is likely to do more than anything else to raise our general level this year is to make sure that the general safety committees meet by the middle of October for the purpose of planning for next year. The general committees should submit the matter to the departmental committees and get their plans started. At a meeting early in November the plan should be put in final shape and on December 1 it should be announced to all employees. That will give the workmen a month to think about it before the new program becomes effective. It won't be a case of waiting until after the first of the year to perfect the plan which should have become operative January 1.

CHAIRMAN FRAME: I think you will agree that Mr. Curtis has been very much on the job during the past year. The records he has quoted are quite remarkable in themselves and should offer a great deal of encouragement to us. I know there are a lot of new faces here today, as well as a lot of others which have been seen

with us on previous occasions. The finest part of these meetings is the discussion which usually follows the papers.

W. R. DUNN (Vulcanite): I am very sorry to say this is my first appearance at a meeting in a good many years, but I have come to the conclusion that to get real meat out of this safety proposition one must attend the meetings. What you hear looks different from what you see in the pamphlets or the reports that you receive from the association office. It has been my practice heretofore to have the younger men in our institution attend these meetings because I felt they were in closer touch, they were the ones who should attend so as to derive the most benefit from what they hear.

When we hung that flag up at Vulcanite we had no idea we would go through the month without an accident. Before that there wasn't anything to indicate to the men that we did want to get through without an accident. But when the flag went up they immediately conceived the thought that that meant no accidents. In fact, they look at the flag every day as they go by and I am going to ask them whenever they pass the flag to salute and take their hats off. If we can get them into the habit they will always have the safety idea before them.

You have said quite a lot today about the trophy proposition: in fact, it has been hinted that it is going to cost a lot of money. I hope it will not cause the Portland Cement Association to go into bankruptcy due to the many trophies they will have to hand out. But if there is anything like that going to come about I would suggest before it reaches that point that the companies themselves buy a trophy for their employees, because I feel they will appreciate that even a great deal more than if they received it from the association.

Medicine for the Chronically Sick Plant

C. L. ADAM (Universal): Mr. Curtis' report mentioned a number of plants that are not improving. My suggestion is that we get into personal touch with the plants that haven't been doing so well. I would suggest at the earliest opportunity that Mr. Curtis, if it can be arranged, visit those plants personally and if possible arrange a meeting with the responsible executives of those companies and show them how far down the line they are, if they do not already know. I believe that personal touch is going to cost a little more money and time but I think it will be well worth it. One visit to each of those plants, in my opinion, would be worth six months of correspondence.

CHAIRMAN FRAME: We certainly do want to get at the plants that are way down the scale. We have a wonderful opportunity to do some fine work. We had made no headway in cutting down the fatal accidents.

C. F. STODDARD (Bureau of Labor Statistics, Wash., D. C.): I want to rise for two purposes. One is to congratulate this association on the work it has done in accident prevention. My second purpose in rising is to introduce myself because of my connection with the Bureau of Labor through which all of these statistics are supposed to come. I want to urge upon the association and the various organizations or plants in the association that these accident figures be compiled and sent in with regularity. That was brought to my attention fortunately by the last report of the Cement Association. These reports usually come to my desk and I review them and fix them up for the *Monthly Labor Review*. In the last report I noticed particularly there were quite a few who did not report completely. So the report itself was not complete. Presumably most of those plants are in states that require regular accident reports and it would not be much trouble for those reports to be duplicated and sent to the association so they can be included in our general and annual report.

I want to urge upon the plants to send in those accident reports, and that they

report not only the number of accidents, the fatal accidents and so on, but the man hour, and all the various details that are required and necessary to make up an accident report.

I want to close by asking the secretary one question if he has the information at hand. He mentioned the fact that 23 plants have gone so far this year without a lost time accident. I am just wondering in how many of those 23 plants the records extend back beyond the nine months of this year. I believe it would be interesting if the figures are at hand to show how many of those plants have extended back into 1926 showing more than the nine months without a lost-time accident.

CHAIRMAN FRAME: Practically all of those plants started their clear record earlier than January 1, 1927, but the trophy rules require that the 365 days start from January 1, and that is the reason for our reference to it in that regard.

L. M. McDONALD (Canada): I would like to say a word in regard to the work of the Portland Cement Association for the past year. Without a doubt we have obtained more material to work on at the plants during the past year than any previous year in the history of the association. Undoubtedly many radical changes must have taken place in the association to have made it possible for that material to come out. I realize perfectly that it gave them a great deal of work. For that reason some appreciation should be extended to the association for the work entailed. Many of the circulars that we have received did in some sense or other pertain to the cement industry, but I believe one of the greatest assets that we have had is the summary of accidents which have taken place each and every month.

Each Accident Should Spur on the Safety Work

Now all cement plants have similar hazards. Whether they exist or not, you never find out until you have an accident, and by comparison of those accidents which have transpired from month to month in the various plants you sometimes pick up something of a hazardous nature which exists unknowingly in your own plant. I believe the greatest material for safety meetings that can be handed out is a summary of those accidents. I sincerely hope that every member of the cement industry will take full advantage of the material which is given in those reports.

You have got to profit by an accident to go ahead in accident prevention work. But why is it necessary to have an accident if you can profit by the experience of somebody else?

I believe those who have been behind this accident prevention work this year should be congratulated for the material they have sent out because of the great benefit and help and assistance it has been to the plants during the past year. It has helped more than anything to have 23 plants today in the running for the trophy. I sincerely trust it will continue. If it is in their program for the coming year I would certainly most heartily endorse it.

CHAIRMAN FRAME: There are many in this room who fully agree with Mr. McDonald's remarks. I think he refers to a report that bears the title, "Significant Accidents in a Certain Month." I know Mr. Curtis has a great supply of these bulletins at his office. If you can use more, or if you want to distribute them to your foremen, or your safety committees, if you will write to Mr. Curtis I am sure he will give you a full supply and will do it willingly.

T. F. HALPIN (Marquette): In Mr. Curtis' remarks a while ago he said something about planning ahead, and I am wondering if he had in mind any definite plan for the coming year.

MR. CURTIS: When we have found a plan that gives reasonable success, it is wise to continue it a while before abandoning it for another. Several of our 1926 activities may well be continued. In general, we will use two kinds of activities—

the cooperative and the competitive types. The trophy is a competitive type scheme. The No-Accident campaign is a cooperative scheme. It doesn't work until every fellow adds his help. I believe the No-Accident campaign will be worked again next year, although I believe the next time we do it we will make some changes.

There are a number of new ideas available. For example, providing a card and button for the man who works safely for a whole year. The cards can have the year stamped across them in big letters in some way so they can be a little different from the ones issued the previous year. A suggestion has been made to give a medal for conspicuous acts in safety work. I feel that the significant accident report is something we ought to be making good use of. You can have as many as you can use. One of the companies distributes eighty copies.

One thing I didn't report on, which might be worth while mentioning, is the progress of the *Accident Prevention* magazine. Last year I suggested increasing the circulation of this magazine. During the year the distribution to mill men has been trebled and we are not through yet. A recent survey showed that 70 per cent of our men read the English language as well as speak it. I think perhaps some men who don't read English very well will get some benefit from seeing this magazine occasionally. In a thing of this kind there is no economy in not sending it to everybody who will be benefited. During the next month or two will be an especially opportune time to send in your suggestions for increasing our mailing lists.

G. A. LAWNICZAK (Alpha): I have been thinking since we have a trophy for those that go the whole year without an accident we ought to have something for those that go through the no-accident month. Take the June campaign—we have six letters in the word "safety." For every plant through the month without a lost-time accident the word "safety" should be sent to them in a gilded gold or bronze.

CHAIRMAN FRAME: Thank you, that is another idea. We are always looking for increased interest in the campaign.

We will pass on to a subject that is of vital interest to everyone engaged in accident prevention work. You will all agree that if we can interest workmen in the safety game it will mean a quick solution of all our problems. We are particularly fortunate in having with us a gentleman who is capable of discussing this particular viewpoint from every angle. I take great pleasure in introducing at this time Mr. W. P. Sabin, assistant to the president, Ash Grove Lime & Portland Cement Company, Kansas City, Missouri.

How to Interest Men in Their Own Safety

W. P. Sabin, Secretary and Assistant to President, Ash Grove Lime & Portland Cement Co., Kansas City, Mo.

I am glad the subject assigned to me did not read: "How to *keep* men interested in their own safety," because the human mind is so constituted that we are *more interested in creating* than in *using* what we create. We are by nature explorers, inventors and creators. The green fields in the distance, the dim horizon, the unplumbed depths, the vast undeveloped resources about us, the untried, the untasted and the unfelt all beckon to us until we become restless and dissatisfied with our environment, our conditions and our possessions, and soon lose interest, wholly or to a degree, in the things with which we have become familiar.

We see this simply illustrated in the play of a young boy with building blocks. He will painstakingly build a house and immediately knock it down, in order to build another. In the natural functioning of this normal human instinct, when untrained and uncontrolled, we find the explanation of our variable interest.

Self-interest should lead a man to exercise every precaution to preserve his physical body intact. Fear of pain, pride in physical strength and personal appearance, fear of being a dependent on the charity of others, desire to maintain earning power, ambition to succeed in a chosen vocation, responsibility for the welfare and protection of a family, a sense of the unfairness to those who may have to share the blame or help bear the burden, and an unselfish desire to help others should be sufficiently motivating influences to keep every man constantly on guard against physical injury. These influences should operate naturally, and they will where men have been trained to *think*. The men who take the initiative in accident prevention, and are most active in carrying on the work, are the thinkers.

The benefits derived from thinking seriously about safety matters have been put in another way in the statement that educational safety work has been responsible for 75 per cent of the progress made in accident prevention. In view of this fact, it would appear that educational methods are worthy of a very large part of our attention. Such methods should be considered as appeals to reason and instinct. A man who knows no fear may be reached through his home affections, through his pride, his ambitions, or his instincts. Men do not live merely to toil; they live, as well, to play, and, as a rule, are easily reached and interested through appeals to their play, or sporting, instincts.

Willing Interest Stimulated by the Campaign

One of the objects of an educational safety campaign is to create and maintain *willing* interest.

"Some one said it couldn't be done;
Some one said that it could;
Everyone found that it was easily done,
When everyone said they would!"

It is much better to have the whole-hearted support of an employee than to have the half-hearted cooperation which results when you compel a man's interest. What we want is real interest and a man cannot be really interested in something he knows little or nothing about and in which he does not have a willing, active part; therefore, he should be interested, informed and given something to do.

It would appear from this premise that the responsibility for the initiative rests with the employer, and this fundamental principle has been fully and repeatedly demonstrated in my company's experience, extending over a period of twenty years. Due to the inherent personal injury hazards of our business, to the human element, to the absence of mechanical safeguards, and to the inexperience of the staff in the prevention of accidents, our early accident record was not one of which to be proud. However, very early in our operating experience the management saw the need of doing something to protect our men against personal injury.

About this time, our legislators conceived the idea that personal injury accidents could be prevented by legislation, and so they filled our statute books with laws, expecting to legislate accidents out of existence. Like many others, we accepted the idea and spent much thought, time and money equipping wheels and shafts and gears, and other dangerous equipment and places, with mechanical safeguards. This was a good safety step but we have since learned it only went about a fourth of the way. An enclosed screw conveyor did not keep one of our night-shift men from falling into it, after he had removed a section of the lid and dropped off to sleep while sitting on the edge of the box.

A belt and rope, left hanging on the wall, did not save a workman from suffocation in a rock tank; and the track anchor, left hanging in the cab, did not save one of our engineers from death by scalding when a locomotive crane tipped off a fifteen-foot trestle.

I could tell you of other similar instances, but those mentioned will serve to emphasize the relative unimportance of such devices where the individual has not been sold and trained on safety first. We soon discovered the fallacy of the effort to legislate accidents out of industry and turned to the really effective method of preventing accidents: namely, interesting and educating our men to the importance of constantly thinking in terms of safety first. Due to labor turnover and other difficulties attendant upon efforts to maintain steady interest, this was not, nor will it ever be, a small job, but we feel we have made some progress, since, with a force of 300 men and a plant comprehending every operation from stripping in the quarries to loading the finished product into railroad cars, we have had only one lost-time accident since March, 1926. We tried many plans and methods and made some progress before the improvement was notable, but we kept at it persistently. We put up posters and warning signs: we had safety committees; we had a dummy figure which climbed a ladder—one step for each day without a lost-time accident; we had barbecues: we had mass meetings on the plant lawn in which prominent outside safety workers participated, and we finally went a whole month without a lost-time accident.

Operation of the Safety Court

Then, we organized a safety court, with Judge, Prosecutor, Sheriff, and Jury. In this court, any employee could prefer charges against another employee for any infraction of safety rules or disregard of personal safety. The accused was permitted to choose his own attorney from among his fellow employees. Court sat one night each week and was open to the public. We were striving at this time to get all of the injured to report for first aid. We made progress, but during the life of this experiment we had two lost-time infection cases which were due to failure to secure first aid.

During the twelve months following our no-accident month we conducted a Safety-First and First-Aid campaign, stressing the danger of infection in small cuts, scratches and nail punctures. The plan and result of this drive is described by our efficiency engineer, Harold E. Williams, in a paper read at a district meeting of the National Safety Council in Kansas City, Missouri, last March. He said:

"During this period, the lost-time accidents gradually decreased until the last three months, in which time we had no lost-time accidents. However, the total number of accidents reported also dropped, showing that either our total accidents were growing less in number or that, as was suspected, only the number of the more serious accidents was on the decrease. On the latter assumption, another safety drive was inaugurated, this to start July 1 and end December 31, 1926.

"One noteworthy feature of this drive over anything that had been previously done was the executive work of the committee in studying the effects of different kinds of propaganda. As a result of this study, it was decided that although the posters we had been using had their effect, they lacked punch because they did not apply specifically to our local conditions and thus had no personal appeal.

"In an effort to overcome this deficiency, a large board was erected, across the top of which were nine white bulls-eyes, with an electric light in the center

of each one for night display; the first three for April, May and June, the months just past in which we had had no lost-time accidents, and the last six for the succeeding months to the end of the drive. The light and bulls-eye were to change to red for any month in which we had lost-time, the others to remain white as before. At the bottom center of the board were the date numbers, which were to change to red in the same manner. In the center were placed the two hands of a clock, one pointing to the date, the other to the month. To the right and left of the numbers indicating the day, were placed two bulletin boards, one for general safety, suggestions and cautions, the other for local items only. The local items were to call attention to safety infractions by individuals. These were obtained from reports made anonymously by a local secret service from within our own organization, after which they were edited and placed on the bulletin board. These bulletins were generally in the form of tactful ridicule, without disclosing names, although in a few instances, where the offender was persistent, the names were given and a bit of the tact removed from the ridicule.

Four Teams Compete in a Safety Race

"By this system many unsafe practices were eliminated. At first this was due undoubtedly to the individual's horror of being ridiculed, and later to his change of viewpoint, caused by environment; he, not knowing who belonged to the secret service nor at what time he would be reported for an unsafe practice, began to take stock of his own indiscretions."

From the standpoint of lost-time and decrease in total number of accidents reported, this six-months' safety drive was quite satisfactory, but there were two minor cases of infection, with no lost-time, but nevertheless showing that we had not yet succeeded in getting all accidents reported, and so (quoting again from Mr. Williams' paper):

"It was decided to divide the employees into four teams; each team to have a captain in the plant and a lieutenant in the quarry. Each team also had a color, a name, and was represented by a wood image of a mule. These mules were placed on a wooden race track on the front of the safety board. This track was divided into 186 spaces, thus making six spaces per day for a 31-day month, the spaces per day remaining the same for any month, regardless of the number of days in the month.

"The rules of the race were as follows:

"First—For any team without an accident for any day, the mule representing that team would advance six spaces.

"Second—For any employee sustaining an injury drawing blood, and receiving first aid, five spaces would be advanced.

"Third—For any employee sustaining an injury, not receiving first aid within thirty minutes, an advance of only one space would be made.

"Fourth—Every month was to be a heat, and every year a race, there being a prize given the team winning the race. Each member of each team was given a button of the same color as the mule representing his team, which button was to be worn at all times while at the plant.

"Each man was personally interviewed by the captain of the team to which he belonged and given the following instructions:

"First—To get first aid for all wounds, regardless of how small, the explanation being that any wound, puncture, splinter, or anything in an eye is a potential case of infection and must have treatment within thirty minutes, this limit being based upon the efficacy of iodine.

"Second—To report to the first-aid station anyone sustaining an injury, with-

out first aid, first calling the individual's attention to the fact that he should receive treatment.

"After a few days under this system, it became apparent that a court of last appeal was needed to pass on disputed cases where first aid was not administered. Our assistant superintendent was chosen to act as judge on such cases, and very few have come before him in disputed cases that have not lost their case, his assumption being that they were guilty of not seeking first aid or they would not be there, and this seems to be the correct attitude for the majority of such cases.

"The following figures show that this system had at last accomplished what at times has appeared impossible, viz., getting the men to report for first aid.

"The month before putting this system into effect, we had five men report for first aid.

"The first month under the new system, 68 reported—11 failed to report within 30 minutes.

"The second month, 73 reported—9 failed to report.

"The third month, 126 reported—3 failed to report.

The Record Due to a Change of Viewpoint

"While a large part of this record is due to competition direct, we believe the greater part is due to change of viewpoint and will eventually be due entirely to this change. As a concrete example of the effect of environment in an effort of this kind, I will point out the instance of one man who sustained a slight injury and refused to get first aid on the ground that it was 'all foolishness'. Since this first offense, he has never failed to get first aid, as he found his viewpoint was very unpopular with his associates."

While this may appear to have been a drive to secure prompt reporting for first aid, the effects of the campaign were much more far reaching and were undoubtedly due to the interest created. Just how effective it has been may be gathered from the following comparison:

In 1925, we had 20 lost-time cases, which resulted in 163 days of lost-time at a cost of \$1.13 per hundred dollars of payroll.

In the first three months of 1926, we had 11 lost-time accidents and 54 days of lost-time at a cost of 5c per hundred dollars of payroll.

Since March 31, 1926, we have only had one lost-time case with 16 days of lost-time at a cost of .0126 per hundred dollars of payroll.

This improvement we attribute to three things:

First: Creation of interest.

Second: Steady maintenance of interest.

Third: Prompt reporting of injuries, thus permitting first aid in time to avoid lost-time.

Recognizing the necessity of keeping the fires of enthusiasm burning, the committee in charge of our safety work planned to have a monthly contest in connection with the mule race, and at the end of the April heat the winning captain challenged the captain of the third team to a contest in horse-shoe pitching. At the same time, the captain of the second team challenged the captain of the fourth team to a game of marbles.

The horse-shoe pitching contest proved to be quite an exciting event. The game of marbles started off a little slowly, as neither contestant had shot a marble since his boyhood days, but as it progressed the contestants became more skillful and toward the end of the contest each was able to hit a marble after ten or fifteen minutes of earnest effort. The result of the game was perhaps due more to endurance and determination than to technical skill.

At the end of the May race, the winning captain challenged the captain of the third team to a game of baseball. The game was umpired by the captains of the other two teams. This was a fast and exciting game. At the end of the second inning, when the excitement was running high, some of the spectators conceived the idea of "egging" the umpires because of unfair decisions and favoritism, and the plot was executed with wet asbestos.

Three of these contests were held at the noon hour, making it possible for most of the men to attend. The baseball game was held at 4:30 p. m. and was attended by every man who could be spared from his post of duty.

Many of the plans and methods we used were temporary in character, as such plans and methods must be if interest is to be maintained, but a few have been of a more permanent character, and, in fact, are still in use, to-wit:

We have always striven to impress upon the minds of new employees the hazards connected with their work, and with the importance of unceasing vigilance against accidents. At the time they are employed men are especially anxious to please and the necessity for working safely can be more easily impressed upon them when their minds are in this receptive condition.

Quite a number of years ago we adopted the plan of making our accident prevention work a section of our semi-monthly foremen's meetings. We had established the practice of having the foremen get together for a conference, dinner, and entertainment at the close of the day. At first, these meetings were held every two weeks but latterly, due to improved conditions, they have only been held monthly. It was our idea that by making our staff of foremen and department heads our safety committee we would be more likely to reach and interest all of them, and through them the individuals in their respective departments. The plan worked so well it has been continued for years without question.

Good Housekeeping an Important Part of the Work

In addition to this general committee, there is a sub-committee composed of three men, which is changed from time to time. Their job is to make a periodical, general inspection for unsafe practices and conditions.

We also learned through our own experience, and by observing the experience of others, that "good housekeeping" is an important factor in keeping down accidents, and therefore we inaugurated some years ago a monthly Clean-Up Contest. The results have been so satisfactory we have never felt like discontinuing it.

Another thing that has contributed to a better showing on accidents has been our physical examination requirements. Every man who seeks employment with our company must submit to a thorough physical examination by our plant physician and surgeon. This enables us to reject the applicant if he is unfit for any job we have open, or, if we can use him, to place him where he can work safely so far as his physical defects are concerned. Subsequent examinations are made yearly, semi-yearly, or more frequently if necessary, in order that any serious physical defects which have developed may be caught.

We believe that these plans have been successful because they have had the willing support of the men. They have benefited from the physical examinations, they benefit from, and enjoy, the monthly Clean-Up Contests, and the safety section of the foremen's meetings has always been full of interest.

Let me repeat, "The responsibility for the initiative rests with the employer." In order to secure a man's interest in safety, the employer must put a premium on safety, and definitely line up with safety in such a way as to appeal to and

engage a man's attention and interest. A man thinks of the thing in which he is interested, and if he thinks safety he will work safely.

The employer must *show his interest* by providing proper mechanical safeguards and safety devices, by adopting and insisting on safe practices, and by keeping the spirit of safety alive in the minds of his men.

The problem of interesting workmen in their own safety has been successfully solved in various ways by many industries and employers of labor. There is no *one*, royal way—there are *many*, and they vary in effectiveness according to the time, the place, the mood, the environment, the number to be reached, the method of presentation, and the personality of the leaders. However, any plan presented should be carefully analyzed before attempting to carry it out. A plan that will work in one place may not in another. A plan that will work with ten men may not be at all suitable for a hundred men. An idea that will appeal to a hundred men may fall flat with five hundred. That is not all—a plan that would “go over” fine with one group of 500 men may have absolutely no appeal in another similar group.

The Wide-awake Foreman Is an Important Individual

The greater portion of our industrial safety effort today is spent in organizations of considerable numbers. With a large group of workers, the limited time and opportunity, and the impossibility of sufficient personal contact with each man, we must resort to group and mass work insofar as the main body of an organization is concerned. Key men can be, and should be, labored with individually. They in turn can pass the information and enthusiasm and spirit along through subordinates, sub-foremen, and gang bosses to the individual workers. But individual work must be supplemented and supported by plans and methods which in their presentation and execution will have group and mass psychological appeal, such as committee meetings, safety publicity, bulletin boards, slogans, suggestions, safety rallies, sport contests, and general educational work.

The real wide-awake, sincere foreman, the type that feels in his heart that he is responsible for the safety of his men, is an extremely important factor in getting and keeping workmen interested in accident prevention, and the principal safety committee should consist of foremen. The foremen should be held responsible for accidents in their respective departments, and should see to it that a committee of one or more workers is appointed or elected to function in each department; this committee to work with its foreman and to be changed every thirty or sixty days.

This may be the means in many cases of changing the attitude of a worker from one of antagonism to one of friendliness, for as soon as he feels a responsibility for promoting safety, he becomes interested and an active booster. While the various measures used seem more or less temporary in character and benefit, they are cumulative in effect and the ultimate result will be the formation of the *habit* of thinking and acting safely under all conditions and circumstances.

The work of an active safety committee is always noticed. We see them when they make their inspections, and also see the results of their inspections in safer jobs and cleaner working conditions. Furthermore, as already pointed out, a man who has been on the safety committee makes a better and more careful workman, for he has not only been obliged to think, act, and live safely, but his experience in safety work has educated him to its importance.

Safety First is not a movement that will continue indefinitely from its first momentum. We must keep it vitalized by feeding it new ideas, and since it

is a psychological law that thought, sooner or later, passes over into action. It is important that all our efforts should be of a constructive nature, and of sufficient frequency to favorably influence individual behavior.

According to a Spanish proverb, if you live with wolves, you will learn to howl. Let us add a safety-first proverb to our accident prevention literature:

Live with Safety-First enthusiasts and you will learn to be a Safety-First booster!

CHAIRMAN FRAME: Mr. Sabin's paper fairly bristles with new ideas. I know he is willing to answer any questions which you would like further information on concerning the various methods they have used in his plant. I know you are asking yourselves this question: Has it paid to go through with the different methods at this Ash Grove plant? But it is well emphasized by his statement that they have had no accidents since March, 1926. It seems to me, Mr. Sabin's plant is well on the road to complete not only one year without any accidents but they are going to do two years just as easily as they have accomplished one.

Essential That Bulletin Boards Be Well Kept Up

I also wish to mention his reference to bulletin boards. It seems to me no bulletin board can meet with full success unless it is well kept up and is an important object around the plant. Also, his reference to physical examinations, and I want to call your attention particularly to this secret service in effect at his plant. I think that is what we need to bring to light the unsafe practice on the part of the men while they are in their shops or while they are at their work around the plant. It has always seemed to me that is what has contributed to accidents.

His court of inquiry is another thing of great importance. We will go into that further this afternoon about fixing the responsibility for accidents. Mr. Sabin is here and will answer any questions.

MISS J. A. WEDER (Giant): I would like to ask Mr. Sabin what they have done about physical examinations. When you instituted it what did you do about old employees who had some condition that you knew was a hazard to the industry?

MR. SABIN: When we instituted physical examinations at our cement plant we had to take into consideration the old employee. We have some employees who have been with us for a quarter of a century. For that reason we decided if we found the man who had physical defects, which seemed to unfit him for the job he was on, we would endeavor to place him elsewhere in the organization where he would not be subjected to any particular strain. We applied that rule throughout and it worked well.

E. SHEA (Marquette): I think it was mentioned here this morning that 70 per cent of our workmen speak English and read English. I would like to know from the speaker or any other representative where conditions exist where they have foreign workers who don't speak or read English, how they deliver the message of safety or accident prevention work?

MR. SABIN: I am sorry I cannot answer that, because our employees are all English-speaking excepting a few Mexicans.

D. ADAM (Lawrence Portland Cement Co.): In our plant we have about eight different nationalities. We have Hungarians, Slavs, Russians, and others. When a new man comes into the plant we immediately get an interpreter. Generally, our foreman can talk sufficiently to the men to make them understand.

G. W. BURGESS (Missouri): We have that problem, gentlemen, of foreign labor. We have Poles, Hungarians, Russians and Mexicans. We find it rather easy to reach these fellows by reason of having men around or close to our executive staff who can interpret the language. We are fortunate in having some foremen who are linguists. They also translate the messages we receive from the Safety Council. We have these messages translated and the bulletins that we place on the board

translated into the Slavish, Russian, Czechoslovakian, and Mexican languages. We find it creates a good deal of interest when those fellows can walk up to the bulletin board and read something in their own language.

MR. SHEA: How do you post that? Do you post the English literature right along with the foreign?

MR. BURGESS: If we want to reach the Mexican we post the English with the Mexican. If we want to reach three of them we post the three right along side each other.

F. H. SASS (Universal): We have quite a few non-English speaking men in our plant. We have 25 to 30 different classes of men out there. However, we believe in telling it to them in English. We are Americans and we believe in dealing in English. However, at our safety rallies throughout the week we have an interpreter who interprets to the men who can't read. You take the great majority of these men and you will find they are married and have children at home who attend the public schools. This written matter that we get up is all printed or written in English and they take it home and have the children read it to them. We don't put up any bulletins in any foreign languages whatsoever, outside of the warnings on heat prostrations and so on.

Dealing With the Foreign-born Employee

A. VAKSDAL (Corning Glass Works, Corning, N. Y.): A few years ago I was a foreigner myself, but I am an American now. I never found it difficult to understand a safety campaign. If you put things up in such a way that they don't have to read it, such as the flag in red, yellow or gold meaning no accidents, the fellows know what it means whether they can read English or not. There are many foreigners who can't read their own language and you can't reach them any other way than to put such things up and let them see it for themselves.

J. R. CLINE (Universal): We have a system in our packing and loading department of asking a man, a Greek or a Spaniard, or some other foreigner, to make up a paper to read at his own local safety meeting. They have written in English and delivered by these Spaniards and Greeks in English, but they are delivered in their own way to their own class. Another thing, all these fellows can understand pictures. The bulletin board is well kept up.

Another thing we do at our safety meetings is to tell these fellows to take their safety home. We feel we are doing everything possible to make safety in the mills as it should be. If they follow out what they are told they will be safe in the mill, but the biggest thing is to tell them to take their safety home.

F. B. HUNT (Nazareth): We probably have more of the foreign labor to contend with at our plant than anywhere else. In fact, when we started our June campaign we had four men speaking in four different languages along with the English language to start that campaign off, and we got good results. We also worked through the foremen as Mr. Adam of the Lawrence company just mentioned.

No doubt you men who are from the east, who attended the Allentown regional meeting of the Lehigh Valley Safety Council, remember how Mr. Farace spoke in Italian. Mr. Farace is a yard foreman at Plant No. 3 of Alpha (by the way, one of the plants which has had no accidents since May, 1926). They are getting results by using those same men in that way.

We have another method which has given good results. We use in our pay envelope a safety magazine which fits right into the envelope. Perhaps some of you men are familiar with it. It is called the *Safety Pin*. We have been getting good results from it. We have found that a number of foreigners take it home and their children read these safety slogans and safety bulletins and in turn explain these bulletins to their parents.

CHAIRMAN FRAME: I think it is a great mistake for any one to neglect his for-

eign employees. They have proved themselves on many occasions to be a very reliable source of labor. Now a loss in one of those families means just as much to those people as it does in any American family. A foreign widow has just as much of a struggle to get along without her husband as anyone else. It seems to me we have to do more constructive work with these foreign employees and I think it is a great mistake for anybody to neglect them. They can be reached. There has been a lot of evidence shown here whereby it can be done.

The gentleman who reported he was a foreigner not so long ago, you will notice, is now a master of English. Without him telling us we could hardly know what his past experience had been.

R. B. FORTUIN (Penna-Dixie): We have numerous one-month campaigns during the year, and recently we had a three-month campaign. We arrange a mass meeting for each one of our campaigns and at these campaigns we have some foreigner, or someone speaking in a foreign language fluently, such as Hungarian, Slavish or Russian, explain the high lights of the campaign. After we finish with that we take two or three of these foreign interpreters around to our foreign element and they explain the campaign to them. We find we get wonderful results in this way. In addition to that all our signs throughout the plant are printed in the foreign language.

Get the Men to Learn the English Language

G. C. HUTH (Universal): The present immigration law, I believe, has made this proposition a whole lot better than it was before. We attempt at our mill to get these foreign fellows to learn the English language and become thoroughly American. This is just a suggestion and might work with some of the mills. We haven't hired a man for the past five years who refused to take out his first papers.

MAJOR RENINGER (Lehigh): In some plants where we have as high as 62 per cent of foreign labor, we find the foreigner will pick up the English language far quicker than we will pick up the Polish language if we lived over there. We have had very little trouble keeping these men in safety work, and some of the records we have made were made in plants where we have as high as 50 to 60 per cent of foreign labor.

We have gotten along with the posters of the Safety Council through some of our foreign foremen who can talk English. Once in a while we have an interpreter to explain what they are for. We have endeavored for several years to get as many foreigners as possible to go to school. The company runs a naturalization school and tries to get these men educated to the extent that they can take out their first papers and become American citizens. We haven't had to make any great special effort to educate the foreigners. We find with their children in school, if they get any piece of literature to take home, they have their children read it and explain it to them.

It has been our custom for the last few years to give one of our safety calendars to every man in the organization. They take those home and I personally asked a great many of the foreigners: "Do you know what is on the back of it?" And they reply: "I get my boy to read it," or "I get my girl to read it." They take them home and someone in the family knows enough English to get the message. We have gotten excellent results and we don't have any more accidents with foreigners than we have with Americans.

J. SELLWOOD (Duluth Furnace Co., W. Duluth, Minn.): I would like to ask Mr. Sabin a question relative to the physical examination given the older employee. Do you have one final examination or do you have them at stipulated times? We at our plant are putting through all our new employees with a physical examination, but as yet have done nothing to find out the disabilities of the older employees.

MR. SABIN: We applied it to every employee at the plant when we took it up,

regardless of the length of service. Every employee since then has been examined. At the present time an applicant can't get on the force without first submitting to an examination. There is a subsequent examination. Those usually are about a year apart.

MISS M. JORDON (Indiana): I would like to ask Mr. Sabin one question about his court of inquiry. Does it create any ill-feeling among the employees if a man has been found guilty by a jury of fellow employees? If he is found guilty how do you fine him for his disobedience of the rule?

MR. SABIN: So far we know there has been no ill-feeling created. The matter is handled very tactfully. The lawyers are selected from their own ranks. They are fined in various ways, but it is more the thought of being up before the crowd than anything else.

MR. LAWANZAK (Alpha): This physical examination of men is a very vital question in many communities. We have never put on a physical examination for that reason. I was always a little skeptical whether it would go through or not. I wonder whether Mr. Sabin has any figures to show whether it really paid, and whether sending the men into the departments they would fit in decreased the number of accidents.

MR. SABIN: That is a bit difficult to answer as to whether or not the accidents were decreased. We really think they were for this reason. We have some accidents which unquestionably resulted from physical defects. We found a man dead one day. The post-mortem showed he had heart trouble. If he had been examined he wouldn't have been employed in that position. We had three cases of that kind. So I think I can say that physical examinations definitely decrease the number of accidents, at least the number of fatal accidents.

DR. E. M. PARTLETT (Pittsburgh, Pa.): I examined about 1,700 of our employees some five or six years ago and found that 33 per cent had hernia, which is a matter to keep in mind from the standpoint of accidents as well as compensation; 28 per cent had other troubles. I think about one-half of the men operating motors and engines were color blind and quite a number were flat-footed, and so on. I think it is excellent from a safety standpoint and health standpoint, and also from a morale standpoint to have these physical examinations.

G. C. HUTH (Universal): There is a pertinent question that comes up in connection with this physical examination. Almost every red-blooded American likes to earn his own bread and butter, but what is to become of these men who are disqualified from employment? We are having the physical examinations in our plant and as time goes on more of the industries will have it. I am wondering what is going to become of the poor fellow who can't get a job.

G. W. BROWNELL (North American): We have for the past five years given a physical examination to all of our employees. I am sure the examination has more than paid us. The men in whom we found defects we asked to sign a release. By that I mean a man with perhaps hernia would go on record as being in that condition and anything that would aggravate it or make it more serious would naturally be taken into consideration before compensation was awarded.

ADJOURNMENT.

Tuesday Evening, September 27, 1927

The Annual Dinner meeting convened at eight o'clock, Walter J. King, president of the National Safety Council, acting as toastmaster.

MR. FRAME: It gives me extreme pleasure to introduce to you as our toastmaster, Mr. Walter J. King, president of the National Safety Council. It is certainly a great pleasure to be favored with Mr. King's presence and I am sure we are all going to enjoy him in this part of our meeting this evening.

TOASTMASTER KING: Everyone hates a toastmaster. I think I was selected because they know I can't make a speech. I don't think a toastmaster should make a speech; he is simply here to introduce the men who can talk.

I listened to the superintendent of the Lehigh Portland Cement Company, Mr. Weitknecht, of the Mitchell plant, I was very much impressed with his address. That thought he put across today of prevention was fine. You have got the stuff to put it together, cement, which is a fine thing. As one of the officials of the National Safety Council it gives me a great deal of satisfaction to know what you have accomplished during this past year. Just think, 100 per cent membership!

I have a friend in your organization (some of you may know him), Major Reninger. The Major has kept me very thoroughly informed regarding your activities and it is a matter of congratulation from all of us who know what you are doing.

Tonight you are going to hear from a speaker whom you will all enjoy. Mr. Isaiah Hale is well known to most of you. There is only one thing about Isaiah—he doesn't talk very loud and those of you who are sitting in the back of the room will have to be quite attentive in order to hear what he has to say. Hale, the gang's all here.

Address

Isaiah Hale, Superintendent of Safety, Atchison, Topeka and Santa Fe Railway System, Topeka, Kan.

I have no idea why I have been wished on you tonight, and there is a fear in my heart that before I go much further some of you, too, may wonder why I have been. I feel sure, though, I am not the first man without merit who has horned himself into your program. It isn't a difficult thing to arrange, when you have a friend or two who may, or may not, tell the real truth about you. A single engagement of this kind isn't always the real difficult thing to arrange; the task is to get in here and then get back to the street; because many a man who has come here on a program of this character, care free and buoyant and hopeful, never lived to get back to the street with his reputation as a talker or his self respect quite intact.

The reason for my presence is so mysterious that I am reminded of the story of a policeman who saw a fellow leaning over the rail looking into the smooth surface of a stream flowing underneath. After watching him for an hour or so he walked over to this man, tapped him on the shoulder and said, "What are you doing here?"

Slightly inebriated the fellow said, "I was just looking."

"What were you looking at?"

"I was just looking down there."

"What were you looking at down there?"

"I was looking at the moon; that is the moon isn't it?"

"Yes, it is the moon, but what of it?"

"That's what I want to know. If that is the moon down there, tell me how the hell did I get up here?"

So many more times have I sat out where you fellows are than I have stood here, that sitting out there I know mighty well what comes into your mind. You settle back as comfortable as you can and say to yourself, "I wonder what sort of a bird this is we have with us tonight, and how long he is going to take to wear out his welcome?" I once heard some men talking, after listening to a fellow blow his own horn. They were comparing the fellow who talks extemporaneously with the fellow who reads a formally prepared paper; and one old fellow who had suffered often and much said, "I like to have a guy get up and read his paper because when he reads it you can watch him and when he gets down to the last sheet you know that *that bird is through*." But I am going to do neither. To avoid the chance of making a detour and getting off of the road, I am going to take the liberty of looking at some notes. I shall keep in mind, too, that old one comparing a speech with the wheel of a wagon, in that the longer the spoke the larger the tire.

A Common Sense Viewpoint of the Question

I shall only be able to hit the high spots in what I want to say, and following my usual custom I shall talk very seriously. I am going to do my best to talk common sense to you in spite of the fact that one of the most uncommon things in the world today is common sense. I recall I didn't even get any advertising out of this introduction, but as information I am the safety superintendent for the Atchison, Topeka and Santa Fe Railway System. I want to talk to you fellows much as I would to a bunch of our superintendents, trainmasters and master mechanics, who correspond to your managers and plant superintendents.

You may not agree with me in what I say. I concede your right to your own opinion; what I say to you is merely mine. As a place to start, may I suggest the viewpoint of your employee on life, as a whole? His mental attitude toward his job is the most neglected asset in your business today. It isn't necessary for me to thrash over a lot of old straw to tell you something of the aims and purposes of the safety movement, because you know quite as much as I do about it. With us, our first effort was the same as yours. We began safeguarding our machines and cleaning up the whole property, only to find, after we had spent oodles and oodles of money and years and years of valuable time, that all we had done had gone for a little more than naught, because we were not making any inroads on our casualty toll.

I then did a little mental cruising in what had theretofore been an uncharted sea, with the result that I made up my mind that in a changed viewpoint, in a little different mental attitude toward his jobs, lies the thing which alone will make a man an efficient and a safe workman, that will let him get out of the rut and out onto the broad highway of life where the going is much smoother and the route toward success is more direct and sure, provided only you can change the man's viewpoint and make him reasonably sure of himself.

Safety is only a by-product of any number of things. We might just as well talk of loyalty, and efficiency, and integrity and faithfulness. The one obstacle which, more than any other, has impeded your progress along safety lines is a disinclination, or at least a lack of inclination, on the part of a great many men to give its aims and purposes a careful and serious enough thought to determine for themselves whether or not it is worthy of their own interest and support. And therein lies a second obstacle in front of the first one, because my observation

has been that a surprisingly number of men are constitutionally opposed to any effort so laborious as thinking seriously about anything.

Some of those from whom we had a right to expect the most, foremen among them, were very slow to warm up to our safety work. Not because they were hard-boiled, not at all. I believe it was rather because many of them were loath to believe that there is or could be any better working system than that under which they had worked for many years, and for which they felt a certain responsibility because they helped bring it about. It was because of their failure to fully realize the meaning of or appreciate the wonderful privilege and possibilities of foremanship.

Safety more than any one policy sponsored by your management or mine, must rely upon supervision, not only for its advancement, but for its very life. The foreman is the keyman. Not only what the foreman may say in the presence of his men but, more important still, the manner in which he says it, will either breathe life into the cause or choke it in its infancy.

Contrary to a too common belief, safety is not something that will ever boil up from the bottom, if it ever permeates the fiber of your organization, or mine, it must percolate down from the top. There is no need to try and sell the safety idea to your rank and file until your management has been sold on it.

The Accident Is Not Seen In the Making

Foremen are seldom eyewitnesses to accidents. There comes over my desk every report of an injury to a Santa Fe man and I don't believe I have seen a report in two years in which the foreman admitted he had seen the accident; but too often, fellows, the foreman fails to see the accident in the making. Too often he fails to see in an irregular practice a personal injury in the making, which, if continued long enough, will ultimately cause an injury. I have an idea that when many men have been made foremen, they were not exactly clear as to just what a foreman is. So they went to the dictionary, turned to the word foreman and found that a foreman is an "overseer." They said, "That is all right as far as it goes, but what is an overseer?" They then looked up the word overseer and found an overseer is one who oversees, one who looks things over, one who overlooks—and so the foreman has been overlooking a good deal ever since.

Too many foremen have an idea they must watch their men; they must stand guard over them, if you please, to see that they make more than a mere bluff at doing an honest day's work. In my humble opinion it is the first duty of management, and a foreman is part of management, to feel and to show an interest in their men. I tell our foremen that their first duty is to give their men a right viewpoint on their relationship with the Santa Fe Railroad; if they have not the right viewpoint they are not the men we want in our employ. That applies equally to the foreman and the man. I tell them it is a foreman's duty to give their men higher ideals, to teach them not only their own individual responsibilities but to give them a decent appreciation of the rights of other men; and above all to make them see in their job the best friend they have in the world.

I argue with our men that if our job is our best friend (and it is), that it is only a matter of common decency and fair play for them to treat their job like a friend and be good to it. I frequently, almost daily, ask our men if they have ever tried to appraise their job in money. I ask a man who earns \$150 a month if he realizes that that is 6 per cent on \$30,000. The man earning \$200 a month is getting 6 per cent on \$40,000. I ask them if they guard their jobs as zealously as they would \$30,000 or \$40,000 in a safety deposit vault? As a matter of fact, a man's job is worth more to him than the money it represents, because if he so wills nobody in God's world can take it away from him. On the other hand, a man who has a job worth \$150 a month has more than \$30,000; he can increase it

to a \$40,000 basis almost over night if he wants to, and in much less time than he can increase his hoardings from \$30,000 to \$40,000.

I claim it must not only be the duty of foremen, but their very great privilege, to make their men realize that this thing of doing only what is necessary to get by is never quite enough; it should be the duty of foremen to make their men realize that the secret of real happiness or success doesn't lie in doing the things we like to do but in liking the things we have to do, regardless of what they may be. They should make their men see in their job a stepping stone for today and not a resting place for tomorrow. They should make their men realize that two-thirds of promotion consists of motion; and, fellows, it is just as true in the accomplishment of it as it is in the spelling of it. They should make them realize that the limitations of any man are not the things he wants to do but can't, but the things he doesn't do because of laziness or indifference. They ought to make their men realize that while it is easy enough for a small man to make a big job shrink, it takes a big man to make a small job grow. There isn't on our railroad today a job that cannot be made a bigger and better job, nor is there one in the cement industry.

Trying to Boost the General Morale

I use a good deal of emphasis in trying to make our men realize that this thing of giving counterfeit labor in exchange for honest labor isn't a good basis on which to work, because the man who gives counterfeit labor for honest wages becomes in time exactly what he thinks and acts—a counterfeit himself. The man who hides out on his job during the day and cheats you and steals from you every chance he gets will never be a credit to you. This thing of following the path of least resistance is the thing that makes rivers and men crooked. Give me the man that follows the path of least resistance and I will show you a crook at heart.

I no longer follow the old orthodox way of talking safety, as I did when I started fifteen years ago; I never go around and tell a man, "Don't do this and don't do that." To the limit of my humble ability I am trying to boost the morale of our men; I am trying to increase their loyalty. My real ambition will never be reached until I can put in their minds and heart an ambition to be somebody and to do something worth while.

Safety isn't something that a department head can ram down a man's throat. In the first place, getting it that way would not do any good; he must want to believe in it. His conversion, when it comes, will come when he has the wish and determination to pick up the banner as an honest-to-God crusader because he believes in principle that safety is right and just. I never heard a finer story on cooperation than was told in one of the National Safety Council conventions some years ago; it was so long ago that I hope very few of you who are here tonight have heard it. It was told by Mr. Kettering, vice-president of the General Motors Research Corporation. You may easily imagine what Mr. Kettering has above his ears. He said—and I am going to take the liberty of repeating it—"I once stood upon the shores of one of our seas and while standing there my attention was directed to the myriad of little pebbles that lay at my feet, pebbles that seemed to be serving no useful purpose. As I stood there I couldn't help but wonder what thought the all-wise Creator might have had in mind when he lined the shores of our seas with that endless fringe of pebble. Shortly after, I walked down the shore a considerable distance, and I came to a gigantic seawall thrown up by the hands of man and which in the intervening years had, on a number of occasions, turned back waves that would have brought destruction and chaos and loss of life. Imagine my surprise when upon examining that wall I found it was made almost entirely of those little pebbles which I had thought were serving no purpose at all. I couldn't help but draw a parallel in my own mind between those little inconsequential pebbles on the

shore of the sea and ourselves who are little more than consequential pebbles on the shore of the sea of life. Like the pebbles, we serve no very useful purpose until we are brought into close and intimate contact and relationship with other men and held there by the cement of mutual understanding and trust."

I tell our men on our railroad that when we all understand each other and trust each other as we have a right to understand and trust each other, some day (though I may not live to see it) we are going to build a safety wall around our property which in the years to come will turn back those waves which have brought physical suffering and heartaches and sorrow into our homes. I remind them, too (as I would now remind you), that just as that concrete wall would have been weakened in its construction by the absence of any one pebble in it, so will this safety wall we are trying to build be weakened by the absence of each individual Santa Fe man who does not make himself a part of it.

The Fundamental of Sincere Cooperation

I received a new slant on cooperation the other day when I heard of a man who was asked what is meant by cooperation. He thought a moment and he said, "Well, as I see it, the first essential toward cooperation between me and others is for me to make myself so other men can work with me." There is a lot of food for thought in that for the man who has difficulty in working harmoniously with other people. We are very prone to attach to the other fellow the responsibility for our failure to do that. The real fact, if we only knew it, is that other people not only find it difficult but often impossible to work harmoniously with us—and with us means with you and with me.

I am just hitting the high spots here, and am sorry I've not the time to enlarge on some of these thoughts.

I have never had any hope of carrying my appeal to the rattle-headed, irresponsible type of man who has no aim in life beyond getting and cashing his next pay check; who has no definite purpose in life, who daily follows the path of least resistance, and who, lacking this definite purpose, is a floater and will some day find himself washed up as a bit of wreckage on the shore of the sea of life, bitter and sore against the world because time has brought success to other men and only defeat and disgrace to him.

One of the problems of every big organization is the man who knows a lot of things that are not so (if you get me). My observation on that is that the thing a man is down on is generally something he is not up on, and that opens a very wide and expensive field for whatever educational efforts that man's supervisor may feel himself equal to. It isn't often difficult to locate the distributor in your ranks because the man who is against something always talks louder than the man who is for something. I am warning our men against the "ballyhooer" who comes around and tells them about their inalienable and God-given rights as American citizens, and a lot of other rot of that kind. Neither you nor I have any rights until we prove ourselves worthy of them. I am warning our men against those fellows who tell them they must stand for their rights, that all men are born equal, which is more rot. It may be true, fellows, that all men are born equal, but let me remind you that it is your own fault if you remain that way.

One of my pet ideas is that one of life's hardest bumps will come when a man tumbles to himself. As an illustration of what right thinking and wrong thinking may do for a man, it has been but a comparatively few years since Walter P. Chrysler, whose name adorns the radiators of a good many cars on our highways, was an engine wiper at \$1.80 per day in a Santa Fe roundhouse in a little Kansas town. As an engine wiper, he was a good one, and had he so willed, I doubt not, he could have been wiping engines there today, perhaps at a slightly increased pay. However, he didn't choose to stay there. While other men were listening to soap-box orators

and attending secret meetings in some back room where they were told how their rights were being taken away from them, and all that sort of thing, Chrysler was burning a midnight kerosene lamp and putting onto a tracing cloth the gasoline engine he afterwards put upon the highways. I would like to remind you, as I do our men, that if Mr. Chrysler should step down from his eminence in the business world and go back to that little Kansas town, he would find any number of his old associates who cultivated that wrong viewpoint toward their jobs, who listened to these agitators, who five years ago in July walked out of Santa Fe service on a strike, and who since that time have been walking the streets of that town, out of a job because they have been unable to get work anywhere else. The really pathetic part of it is that most of those men in a short time would have been entitled to an old-age pension that would have kept them in reasonable comfort as long as they lived.

I wish you men would go back and tell your men, and especially your young men, that loyalty is one of man's cardinal virtues, loyalty to his government, loyalty to himself and to his job. The most worthy of human achievements, and what ought to be the greatest of human desires, is to be useful; and one doesn't have to be a genius to be useful, because industry and faithfulness and integrity will make a winner of any ordinary man. The man who tries to do something and fails is entitled to lots more credit than the man who tries to do nothing and succeeds.

An Ambition to Be Somebody Worth While

Some day I am going to make a safety talk and from the time I begin until the time I sit down, not once am I going to mention the word safety. Rather, I hope I may be able to say something that will put into the hearts and minds of men an ambition to be somebody and do something worth while. I wish I might do that because someone has said that the height of service is helpfulness to others, and I can conceive of no greater service to another person than helping that man to find himself. It isn't every man that knows what he is worth. You may have heard of the fellow who showed up at the employment window of some large industry and asked for a job. The agent nodded to him to come inside and later on was told, "I will give you a job."

The man said, "What will you pay me?"

The foreman said, "I'll pay you what you are worth?"

"Well," replied the man, "I wouldn't work for that."

And it isn't every man who knows what he is worth! I feel that you men should constantly remind your men that just ahead of every man in your service there is a better job than his and just behind him is another job not quite so good. Some day, in the very nature of things, there is going to be a shift, and that man should daily ask himself, "When that shift comes which way will I go?"

Within the last few days I had the pleasure of talking to one of our large shop organizations. I reminded them (and this is only a thought for you) that no man in our service was ever recognized because of his record at being the first man to reach the clock to punch out when quitting time came. I said to them, "I really believe if I were you fellows, I'd be on the job a few minutes before eight o'clock. I'd change my clothes, lay out the day's work as far as I could and actually have it under way when the starting whistle blows; and then I'd give an honest day's work for the honest day's pay I felt I was going to get, and if I didn't feel I was going to get an honest day's pay I wouldn't stay a minute. I'd work along happily until the quitting whistle blew, and when it blew I'd look at the job in my machine and if I could finish it up in a few minutes I believe I would finish it. Then I would change my clothes and wash up and I'd check out in a more or less dignified and orderly way." I noticed some of them smile, and I said, "I know what you fellows are thinking; you are saying to yourselves, 'Oh, but Hale, that isn't being done!' I know it isn't being done and that is just exactly the reason why Hale would do

it." It doesn't take much of a man to do the things that everybody else does. I ask you as I asked them, how long do you suppose a young man in one of our shops could do that sort of thing when the general foreman or the master mechanic came by and said, "Who is this young chap who seems to be so interested in his work?" We give too much concern to what the job cannot do for us and not quite enough to what we can do for the job. A lot of men are so busy planning what they will do tomorrow, they forget all about what they planned yesterday to do today.

I am not asking our men for their interest in this safety movement; I am asking for their enthusiasm. I want them to add their heart service to their head and hand service. The very best work in your line of endeavor or mine is done by the man whose conscience won't let him do any other kind. And so I can't get very far nor stay long away from the thought underlying all I've said to you, that in a changed viewpoint, in a different mental attitude toward our job lies a panacea for most of our industrial ills. I honestly believe that, through awakening of this ambition, our advancement in responsibilities, our acquisition of things every man wants most in life, the respect of his family and friends—all absolutely depend on the man's mental attitude toward his job. Roger W. Babson, probably the world's most eminent statistician, recently announced that only one man out of 50 in America ever thinks; that only one man out of 500 ever originates anything, even an idea that is worth anything to anybody else; and then he said this (and please get it), that at the age of 50 years, 53½ per cent of the male population of America are down and out and have quit.

Management Carries Responsibilities Not Always Recognized

To me, it is a very sad commentary on our much vaunted civilization and intelligence and our talk of brotherly love, and that sort of thing, when we are told that at 50 years of age, at what ought to be the best years in any man's life, that 53½ per cent of us have quit cold. Do you know why they have quit? In my opinion, it is because they never tried; they never tried because they never cared; and they never cared because they never had the right sort of influence from men like you, and possibly from men like even my humble self.

I would remind you that management, which is supervision, carries with it responsibilities that are not always, or even often, recognized. An impressive number of summers and an equal number of winters have taught me a lot of things. They have taught me, for one thing, that other people treat me just about as I treat them; they have taught me that when I go out looking for trouble I never have any difficulty in finding it, and they have taught me that the Golden Rule is the sum total of all wisdom for getting on in the world. I want to tell you men, many of whom are in authority over large bodies of men, that it isn't the Golden Rule when you take flesh and blood and make out of it nothing more than a mere commodity at an agreed price per hour or per day. I tell our foremen that the man who builds tracks or bridges or locomotives, or makes cement, and who does not at the same time undertake the task of building character among his men, presents a mighty sorry spectacle as a leader of men, and as a foreman has no value whatever.

We hear a great deal today about service. Service is only a modern symbol for countless human virtues that have been known since the beginning of time. Service was a mother solicitude for her children; service was in the long hours of toil that your fathers and mine gave to us; in the hardship endured and the burdensome debts unrepudiated; it was all of these and a million other little things that only the Recording Angel will ever number. But service is the

one thing that every man must put into his job or into his life if he ever expects to take anything worth while out of either one of them.

I don't believe that success in life is ever possible except through service; there is no open gateway to success, fellows; if you reach it, you must climb the barriers, not always or often an easy thing to do. The pity of it is that multitudes go wandering through the years looking for a break in the wall, for an easy way through, only to lie down at the end of the trail weary, and disappointed and unsatisfied. John Burroughs, the naturalist of California, said before his death, "A man's life may stagnate as literally as water may stagnate," but just as motion and direction is the remedy in the one case, so is some definite purpose and activity the remedy in the other."

Less and less each year is the world condoning or excusing failures in men; and more and more every year is the world bowing down and kow-towing before the man who early in life made up his mind what was right and then had the guts to go ahead and do it, regardless of what anybody else did or what anybody else thought. In railroad just as in manufacturing, catastrophe is only a step or two behind integrity; and if you will go with me and look under the hood of any failure stranded along the great highway of life, we will find there unmistakable evidence of where some fellow tried to use a substitute for common honesty. There is no substitute, there never has been, and yet you and I know men who are daily trying to use a substitute and hoping they may get by with it.

I can't tell you how very happy I am to have been here with you. I have appeared in many cement plants over the country, and I am very happy to be here for no other reason than the fact that Lester T. Sunderland has been a life-long friend of mine and there isn't a man in the world for whom I have more respect. Certainly I recall no one who in the same measure and in the same way held out a helping hand to me in my youngster years when I needed help. I only hope someone may tell him that I have been here. I should have stopped right there, but let me tell you one of the privileges of foremanship is to reach over and lean out and offer a helping hand to some poor devil who is in a rut and who only wants a kindly word and a little bit of encouragement from you.

There is something pathetic about a rut. I heard it said not long ago that a grave is often the last six feet of a long, long rut. A poor devil lives in a rut and is laid away in one.

In expressing my appreciation to the officers of the Cement Section and to Mr. King, it would be amiss not to tell you how very grateful I am to you for your very close and sympathetic attention.

(The members arose and applauded.)

TOASTMASTER KING: Mr. Hale, I think I voice the sentiment and the opinion of everyone here in this wonderful audience when I say you have rendered this company a great service. You have run true to form in giving us what you have given us. It is a real contribution. It has made this evening complete. I am mighty glad you have been with us and we appreciate all you have done.

Have any of you boys anything further for the good of the cause? If there is nothing further, I wish to express my appreciation and thanks for your kind invitation to be with you this evening. It has been a most enjoyable evening.

ADJOURNMENT.

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Cement and Quarry Joint Session

Wednesday, September 27, 1927

**R. FRAME, Chairman Cement Section
Insurance Manager, Alpha Portland Cement Company,
Easton, Pa.**

**L. R. CARTWRIGHT, Chairman Quarry Section
Vice-President, Mid-West Crushed Stone Company,
Indianapolis, Ind.**

The joint session of the Cement and Quarry sections of the National Safety Council convened at two-thirty o'clock, R. Frame, insurance manager, Alpha Portland Cement Company, Easton, Pa., presiding.

CHAIRMAN FRAME: This session is a joint meeting. As many of you men know, the cement and quarry industry have a lot in common and it has always been the practice to have one joint session at which we could discuss the subjects pertaining to our mutual interest.

I am going to ask Major Reninger to announce the nominations of officers for the Cement Section for this coming year, and immediately following will be the elections.

H. A. RENINGER (Lehigh): There is one thing I want to bring out that I am very proud of as far as the Cement Section goes. That is in regard to the new membership in the National Safety Council. We have 13 new members, making a total of 79 in the Cement Section, with no cancellations, giving us a 100 per cent clear record, and the only section in the National Safety Council having a 100 per cent record in membership.

There were four companies who were reported as having cancelled their membership. These companies—the Pennsylvania, the Dexter, the Penn-Allen, and the Penn-Dixie—have not cancelled their membership but have all combined under the Penn-Dixie. They are all actively represented in the Cement Section.

Another question was brought up by Mr. Curtis in connection with community activities, upon which I would like to touch. What can we do in the way of helping the community? Those of you who have plants in large communities, are not up against it as much as the smaller community. Where you have a small community, as we have in a number of places—at Mitchell, Indiana, for instance, where the plant is more or less the chief manufacturing concern—we believe there is a field for our safety committees to do some good, active safety work. Perhaps it isn't so necessary that we go into public safety as we have to in other cities, unless you are on a main

highway, but I believe we have a field in the schools. There should be put into the school system a course of safety, starting with the child in the first grade and keeping on up to the seventh or eighth grade.

Years ago it was hard to do that, for the simple reason that we didn't have the material and when we came to the teacher and said we would like to put across some safety work and asked what she could give us in the way of help she would have to go and dig out stories and plays and different things; and, of course, she didn't always have the time to do it. However, with the inception of the Educational Section of the National Safety Council, we have gathered a great amount of information from cities all over the country and a course has been outlined. This course has been studied by some of the best educators. It has been worked out in detail now so that the mind of the child from six years on can absorb that information, and I believe we can do a great deal of good. Get the school authorities in your community interested and have them become members of the National Safety Council.

Let us get our school people interested in home safety and public safety. Eventually when the child has reached the age to enter into industry he will have absorbed a great deal of that safety we are trying to give him now. It will become more or less of a habit and that is what we want in safety work.

I think it might be a good plan to have one representative of every plant here and hold a meeting this afternoon or tomorrow morning and get one of the National Safety Council people here to talk to us. If we can, let us get Miss Stevenson to talk to us on school safety and what we could do. Are you men interested enough to get together after adjournment of this meeting and have a talk by Miss Stevenson or some one of those girls of the Education Section who are familiar with this work? How many of you would like to come to a meeting of that sort?

(A number of men raised their hands).

The School Children Are the Workmen of Tomorrow

We can set that meeting for four-fifteen. I know that many of you are interested in this work and have suggested that we do something of this sort. I would like to have one representative from each plant. We could go into the details and find out what we might be able to do.

CHAIRMAN FRAME: Major Reninger will be glad to answer any question in regard to this matter.

MISS M. JORDAN (Indiana): I think that would interest everyone here because the school children of today are going to be the workmen of tomorrow, and if you start in now teaching them the rules of safety and how to be careful in their play, in their household duties, if you get them at that age when they start working in your mills and plants you won't have nearly as much trouble with them.

I want to know if the procedure of that will go through the school boards.

MAJOR RENINGER: Yes. You won't have any trouble if you show them just what you have to offer.

CHAIRMAN FRAME: The average school superintendent, from my experience, will readily admit that he knows very little about the aims and the progress of the National Safety Council; and he will just as readily admit that it ought to have its beginning in the public school and he will welcome any suggestions from any community man as to what might be done.

MAJOR RENINGER: There are outstanding cases where industry could take hold of this thing. Mr. Kreglow, of the New Jersey Zinc Company, backed up this work with the schools. I am going to ask Mr. Kreglow if he won't review briefly their success.

MR. KREGLOW (N. J. Zinc Company): Most of the men who are interested in safety are members of the school boards. However, we have found the teachers very friendly toward it and also the superintendent. A number of times we took them along to our

local meeting and we got them interested. We have memberships for everyone of our school buildings. We also have the safety patrol. I think it is the right way to attack the problem and it is going on now without any trouble at all.

MAJOR RENINGER: The Nominating Committee of the Cement Section wishes to report as follows:

Report of the Nominating Committee

Chairman, T. F. Halpin, Marquette Cement Mfg. Co., LaSalle, Illinois.

Vice-Chairman, F. E. Town, Supt., Manitowoc Portland Cement Co., Manitowoc.

Secretary, A. J. R. Curtis, Portland Cement Association, Chicago, Illinois.

Chairman Membership Committee, Henry A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.

Chairman Poster Committee, R. B. Fortuin, Penn-Dixie Cement Corp., Bath, Pa.

Chairman Program Committee, Russell Frame, Alpha Portland Cement Co., Easton, Pa.

I want to present these names as the ones placed in nomination by the Committee as officers for 1927-28. Signed by the Committee, Mr. White, Mr. Fortuin, and myself.

CHAIRMAN FRAME: Of course, it is your privilege to nominate any other gentlemen for the positions which are open at this time. It will now be in order to listen to any other nominations you care to present.

(It was regularly moved and seconded that nominations be closed).

CHAIRMAN FRAME: It has been regularly moved and seconded that the gentlemen proposed by the Nominating Committee be elected to serve as officers for the Cement Section for the ensuing year.

(The motion was put to a vote and carried).

CHAIRMAN FRAME: I declare the gentlemen duly elected. I take pleasure in presenting Mr. Halpin, of the Marquette Cement Mfg. Company, your next Chairman.

Mr. Curtis tells me he received a telegram from Mr. Town regretting that it is impossible for him to attend the session. Mr. Curtis will again serve as Secretary of the Section.

Now we come to the first subject on our program—"Fixing Accident Responsibility." The first question when an accident occurs is, who is to blame for the accident. We believe it would be of interest to discuss this, and I am sure it was placed in able hands when Mr. W. L. White, Jr., General Superintendent of the Sandusky Cement Company, Cleveland, Ohio, was selected to present the subject. I take great pleasure in introducing Mr. White.

Fixing Accident Responsibility

W. L. White, Jr., General Superintendent, Sandusky Cement Company,
Cleveland, Ohio

Fixing accident responsibility is a most serious problem. It calls for a decision, which, under any circumstances, is hard to make; one which must be carefully studied, and only a cool, clear, unbiased opinion is to be used in handing it down.

The safety movement, as we know it today, particularly in the cement industry, is really an innovation compared to the age of the industry. The year 1919 saw the beginning of extensive accident prevention work by the Portland Cement Association, and, while there were a good many individual plants and companies which paid particular attention to the prevention of accidents before that date, yet, nationwide attention to accidents began in that

year. Attention to accidents means placing the responsibility on the party directly responsible for them. Little or no attempt was made to fix accident responsibility in years previous to 1919.

It might not be amiss to state here that the first day I started with a cement company there was an accident at the plant which resulted in a fatality, but, to be honest, perhaps through inexperience, or youth, or both, it did not make the impression that an accident does today. I do not recall any attempt to fix accident responsibility in the first years of my work. The general attitude in the cement industry was to take an accident, serious or otherwise, with a shrug of the shoulders, as if it had to be, or, as if it were part of the routine operation of the plant or quarry.

There are four headings into which "Fixing Accident Responsibility" can be classified:

- (1) Executive or company policy
- (2) Plant Manager or superintendent
- (3) Plant Safety Committee
- (4) The individual

(1) It is a well-known fact that the attitude of the superior officer or executive, president or board manager, or whatever individual or group directs the policies of an organization, is reflected down to the humblest employee. If this individual, or group of individuals, is not squarely behind the welfare of the employees, and does not sanction safety work, it has a bearing on results secured by the company. This might be termed more psychological than actual, and, therefore, a president could hardly be accused of being the cause of an accident. However, careful analysis shows that he is responsible to a much greater degree than a casual glance first discloses. The mere fact that most individuals and groups look up to leaders for initiative is sufficient cause for the statement that the executive is responsible in a certain measure, for accidents if he, or they, are indifferent to the safety movement.

The Modern Executive Must Be Behind Safety Work

It is inconceivable that an executive of today is not squarely and actively behind the safety movement. There are some who are passive, though, and such should certainly be held liable for at least part of the responsibility of the accidents occurring in their organizations.

(2) The second party on whom the responsibility of accidents rests, is the plant manager, or superintendent. In a great measure, the entire success of safety work depends on him. If safety is not being pushed energetically, or, as in some few cases, is not even considered, then this man is directly responsible, except, perhaps, in the rare case where his good intentions are held in abeyance through the orders or wishes of his superiors. A good plant manager includes the safety movement as part of his daily duty. I say daily because safety work is largely missionary work, and the true safety man can be likened to a missionary who toils unceasingly, day after day, without any thought of reward, gratified entirely, through love of his work, with but small visible results. He must be a keen student of human nature. His interest must never lag. He must be able to put across the idea of safety, not only to the safety committee, which should be directly under his supervision, but also able to put the idea across to the individual, through his actions and speech.

The following case occurred during the war period. The common labor at the plant was composed mostly of the rag, tag and bob-tail which had escaped the draft, and more negro than white. During a particularly rainy period, with the coal storage low, it was necessary to put a force of laborers

shoveling from the coal pile into the screw conveyor under the coal trestle. This screw conveyor was guarded with a heavy bar grating, bolted down to the concrete. The plant superintendent was in this particular department for some little time, principally with the intention of putting across the safety idea to these men, as several serious accidents in screw conveyors had occurred prior to this time. No sooner had the superintendent left the storage, than one of the negroes removed the grating, straddled it, and started to shovel in coal.

He slipped, fell in the screw, but miraculously, had only the flesh and muscles of the calf torn, instead of losing his entire leg. While he lay on the stretcher waiting for the doctor, the superintendent asked him why he did it, and he was frank enough to admit that he wanted to hurry his work up, that is, fill the coal tanks over the boilers, and then sit down and rest, which is characteristic of the negro as you know. This accident brought the superintendent face to face with placing the responsibility, and he felt guilty because he did not have the ability to read human nature better, or else was unable to sell an idea, and, from that time on, this superintendent became a better safety man.

The Functioning of the Safety Committee

The injured man was not censured at the time. He was suffering enough pain without giving him mental stress in the bargain; but on his return from the hospital, coming back to work, he became one of the best safety men in the plant.

Perhaps you have all had similar experiences, and the plant executive who is unable to strike the chord of safety, and cannot sell or put across the idea of safety, lacks one of the fundamental characteristics which will make him a success.

(3) It is no easy task to have a safety committee function properly. In the early beginning, when safety committees were first organized, while it was not the rule, yet a good many plants had a safety committee in name only. This committee might be composed of any number of men, meetings would be called at various irregular intervals. Sometimes the members of the committee were "too busy," having a small repair job to work on, and considered the operation of the mill of more importance than the safety committee meeting. Again, the spirit of the organization would be dominated by the plant executive because he took it upon himself to turn down all recommendations except those which he himself might bring before the committee, feeling that an employee was "treading on his toes," or presuming beyond his station, or overstepping his authority. In other words, the safety committee was not being handled right by the plant executive. A good executive will have a good safety committee, and this is the third group upon which the responsibility for accidents rests. It is not right for a superintendent to take upon himself the duties of a safety committee, so to speak, nor to inspect the plant at such times as he may see fit, perhaps with one member of the safety committee or alone, nor to install certain safety devices and consider good safety work being done. Such practice, in reality, is nothing but the result of egotism on the part of the superintendent.

A manufacturing plant as large as the average cement plant today needs a safety committee that consists of not less than six, and ten is considered approximately the right number for a three thousand barrel plant.

The committee itself must be made up of real safety men, whose enthusiasm must be ever to the front. The members of the committee should not

necessarily be chosen by the superintendent, as the employees know best who of their number is most interested in safety work.

The committee should meet at regular intervals, and, in addition, have special meetings when the occasion demands, such as a serious accident, and it is only right to place in its hands the fixing of accident responsibility.

A man does not have to be college bred to make a good safety man, but he should be one of sound sense, a thinker, and have a good understanding of the idiosyncrasies of human nature, coupled with unflagging interest and endless patience. When all of these characteristics are found in one man, he is a jewel well worth keeping and generally demonstrates his worth through the results obtained. However, it is not difficult to find many of these characteristics in the average plant employee. If the safety committee is properly organized, and has the shining example of a good superintendent, it is bound to function efficiently.

Bad Safety Records Pull Down the Average

The accident records of the Portland Cement Association show that there are a "vicious few" plants which apparently lack something to bring their safety records to at least normal, and this record of the few pulls down the record of the majority through an excessively large number of man hours lost on account of various kinds of accidents. On the other hand, there are a number of plants which have an enviable safety record. A major portion of the success of this record can be traced directly to the safety committees.

It will not do to appoint a safety committee and then, on the day or days specified for the regular meetings, permit its members not to attend on account of some breakdown in the mill, or other excuse which might be forthcoming; or, on the other hand to cancel the meeting until the next day, or the day after, as the superintendent may have something which he considers needs his attention. There should be, as stated before, a specified time for the meetings and the schedule should be adhered to, and, except for unforeseen, serious reasons, no member should be allowed to be absent. If there are one or two members who would rather not attend, it is usually an indication of lack of interest, and they should be removed without further consideration, and others appointed in their places.

Neither should the plant superintendent, through the authority vested in him, become a jury of one and veto valuable suggestions offered by various members of the committee, merely because they might not strike him as the right move. If the suggestion is approved by a majority vote of the committee, unless he questions it at the time it is discussed and gives reasons sufficient to vote it down, the resolution should be placed on the books and the work done as suggested. Too often a peremptory veto takes the pep or enthusiasm away from the committee, and this, in turn, is reflected throughout the organization. With what result? Either there is an increase in accidents or a failure to obtain results in periods when drives are put on, such as the recent campaign of the cement industry in June of this year. Accidents in plants can be reduced if the safety committee is functioning properly, under a good executive. If they are not reduced after the organization is started, then it must assume its share of blame for all accidents, major or minor, which occur, for it has failed to do its duty, which is, first, putting across the safety idea to fellow employees, and, second, providing the good example.

No doubt some of you have observed members of your own safety committees doing foolhardy things in the plant, or making disparaging remarks in the presence of other employees. If these failings are not corrected after a heart-to-heart talk, they should be dismissed from the committee and the

fact published throughout the plant, which, as a rule, is sufficient punishment and makes them better safety men. Sometimes one hesitates to use the big stick, but it is necessary with certain types. It is rather difficult, perhaps, to cite cases where safety committees have flagrantly violated their duties. Actually, the idea of the formation of the safety committee originated from the fact that the plant executive cannot reach each individual throughout the plant, not coming into daily contact with as many of them as the members of the committee do, and on its shoulders rests the responsibility, which is very heavy. If this idea is instilled into the minds of its members, there is no doubt that the committee will never be censured nor taken to account for accidents which might occur.

(4) Fourth and last comes the individual himself. Except in catastrophies, where many are injured, and some killed, it is the individual who is generally responsible for the accident, and that responsibility must rest on his shoulders. Only, however, after a thorough investigation. If the plant superintendent is a safety man, and his safety committee is working properly, the injured employee has had an opportunity, through observation of the actions of his fellow workers, and discussion with them, to learn about the safety movement and has been instructed regarding all hazards about the plant. If he does not benefit through these methods he is entirely to blame.

The Other Side of the Subject

There are certain individuals who seem to be unlucky and who are continually unfortunate. In one particular case it was necessary to discharge the man. He would be injured, and, a day or two after his return to work, he would have another accident. Within the course of a year he suffered ten accidents, not quite one a month. It was finally decided that he was too great a risk and he was let go. Such is an unusual condition, however.

These comprise the four headings into which responsibility for accidents can be classified, but they are only one side of the subject. There is another side, which some people have emphasized, that is, the sentimental. It is not the intention to take that up in this paper as sentiment should not be used in handling safety matters. The only sentiment which enters into the situation is this; the man, or men who are responsible for an accident, and on whom the responsibility is placed, are usually punished sufficiently through the knowledge that they are the cause of pain and monetary loss to a fellow being, and further punishment should not be meted out, except in cases of gross carelessness, other than the publishing of the fact that they were directly responsible for the accident. That is as far as sentiment should be considered in handling this matter. Nor should generosity be considered in placing the responsibility.

There is one type of accident which cannot be accounted for even after a thorough investigation, and the responsibility for such accidents cannot be placed on anyone's shoulders. Particular reference is made to a fatality experienced at a cement plant in 1926 where one man was electrocuted and two others severely shocked while pulling on a cable from a car puller. These men were in the packing department and it was their duty, in connection with packing cement, to unroll the cable from the drum of the car puller, attach it to the last car of the string, and, after this hook was attached, pull the cars in front of the packing house door. These three men took hold of the cable, after starting up the motor of the car puller; two of them were knocked ten feet, one unconscious and the other severely bruised, but the third, presumably from a weak heart, was electrocuted.

Just who should be held responsible for this death is still a question. Starting at the top, the president of the company is a safety man; the superintendent has been giving, and continues to give, all there is in him to have an excellent record at his plant; his safety committee is composed of good safety men, and the general attitude of the whole organization of the plant places it in the front ranks of the safety movement. A thorough investigation of this electrocution brought forth the fact that it was caused by a faulty electrical connection. The first deduction would be that the plant electrician, who, incidentally, is a hearty worker on the safety committee, was responsible, but, if this conclusion is reached, why should not the plant executive take his share of the blame, or, going higher, why should not the head of the operating department, or even the president be implicated? To place the responsibility on any of those individuals would be wrong, because the motor received regular inspection, and the short circuit, which was the cause, evidently happened shortly after the motor was inspected, without giving any sign of happening at that time, and it could have happened the first time the machine was started up after it was inspected. It would, therefore, be most unfair to place the responsibility of that accident on the shoulders of any one individual.

In Numerous Cases Responsibility Difficult to Place

Another fatality which a cement company recently experienced, happened to a young foreigner while stripping in the quarry. He was excavating in a pocket. A large stone suddenly slipped out of the bank. Close inspection failed to disclose the possibility of this stone moving. It fell against the man's leg, breaking it above the knee. He was removed to the hospital and the bone was set and the leg placed in a plaster cast. Examination several days later showed that the set was broken. An operation was performed, but the man died from strombosis or blood clot. Perhaps the quarry foreman should be blamed for this accident in that he did not detect the loose stone at the location where the man was injured. We all know that careful inspection does not always disclose defects, and the company feels that this man is not to be blamed for the original accident. Being a muscular fellow, the doctor claimed, was the cause of the original set being broken, and they had every reason to believe he would survive the operation. Strombosis is apt to happen to anyone undergoing an operation however slight, where blood vessels and arteries are cut. On just whose shoulders the responsibility for this fatality should rest is a difficult problem to solve, but the doctor came in for censure, perhaps unfairly.

Numerous cases where it is difficult to place the responsibility even after a most thorough and careful examination, could be cited.

There is another type of accident which occurs frequently in cement plants, which is to be most heartily condemned, that is, accidents caused through "horse-play." The responsibility can invariably be placed on one or several men, and those men should first be given a fair chance to stop the practice, and if they do not heed the warning, dismissal is called for.

One reads and hears of so many horrible results such as those of ruptured intestines through the application of compressed air, or, electrification of the drinking cup, which caused the death of an employee who had a weak heart, and, while meant as a joke, such practice can be called nothing but horse-play and should not be tolerated. This is one of the few cases where accident responsibility is easily placed, and the person condemned should not be given much consideration.

I had occasion to discuss safety with an officer of one of the cement com-

panies some time ago, and remember distinctly his making the remark that he had not been pushing safety work as he should in that year, and the record of his company was much worse than in previous years. This I took as an indication of his thoughts on the matter and have watched the record of that company from that time on, and the results obtained by it have been truly remarkable. In fact, it is now near the head of the list in the length of time during which no accidents have occurred at their various plants, where before this record gave anything but a good impression.

If all executives have safety work at heart it would do worlds of good in reducing the number of accidents in their plants, for every individual would be proud of the fact that he was doing his little bit to have a good safety record, and one of his reasons for this satisfaction is the knowledge that his superior officer is keeping a close check on the plant's accident record.

On the other hand, there are numerous cases where safety work comes from the heart of every one concerned, from the president to the humblest employee, yet the accident records are deplorable. The records at the various plants where this is a fact will go along unblemished for months at a time, except for an occasional scratched finger or other minor-no-lost-time accident, and then, suddenly be spoiled by a fatal accident.

Unceasing Effort for Safety Is Necessary

I have in mind one plant in particular which would build up a wonderful record; all the members of the safety committee and the organization as a whole were on their toes to make the record 100 per cent for a year at least, when, out of a clear sky a fatality would occur; for instance, an electrocution where a man stepped from the crane girders down to the bucket and touched the trolley cables. Part of the craneway did not have a roof over it and it was raining at the time of the accident. That he neglected to shut off the current on the trolley cables before he went to repair the bucket, was assumed. The man was worked over for hours, but without result.

A year went by with a very good record before another accident occurred. This was the electrocution previously mentioned, where a man was killed when pulling the cable on the electric car puller.

About twelve months later, an employee working in the basement of the silos, in crawling over a screw conveyor which was three feet above the floor, got caught in the screw, tearing his leg out at the hip. The man died shortly thereafter.

Such accidents as these can be enumerated indefinitely, although the general trend is toward reduction. Various methods are tried in an effort to overcome and reduce them to a minimum. Placing the responsibility for such accidents has been gone into in this paper. It is poor practice, however, to close the door after the horse is stolen, and the best way to prevent waste of time, trouble, and perhaps hard feelings due to placing accident responsibility, is to prevent accidents, or, to close the door of the stable before the horse is stolen, and this can only be done through unceasing effort on the part of every one, or, in plain words, constant missionary work.

CHAIRMAN FRAME: Mr. White has given us something to think about when we try to fasten responsibility for accidents and for deaths. I know he will be glad to answer any questions.

A. JONES (Indiana Limestone Co., Bedford, Ind.): In Mr. White's talk he spoke of an accident that occurred through a rock falling out from the face of the ledge and breaking a man's leg. I would like to ask if they ever decided what was the cause of that rock slipping.

MR. WHITE: The formation of the stone at this particular quarry was up and down. This stone slipped out of the side. Why, we don't know. There wasn't any blasting at the time. The quarry is regularly inspected by the foreman and whether there was moisture there that let go all of a sudden we don't know.

E. W. BALDWIN (Solvey Process Co., Detroit): This question arises in my mind: If a man has had ten accidents in a year, shouldn't he be let out a little before that. We let a man out if he has had two, three or four.

CHAIRMAN FRAME: You mean lost time ones?

MR. BALDWIN: Yes.

CHAIRMAN FRAME: That is one way to create safety rules.

W. R. DUNN (Vulcanite): I recall an accident some 15 years ago where the rock was of a vertical formation at the top, that looked as if the rock was about ten feet wide. You couldn't tell what it looked like when you were down at the bottom, 50 feet below. The rock tapered to about one foot at the bottom. Naturally, you would suppose the rock was ten feet wide below the same as it was at the top. Without a warning of any kind it crushed down and toppled over and killed nearly all of the men in the quarry.

P. E. SANDT (Edison): May I ask Mr. White or Mr. Dunn what time of the year, if they recall, when these slides occurred? We have a great many in the spring of the year and it is a case of constant education with our men to keep everyone on their toes in the spring of the year.

MR. WHITE: I believe there is a misunderstanding on that. This pocket proposition, as we have it down in this quarry, is not over six or eight feet. We dig the clay out to expose the limestone. This stone just kicked out and was big enough to fall against the man's leg and break it.

MR. DUNN: In that case I mentioned, the rock was perfectly dry. The accident occurred about midsummer.

CHAIRMAN FRAME: You heard Mr. Curtis report this morning on the splendid accident record which had been obtained by a number of members in the Portland Cement Association so far in 1927. He mentioned the fact that there were 23 plants which so far have a clear record. It has been said many times that one of the most difficult problems after you have gotten a fine record is how to keep it up. That will be a burning question with a lot of our members in the Trophy Club. In this connection I am delighted to introduce at this time Mr. W. H. Weitknecht, superintendent of the Lehigh Portland Cement Co., Mitchell, Ind. Mr. Weitknecht's plant is the one member that has won two trophies. He is going to take up a new angle this afternoon.

How Can a Mill with a Perfect Record Keep It Up?

**W. H. Weitknecht, Superintendent, Lehigh Portland Cement Company,
Mitchell, Ind.**

I feel that I am in the position of that writer on farm topics in a leading farm paper, who wrote splendid articles on successful farming for some years, only to have his farm mortgage foreclosed sometime afterwards.

How can a mill with a perfect record keep it up? I hope we haven't been foreclosed. I know we haven't, but we haven't quite kept it up. That perhaps calls for an explanation and we are always willing to justify our position on any question or condition.

In 1923, we had what we called a very enviable record, but we were beaten for the trophy by a few fractions of man lost-time per hundred thousand man hours. In 1924, we succeeded by having, I think, just one and a fraction lost-time hours per hundred thousand man hours. In 1925, without any other lost-time accidents, we had a fatality in November chargeable to us, and yet it did

not result from any negligence on the part of any of our employees. It was due to carelessness, rather, on the part of the railroad company. In 1926, I am very glad to say, we were one of the companies that had a perfect record and we won the trophy again. In 1927 we continued the good work until about the middle of July when, after the whistle had blown, one of our men leaving his work to go to the clock house to register out was bumped by another employee in his Ford; he fell on the concrete pavement, giving his left knee a twist to such an extent that he was unable to report the following day. He reported for work the following Monday, this having happened on Thursday night. So we have two days' time lost on our record.

Perhaps that in a way—the type of accidents and how they happened—is a justification for my being here, since we have not had any serious accident in the industry arising from the employment itself.

We believe that the knowledge of any subject is the true basis for success in that line, and we have come to know that personal injury accidents can be prevented. After what you men have heard today you dare no longer rest on a belief that it can't be done. For if 23 cement plants (cement being an industry known to be hazardous) can operate for seven or eight or nine months, employing many thousands of men, without a single lost-time accident, you know that plants can be run without personal injury accidents.

Responsibility is Preventive and Corrective

That brings to you the matter of responsibility, which is twofold—preventive and corrective. The preventive side, of course, is involved. Who can say that the employment offered to the employee was in accordance with his capacity? The employer knows more about that employment than the employee possibly can know. Instruction is required before that employee goes to work. Was that instruction competent? Did it cover the nature of the work and the performance of it sufficiently? That is a responsibility for the management, more so than of the employee, through its foreman. So that the responsibility of the management as a result of the accident to the workman extends far more than to safe places. It involves, also, to a large extent, safe practices. Have you had foremen in whose departments accidents happened because the men practiced what the foremen had practiced, what they had seen him do? Isn't that a responsibility?

The other is corrective. It deals with placing the responsibility after the accident has occurred, and that is perhaps more specific and more personal. Who is responsible for it? A responsibility, to have any effect or force, must be personal, it cannot be impersonal. That is the duty of the investigating committee which we have in our program of safety work. But you say, if you have had so few accidents, what investigation of accidents does the safety committee or the accident investigating committee engage in? The answer is it engages in preventive investigation. There are many near accidents that almost result in personal injury. There are bad practices that should be discovered, and will be discovered if you have a good safety committee and a good organization; and it is just as much their duty to investigate the possible cause of any accident before it happens and place the responsibility, as it is to have the accident happen first and then fix the personal responsibility. For it follows that if you have in your industry a number of minor accidents, not lost-time accidents, but near accidents that might have resulted seriously, you are going to have personal injury accidents that will be serious.

Now, we have come to the point where our accident investigation work deals almost wholly with those near accidents and those bad practices, as a preventive measure. We try to discover the bad practice, we try to discover the responsibility for a near accident, and place it before the accident has happened. And you will find, I think, that that will be one of the keynotes of maintaining continued interest on the part of your safety committee in the way of accident prevention.

Before the Portland Cement Association awarded those splendid trophies for the best record, our company, because of the number of mills they had, began those contests at the different plants, instituting a no-accident-month campaign; and it unified the work of the safety organization of the several plants of the Lehigh Portland Cement Company and put every safety committee, every employee, every foreman on his toes. They wanted to win the safety flag. After they won that they wanted to win the cup. It was the incentive of competition that started them. We now have so many cups and so many flags that we can decorate our entire plant with them. But every cup that we get and every flag that is sent out to the mills seems to be more appreciated by the men than the first one. They know, first of all, that accidents can be prevented. They know they are standing on a record of which they not only feel proud, but one they must defend.

We are never satisfied, we always want more. Capitalize that spirit in your organization. We want to win the trophy in 1927 and we want to win it twice in succession. Those of us who attended these meetings were told by our safety committee if we wanted to win the association trophy in 1926 that we must have a perfect record, because the progress made in the reduction of lost-time accidents is such that hereafter no mill will win the trophy unless it wins it on a perfect record.

Men Must Acquire Safe Practice Habits

In 1927 we said the same thing, and much as it has hurt to lose those two days it has served to do one thing: it has served to make the men more circumspect in the real sense of the term. They look around; they are no longer content with taking care of their own safety, but are looking around for the safety of others. That is the very thing I have been trying to impress upon our safety committee. They cannot possibly be safety committeemen and serve in the plant only. They cannot be safety men at mass meetings and not be safe men on the job. It is a matter of habit. They must develop safe practice habits. There again, if I may digress a moment, if you instruct your men and supervise their work in safe practice habits, you will prevent accidents; and that is the chief reason why plants will get along with relatively few personal injury accidents. If they cannot minimize their accidents because of the natural deficiency and delinquency of some workmen, the unlucky fellow, as we say, let him go. Be fair to the others. Transfer him from that department to another where the work is less hazardous, but if he is a fellow who stumbles over his own feet give him a few nice talks and say, "John, if this thing happens again we will let you go; you must look for employment elsewhere."

And after several transfers from hazardous to less hazardous and still less men. The wife of one of the men came to me begging for the re-employment of hazardous occupations, he still has near accidents, we let him go. We recognize a responsibility not only to that man, but we recognize a responsibility to his fellow the man. I said, "Has it ever occurred to you what a serious thing it would be for your husband to become crippled while in our employ? You are thinking only of the immediate future. He is not safe to work in the line of employment in which he wants to work. He doesn't want to be a common laborer. He is a better grade workman, as far as mechanical ability is concerned; but we cannot continue him."

We are careful not to humiliate him by letting the rest of the employees know why he was let out. Speak to him and let him quit. It is labor's respectful resignation, just as you, an executive, do not expect to be bodily discharged in being given your walking papers, but you are politely asked to resign.

What about this spirit that pervades among the men of the plant or the safety organization? They call attention to things, they want that thing prevented. They don't want the man to get fired. It isn't a question of winning the trophy, it is a question primarily of realizing our responsibility to that man and to his fellowmen.

and on the other hand keep up the proper spirit of the organization; because it is in that spirit you maintain your accident prevention work and keep the work together.

Bulletins are important. Important also are accident investigations as a preventive measure, the discovery of bad practices, plant inspections for every purpose, instruction for their correction. This further in the matter of responsibility—and I am stressing that because it is the vital thing to keep up the spirit of the organization—is the fixing of definite responsibility. We have our departments compete against each other in friendly rivalry. Every department is a family and every man in that department is a member of that family, and if any accident, near accident or bad practice is discovered, the whole organization feels its responsibility. If the discovery indicates gross carelessness on the part of some individual, if it indicates a very bad practice, or if it indicates a bad practice that hasn't been eradicated, the foreman, as the head of the family, is taken into account.

That particular near accident—that fool thing—may be discussed and brought to the attention of all of the safety committee, together with some keymen in every department; and how do you think that foreman feels when that thing comes up for discussion? He isn't boo-hoed, he isn't reprimanded by the committee. It is the force of public opinion, and he would rather take a whipping than come to that safety committee meeting.

Personal Responsibility Is the Keynote

Responsibility—continued responsibility, definite responsibility, and personal responsibility—is the keynote not only of accident prevention but of keeping up the spirit. What makes you men do your job from day to day? Why are you there? Why don't you go some place else some day? You'd like to go fishing or hunting, but do you do it? You can't go off unless you have made proper arrangements. Why? Because you have a feeling of responsibility. Why do you do the work the way you are doing it? Partly because of a sense of responsibility.

The same thing applies with individual foreman and with individual employees. You want to bring the matter of responsibility for personal injury accidents right to the individual, group the individuals with a head, which is the foreman, and then continue to call attention to that very fact.

I might mention special safety committee meetings. We have them every once in a while. I think we average two meetings a month, one a regular meeting and one, possibly, a special meeting. The reason for calling special meetings throughout the year is to keep up the interest. They know it isn't simply a regular meeting. We try to keep the regular meetings interesting by discussing the significant accidents that are reported every month by the Cement Association. We try to keep up the interest by discussing such accidents as we have had in the organization. Incidents which come to our attention are noted and sent out to the various organizations for the continued interest, and to call specific attention to cases of personal injury accidents such as might happen with us. It puts us on the alert; and perhaps last, yet not least, are such meetings as this one today. We have three of our foremen here at this meeting. We are fortunate by reason of having had the best record for several years among the Lehigh organizations, and therefore have had the privilege of having two or three men sent to every Safety Congress by the Portland Cement Association. When the National Safety Council held their meeting in Louisville a few years ago we had the good fortune to send three men there.

So meetings of this kind are very important. That is why I am glad to see the Cement Association take up the program of regional meetings and sectional meetings. The men get together, as we do here, workmen, not merely executives or general managers or safety engineers, but workmen who have served on the safety committees, and prospective candidates for safety committees; and what is the result? They come back with the proper spirit, which it is the responsibility of the manage-

ment to inculcate in them before they leave. They come back to their safety committees and report to them, and sometimes they don't get through in the first meeting. We continue to have a report at the next meeting, or we call a special meeting, and in that way we continue to keep the matter of accident prevention alive.

But as I said in the beginning, the keynote of the whole thing is the fact that the men know that it can be done, and they would be ashamed today if our accident record got bad. They keep up the spirit and I, for one, believe that we have our employees at Mitchell thoroughly sold just that way.

CHAIRMAN FRAME: Mr. Weitknecht has given us a sound, sensible, well organized and conscientious method by which he controls accidents in his plant, which radiates from himself as a superintendent and, as you have gathered from his remarks, extends through every one of his foremen down to the very men themselves, who have begun to appreciate that an accident record means something to every plant. He has brought to the surface many interesting thoughts on accident prevention. Some of you, I know, have questions to ask Mr. Weitknecht.

V. ROBERTSON (Canada): I would like to ask the speaker, after they have had an accident, which, of course, is investigated, is that investigation made by the executives or by the safety committee?

Special Committees Often Appointed

MR. WEITKNECHT: It is made by a subcommittee of the safety committee, which is an investigating committee usually appointed for the occasion. We appoint a special committee for every particular occasion; it tends to distribute the work and it gets more people interested. Those people who investigate accidents are better safety men because they have served.

MR. ROBERTSON: Are the findings of that investigation made public or are they confidential?

MR. WEITKNECHT: The findings usually are made public. We have had but few, but I cannot recall an accident where the cause was not evident. The reason for the investigating committee is more to ascertain just exactly in what practice this accident had its origin. If there is any mystery attached to it, it is fully explained. Usually the matter is gone into in detail at the next meeting of the safety committee, and sometimes we have a special meeting just for that purpose. I might add this: prior to the June no-accident campaign we had mass meetings and we had departmental meetings where we got a large number of men together in our shop. These men were addressed by the foremen. The men in the quarries, which are about two miles away, were called together and we had special meetings. So we may call a special meeting at any time when some particular near accident has happened. When I say near accident, I mean some occurrence which almost resulted in an accident. We make it a point to bring it to the attention of the safety committee and they to the department committees, and that is the duty of the accident investigating committee.

CHAIRMAN FRAME: I want to emphasize that a little bit stronger if I may—Mr. Weitknecht is right after the near accident. They have gotten to the point where they have few lost-time accidents. He is transferring his activities into looking into every near accident and thus he maintains a clean slate.

MR. HEALY (T. H. Martin Co., St. Louis): Do you have any difficulty in getting the men to adopt respirators where necessary?

MR. WEITKNECHT: Yes. However, we have few places where they are necessary. We have one place in a certain part of our packing house; but we have found that there is a risk involved in their use. We haven't found a single case where inhaling of cement dust such as exists in our plant has injured anyone. I think that is a matter of record for the Portland Cement Association.

CHAIRMAN FRAME: In that connection I wish to announce to anyone who is interested in respirators, the New York State Department of Labor has recently issued a pamphlet in which it is discussed from every angle. After reading that it is my personal opinion that its practical use is limited in the cement industry. You can get that pamphlet from the Department of Labor, Albany, New York.

DR. E. M. PARTLETT (Pittsburgh): I was glad to hear you say what you just said about limestone dust, because it is so. I have interested myself in that for some years. I have some data that limestone dust is free of silicate and is harmless.

QUESTION: Do you make these men who are involved in accidents appear before the safety committee?

MR. WEITKNECHT: We have not had any serious accidents. A man was injured and lost two days' time and he was before the safety committee largely as an example to the others. We don't want these men to feel that they cannot appear before the safety committee. We want them to feel somewhat like the real honest-to-goodness boy who, while he may get into mischief, will tell the truth, but he hates like anything to face his dad.

When Responsibility Is Definitely Placed

A. C. HEWITT (American Limestone Co., Bellefonte, Pa.): There are two questions I would like to ask, one from Mr. Weitknecht, and another of more general interest. When you investigate the cause of accidents and find that the responsibility can be definitely placed on a particular individual, how do you handle that case? You say that you make public the findings. Do you make public the responsibility and cause shame on the fellow who caused the accident?

MR. WEITKNECHT: All accidents that require any investigation are like gossip in our plant. You can't keep it secret and we don't want to. It is reported and then investigated by the committee. If it is of a very serious nature we call a special meeting of the safety committee. If not, it goes over into the next meeting. The findings go to every department and become public. We even issue in particular cases notices on the bulletin board. We have had so few to issue that the practice has almost been discontinued. But that is exactly what we do if we find some fool stunt practiced.

MR. HEWITT: I would like to have some idea of how many cement plants—not companies but individual plants—have a full-time safety man who does nothing else except safety work?

CHAIRMAN FRAME: I think there are very few of them. That is my personal opinion, however, and I may be wrong. I will ask those plants represented that have a full-time safety man in their plants to please stand up.

(Twelve men arose.)

CHAIRMAN FRAME: That is better than I expected.

R. E. HOFFMAN (Atlas): The gentleman beat me to the question I intended to ask. I have heard four talks today and I haven't heard the mention of a safety supervisor except just now. I would like to know from some of the plants that have safety supervisors what part they play in their success?

G. C. HUTH (Universal): I am a safety supervisor but I don't care to talk about myself. However, I can tell you about my job. My job as supervisor of safety is a combination job. I supervise the safety men of the mill. The biggest job that any safety man has, I believe, is getting the job out of the office and putting it out to the fellows who are actually doing the work. The safety supervisor organizes and helps them along. I think ultimately the fellow on the job should carry all the work. That is the way I have been trying to work it out.

A. J. EALES (Bessemer): I don't know just how to explain this, with regard to my own personal job. I don't handle the employment of the men at all. That is done by the foremen individually. I spend most of my time around the plant, not in the quarry. But with regard to putting the safety thing over, I think the foreman is your

best man for that. The men will take more from your foreman than they will from your safety man. Your safety man can handle the foreman, but the ultimate success rests with the foreman.

CHAIRMAN FRAME: Since we have gotten into the engineering phase of this important subject I notice we have with us today an engineer associated with one of the largest cement manufacturing concerns in the United States. I see Mr. Carlson sitting there and I wonder if he won't add just a few words to the importance of engineering in regard to the prevention of accidents.

A. G. CARLSON (Universal): I am not going to attempt to tell you how to prevent accidents, but I will say something about how we prepare equipment to help prevent accidents. The Universal Company has spent thousands of dollars for safety equipment. In recent installations this safety equipment is considered part of the job and the cost of same is swallowed up in the construction work. Every job, before it leaves the office, is inspected to see that all dangerous places are properly guarded. Previously, safety features were things the companies delayed putting on until forced to do so, and this cost them more money than if they had been installed at first. I think it is safe to say, since we have installed safety devices, there have been considerably less accidents. Before we had all the safety equipment, we had considerable accidents which cost the company more money than the installation of the safety equipment.

A Month to Investigate Plant Conditions

D. ADAM (Lawrence): Our friend, Mr. Hoffman, I think, asked a question which has remained unanswered. I happen to be a safety engineer. In 1924 I took over the duties of the safety engineer in our company. I faced 1,276 lost days, some permanent disabilities and two deaths. I was told to go to it, which I did. Today we have 110 lost days and 11 lost-time accidents.

When I first started in the safety work I took a month to go around the plant with my eyes open, my ears open, and my mouth closed. In that month I learned a lot. In three months' time I realized that guards and bulletins were good, but they didn't mean everything. I realized the only way to get the men interested in the safety movement was to tell them the reason why.

Our results merit what I tried to do. I introduced a Thursday afternoon talk which I consider has been the backbone of the safety work in our plant. I get a man from each department for half an hour and sit down as man to man with him, talk from an ordinary, common sense point of view and tell him about the rules and regulations of our organization; why they were made, how they are based, the reason they were made, and the benefits that would accrue from them. In that way we eliminated all our accidents. Previous to that we had one every week.

It doesn't go home unless you have a heart-to-heart talk with the man. We can collect the ideas at this meeting, formulate them and transfer them on to the individual.

In that connection I would like to mention this: Sometimes it is not always possible for a fellow to talk and explain those things to a man. I attended the public speaking class this morning at eight-thirty given by Professor Hardy. As Professor Hardy says, the main point in a talk is to get at the fellow direct, not to shoot over his head. Don't be dogmatic about it and say they must do it. It is not a case of, "you have got to do it." Tell them why they have got to do it.

MR. BLACK (Philadelphia): I wish to say something in regard to the dangers of dust. My company conducted an informal investigation. This investigation involved going over the records of physical examinations of in the neighborhood of 25,000 men exposed to cement and limestone dust and other dusts of that nature. The evidence was definite that their average health was so high that we came to the conclusion their health was above the average of workers alongside of them.

We put those various dusts, including dusts of silicate, granite, and that sort of thing, under microscopes and we found, without exception, that where you find a

sharp dust it is dangerous, but where you find a dull dust it is not dangerous, unless there is poison in the dust itself. That was our conclusion. It would be hard to support it in a general way.

CHAIRMAN FRAME: Thank you very much, Mr. Black; we are glad to know of your findings on this important question.

Is Mr. Jacobsen in the room today? I wonder if he is prepared to tell us something about his observations on the safety engineer?

H. G. JACOBSEN (Bates Valve Bag Co.): It has been my experience, if you want to get my angle on it, that in safety work, if we have 100 plants possibly we have 100 different methods, inasmuch as we have 100 different managers, and they all work more or less differently. They all have different personalities and they attack the problem somewhat differently, although possibly along the same main lines, and generally if they use common sense, they arrive at somewhat the same results.

Mr. John this morning spoke about the difficulty that was met with during the years that we had to do the pioneer work, and I can speak freely on that subject. It was difficult to get the various companies to report their accidents and take hold of them in a real two-fisted manner. I think that period has been passed and I am certainly more than pleased to be here today, because I never have yet seen a meeting quite as well attended as this one, nor have I seen a meeting that has been attended by men of such caliber as I see here today.

Safety Suggestions Come From Everybody

CHAIRMAN FRAME: I am sure we all have a very fond recollection of our pleasant association during the years Mr. Jacobsen was in charge of accident prevention work for the Portland Cement Association, and we all know what strenuous efforts he put into the organization of the various plants and the ground work he laid for the success we have recently attained.

J. R. KLINE (Universal): I have similar lines to offer about the general safety work in our plant. We are safety men at the plant all the way down. We take suggestions from anybody in the mill on any subject and give him a reasonable answer. There have been at least 1,800 suggestions made at our plant this year and every one of them has been put on record and sent out to the departments that take care of them. Each department has meetings at least once a month. Every man attends a meeting at least once a month. I talk to them at the meetings, tell them anything and everything. I give them reasonable answers to their inquiries about plant operations, safety work, or the general topics of the community.

CHAIRMAN FRAME: Don't lose sight of the fact, gentlemen, that Mr. Kline's plant is a member of the 1927 safety club.

I would like to ask Mr. Weitknecht about a problem that has been a prominent one in the cement industry almost ever since operation began. I refer to the guarding of screw conveyors. As you men know, we have had a large number of deaths and very serious injuries caused by screw conveyors. The Alpha Company recently had a fatal accident at a location we thought splendidly protected. The screw conveyor is contained in a concrete box some 26 inches high from the floor. The sheet metal covers on the top are securely bolted down. Somehow, it seems, the pressure was so great that it warped or caused the sheet metal covers to raise up and spill out the cement into the tunnels. We had a man working in these tunnels whose duty it was to clean up the spill. There was no witness to the accident but from the best information we could gather, we think that for his own convenience this man unbolted the sheet metal cover from the screw conveyor or laid it to one side, which is contrary to our safety rules. He happened to have some other duties in one of the other tunnels and when he came back he somehow or other got into the trap which he laid for himself.

I know of two other fatal accidents that happened just recently on the screw conveyors. We have made wonderful progress along many other lines, but the

screw conveyor is the troublesome problem. I would like to ask Mr. Weitknecht how they take care of screw conveyors in his plant.

MR. WEITKNECHT: We have screw conveyors in our tunnels, I presume, very much like those existing in other plants. In the last 20 years we had two fatal accidents. We used quite different methods. We had the same condition with the material flooding the conveyor, lifting the lids, shifting them, or even tearing them loose from their moorings. We finally decided that from a mechanical equipment standpoint we would make that particular thing foolproof. We made bar grates and put them over the conveyor and bolted them down in such a way that it would take an employee a long time to unbolt them. These bar grate covers will stand the twisting of conveyor screws before they become loose. They are fastened to anchor lines, anchored to anchor bolts. Wherever we have a possible flooding condition we have those grates bolted down. They are bolted down so hard that the conveyor will tear before the grates give way and there is a strict order that no employee has anything to do with those except the foreman and special repairmen, so if anything goes wrong with those conveyors we know who is responsible. It is the duty of the foreman himself when he knows that work is being done on the conveyors in the tunnel to make a personal inspection, besides having the report of the special repairman for that job.

Experience With the Dangerous Conveyor

MR. KLINE: Do you use a sheet metal cover at any point in addition to the grating bars with the idea of keeping down the dust, too?

MR. WEITKNECHT: We have done that, but in our tunnels we have little dust now. Cement sacks are frequently laid over the grating.

CHAIRMAN FRAME: Has anyone a different method?

MR. HEWITT: I was formerly with Security and about ten years ago they had almost that same identical thing with their conveyors through the stock house. If Mr. Brownell is here perhaps he can tell what is being done there at the present time.

G. W. BROWNELL (North American): I don't believe there is any variation over what Mr. Weitknecht said.

G. E. BARTLETT (Lehigh): All our conveyors in our plants are put in the same way as Mr. Weitknecht spoke of. We have our covers on the top of the grating. They just keep the dirt out and it cuts out all the dust in the plant. We have never had any accident with the conveyor since we adopted that plan.

I want to say in connection with my work as a safety man, I put in all my time in safety work. Mr. Adam spoke about the treatment of the men. My method in treating men harmonizes with his.

CHAIRMAN FRAME: Are there any representatives of the various state departments? If so, we would like to hear from them.

T. J. QUIGLEY (Dept. of Labor, Harrisburg, Pa.): With reference to the accident statistics as compiled by the Department of Labor and Industry for the Commonwealth of Pennsylvania, I am just going to call your attention to the difference between mechanical safeguarding and education. Our statistics prove conclusively that of all the money spent in the Commonwealth of Pennsylvania for safeguarding machinery, only 25 per cent of all accidents are preventable through mechanical means, and 75 per cent of all accidents occurring in industry cannot be prevented through mechanical means of safeguarding. In other words, it is a campaign of education, not only to educate the men but the management. If the management is thoroughly sold on safety, and if the foreman, whom I believe to be the most responsible man in connection with every plant, is a real safety man in connection with every plant, is a real safety man he will not permit certain conditions to exist in his plant, which are responsible for accidents.

In my work of investigating accidents and inspecting quarries there is seldom a case where I investigate a quarry that I don't find conditions which should not exist.

Yet the foreman is passing through that quarry every day and never sees them. Now there is no use passing the buck to the men. The foreman has his duty to perform. In connection with the accident mentioned by Mr. White, I wish to say I investigated that accident. They had removed the surface and the men were working in between the rocks just cleaning out the clay. The stone itself wasn't more than three feet high but it fractured the man's leg. He was taken to the hospital, was operated on and died. There was no way that man could have told that the stone was loose because the place where he was working was not over seven inches wide and he was just removing the clay from in between the rocks. The accident could not have been prevented.

One of the methods we are now practicing for the prevention of accidents is holding meetings right where the men work. In many instances I succeed in getting the plant management on pay-day to shut down twenty minutes before regular quitting time and during that time I address the men on accident prevention. In many other cases they shut the mill down twenty minutes before lunch time and then I talk to the men.

It is my opinion that a talk to the men right in the industry, talking to them right where they are working, pointing out to them how accidents are occurring and showing how they can be prevented, is the greatest means of preventing accidents that I know of. You have got to talk to them in their own language. You want to talk to them in the language they understand.

Further Activities in Pennsylvania

J. S. ARNOLD (Director, Bureau of Inspection, Harrisburg, Pa.): I would like to add another word in connection with what Pennsylvania is undertaking to do now with special reference to mines other than coal mines, pits, and quarries. Mr. Quigley who just spoke to you has been made chief of our quarry section. He will have a force of instructors under him who will be men trained to know the work as nearly as possible. They will be men who have had previous experience along those lines and what experience they have lacked will be supplied before they go out into the industry. The advantage of that is that a man with special training is far better prepared to talk about safety in your particular industry than a man who has not had that special training.

DR. D. E. M. PARTLETT (Pittsburgh): In that particular connection, I want to tell you gentlemen of the Department of Labor and Industry in Pennsylvania, that we have gone over a certain number of your rules and regulations at each safety meeting in order to become better acquainted with the rules and regulations throughout the state, and I think that is an excellent thing to do.

CHAIRMAN FRAME: I would like to call on Mr. Jack Dempster to give us a few words.

J. A. G. DEMPSTER (Canada): We are trying to run an accident prevention campaign by just an appeal instead of by legislation, if you see what I mean. We try to show to the man that, being a human being, he is the one who will suffer the most in the long run. As soon as we came to the point where we realized that they were all human beings, our records began to pick up.

Back in 1920 and 1921 the company from which I come had practically the worst accident record in the whole of the Portland Cement Association, but in 1925 we won the Portland Cement trophy for a perfect year. We went 521 days without a lost-time accident. Today, were you to visit our plant, outside of the few posters that you will see displayed, outside of the guards that you will see up, you wouldn't know that an active safety campaign was being waged all the time. But it would take you a week, probably a month, before you found out that our plant and our company are as one big family, simply because every individual man has been taught that he must be a safe worker.

We use no methods that are different from anyone else's. Management has its own responsibilities, it is true, but we are proud that we have a loyal body of safe workmen, men who know that, outside of the loyalty to their plant, an accident means something to them. We have also tried as much as possible to do away with the word "accident". In looking through the dictionary you will find that "accident" is something for which no provision can be made, it is something that happens unforeseen, something that is wished on you. We claim that an injury is not really an accident, because it is something that can't happen. We always have shown the men where the accidents have been caused, and as soon as they understood the policy the management assumed with regard to them our accidents stopped.

Among Effective Methods Is the Plant Publication

One method we use is the plant publication. We never know whether that does any good or not. It is a humble, mimeographed thing. It is not put out as the official voice of the company. It is not an attempt to high-hat or patronize the men; it is just a medium of conveying orders or wishes or commendations from the office, from the man higher up to the man lower down; and by attempting to place all on the level in that little publication we may have accomplished something.

Which of our methods has brought about the greatest results, we probably will never know. Today we are proud to stand in rank with some of the highest in the land, United States or Canada, as a plant and a company that is second to none in accident prevention.

CHAIRMAN FRAME: Has anyone else anything to add to the meeting.

A. JONES (Indiana Limestone Co., Bedford, Ind.): I don't feel like leaving this meeting without giving you another angle of this safety work. I am with quite a large organization. We employ in the limestone industry some 5,000 men. We are closely situated to Mitchell and I just want you to know the influence of the Mitchell plant on the community it is connected with. The Mitchell plant has been doing a lot of safety work in the schools in Mitchell and I have found out that they have spread that work to Bedford, Indiana. It has come into our territory and is tying up with our safety work. It had gotten so that we became ashamed of ourselves and we attended some of their meetings at Mitchell, and it has been my pleasure to become acquainted with Mr. Weitknecht and his assistant there. Whenever they make a good record we are proud of it, because they are now helping us to organize a safety-first campaign. However, it has been through the instrumentality of the Mitchell plant that we started this work, so I want to throw a bouquet right now to the Mitchell plant while I have an opportunity.

CHAIRMAN FRAME: I don't think Mr. Weitknecht knew what was coming when he tried to beat out Mr. Jones to the floor.

MR. WEITKNECHT: No, otherwise I would have insisted on my rights and addressed the Chair first.

In connection with general accident prevention, I want to give you this by way of illustration: Some years ago I was called into a meeting that had to do with the solving of a problem, and one of the men who was there said, "Now, let's put the thing over, let's all get very enthusiastic and put the thing over." Another man said, "That is all right as far as it goes, but is it a problem that requires enthusiasm alone? We know it has to be done, we know we can do it; what we want is resolution."

I said at the beginning of my talk we have settled the matter in our own minds, not by what we have done, but you men certainly should have had it settled in your own minds by what the cement plants have done so far this year. You know the thing can be done. It isn't enthusiasm you want. Of course, you want to be proud of it, you want to be glad of it because it gives you stimulus, but what you want to do now is to go home and carry this resolution with you. Get the determination and

enthusiasm from your workers. You who are responsible for the work must become resolute and not merely enthusiastic, because you have many difficult problems and enthusiasm will soon be robbed if it has too many variations.

CHAIRMAN FRAME: I will now turn the Chair over to Major Reninger, who will conduct the discussion on School and Community Safety for those of you who are interested in that particular phase of safety work.

CHAIRMAN RENINGER: I have asked Miss Telford to address us on this subject. She is Field Secretary for the Education Division of the National Safety Council. Miss Telford has had over three years of experience in traveling over the United States, making a study of safety in the schools in cities like St. Louis, Chicago, Cleveland and Detroit; and it is through her efforts and the efforts of her colleagues, Miss Stevenson and Miss Smith, that we really have the education magazine as it is today. It is through their visiting the schools that they have been able to collect the data and give it to us in the form that the teacher can use.

Address

**Miss M. Laverne Telford, Field Secretary, Education Division,
National Safety Council**

May I first of all, before I say anything about the program that I want to present to you, define safety education? Forgetting for the moment pedagogy, forgetting technical phraseology, forgetting the important philosophy associated with the safety movement, may I say that safety education as I see it is teaching children to become conscious of the hazards which surround them, teaching them how to avoid those hazards, and in teaching them, making them anxious to do so? I am thinking of a positive rather than a negative program. We are not saying, "Don't go skating on thin ice," but we are saying to them, "What is the danger of skating on thin ice?"

It seems to me the first thing to bear in mind in a school program is that it must be positive, secondly, it must meet the needs of the group for which it is designed. If you lived in the Iron Range in Minnesota, for example, and your children went to school there, one of the things you would feel should take a major place in safety education would be the danger of percussion caps. Percussion cap accidents are all too common in the Iron Range.

So those are my first two points. Thirdly, it seems to me we have a right to present to the school people, regardless of the school's size, a safety education program. This, I think, is important, because there is a tendency on the part of people in smaller towns to say, "Safety education is extremely essential in Chicago, but we don't need it in this town." Then next I want to present the thought that safety education has a place in our schools regardless of the type of school, regardless of the size of the community in which that school is located.

What we have been trying to do along these lines, with the assistance of the school, with the assistance of the public-spirited citizens, is to develop a correlated safety program to meet present-day conditions, to be designed along the lines that school people insist present-day school programs must be designed. You will find people talking about habits, safety attitudes, and safety skill. We want a correlated program because the school program now is full, there are a great many things to teach children in the comparatively short time they spend in school. So we say to the school people, "We are not talking about an addition of a new subject to the curriculum; we aren't asking for thirty minutes from nine to nine-thirty o'clock on Friday morning; we are talking about injecting safety material into your existing subjects. Talk it in the language class, write about it in the penmanship class."

My illustration on that particular point is a personal one. When I went to elementary school I took the Palmer Method of penmanship. I don't know how many times I was at my desk writing over and over again the phrase, "This is a specimen

of my penmanship." The phrase, "This is a specimen of my best penmanship," isn't particularly important in my everyday life.

We went to the school people and said, "If that is the way you are going to teach penmanship, why don't you give children something to write that will mean something to them?" We talk about safety projects and problems in connection with arithmetic, history and geography, and in the other subjects of the curriculum. It is true that the majority of school safety work to date has been done in the elementary schools, but it is spreading to the junior and senior high schools.

Because it is a correlated program I am discussing today, because it must vary in each community, I can't bring it to you in a brief way and say, "Here is the safety education, won't you take it back to your own community and see if you can't get it across in your schools?" We can't do that; we can't give you examples of safety education, asking you to take them back to your school people and say to them, "Here is something they are developing in Worcester, Mass.; it seems to fill the need there, why can't we do something like it in our community?"

The thing I want to ask of you specifically is that all of you take home with you that little leaflet published by the Education Division of the National Safety Council, so that you will have listed and described in just a sentence or two the school material that is now available. Will you take back with you to your superintendent this little leaflet on safety teaching in the modern schools? And then will you also take a copy of *Safety Education*, a monthly publication of the Education Division of the National Safety Council, a magazine that is designed for the use of teachers and students? And will you go over this material yourself and present it to the school people in your community and say, "This seems to me to represent the type of work that is being done in our progressive schools; hasn't it a place in our own schools?"

Safety Also Taught Through Student Activities

You can't go into a school and teach safety education. I can't come into your plant and make your men safe. But you can call to the attention of your school people the fact that the subject of safety education is important enough in the school field to have become a subject of discussion at the meeting of the Society on the Study of Education.

I have talked up to this time only of safety education in the curriculum. Safety is also taught through student activities, through local safety councils and through payrolls. That may have a place also in your community. The purpose of a junior safety council is to group the children into a small organization, giving them something to do, like being in charge of the passing of the classes in the corridors. They may have charge of the condition of the playground, or the inspection of the playground equipment. At dismissal time they may see that the children, particularly the younger children, are escorted safely across adjoining streets and highways.

There are two very definite methods of presenting safety to your school people—one, safety through class instruction in the class room, and the other, safety through child activities.

I wonder if you are thinking what relation all of this has to your work? If some of you are thinking of asking that question, I will answer it by telling you this: About two years ago I went across the Iron Range in Minnesota. Shortly after I reached Hibben, a student in one of the Hibben schools had come to school with a percussion cap in his pocket. He then took it out and held it between his thumb and his fingers. Mind you, he was in school. He tapped it with his pencil, and when the excitement was over they found his thumb, his first finger and part of the second had been blown away entirely. Immediately the authorities went to every school in Hibben, to all of the other schools along the Iron Range and put up notices relative to the danger of children handling percussion caps.

Don't you suppose the safety engineer in the mining range then talked to his men about the careless handling of percussion caps, and don't you suppose some of those

men went home and talked to their families about it? There was a very effective tie-up between the subject that had been presented to those children by that accident and the man's memory of the instructions which he had received from his safety engineer.

I believe the teaching of safety must begin in the kindergarten. It must begin even before that, if possible.

The Education Division of the National Safety Council not only has certain school publications, but they have a magazine, a junior Safety Council handbook, they have a manual for teachers, various leaflets such as Safety Supervisors' programs. Safety in Women's Sports, and so forth. We are glad to offer wherever it is possible a limited amount of field service, have someone come in and talk to your school people and make an attempt to present it to them from the school person's point of view. We are glad to be of assistance by correspondence wherever it is possible.

I appreciate the opportunity of talking to you, primarily for the reason that from our small office in New York City we can't look out across the map of the United States and effectively pick out interested locations; so if you can help us find out where the interested localities are you will have rendered us a service, as well as perhaps starting a worth while thing in your own community.

The Problem in a Moderate Sized Town

R. B. FORTUIN (Penn-Dixie): We have a problem in the town of Nazareth, which has a population of 5,000 people. There are six cement plants, a brick plant, a foundry, three silk mills, and several other industries of a like nature in and around that town. Several years ago membership in the National Safety Council was given to the public schools by several individuals in the town, with this thought in mind: that after one year's membership the school board would probably feel that they were deriving sufficient benefit out of their membership, to carry it on in the future. The membership expired this past year. Major Reninger got in touch with me and asked me to look into this thing. I went to see the superintendent of schools. He said to me, "I don't want anything to do with it; what do we get out of it? We get a magazine, put that magazine in the library and nobody looks at it."

Now here's a situation where the superintendent is antagonistic to the situation from the start. He never supported it when it was a contributory membership. Now a few of us have gotten together and started proceedings for the future. We have gone to the burgess of the town. He has heartily endorsed the program we have in mind. We have gone to several members of the school board and they have assured us of backing, and we have gone to a number of leading men in industries in town and they have assured us of support. What we intend to do is to go before the Parent Teachers Association and present this idea somewhat as was outlined, and in that way force the school board to bring this membership back into the town.

CHAIRMAN RENINGER: Just as soon as you are ready to have a meeting with those people I feel that we can count on Miss Telford coming up to assist you in explaining the situation to the Parent Teachers Association and the superintendent. I feel sure that she will be glad to do that because we are trying to outline a program to have her come and check up on the Allentown and Easton schools, and I know she will be only too glad to help you out there.

MISS TELFORD: I have a postscript I would like to add. May I make this generalization, on general pitfalls that I think all of us fall into? I don't know your specific situation but you made me think of this general situation, that in all schools, particularly in small schools given over to one type of industry or two or three industries, there is a fear on the part of the school people that the safety education is a camouflage cement safety program that we are calling it safety education and putting into these schools our own courses. I see no way to meet the objection of

school people on that score, other than to present it to them from another angle entirely.

If I should be talking to the teachers in your school I should say, "We all agree that the function of our schools is to teach people how to live." That is the very thing we want to do, teach them how to live. But, specifically, what does that mean? Can you teach people how to live in this age, for instance, without talking about automobile dangers and other dangers? Tell them that a certain part of the program of the National Society for the Study of Education was devoted to safety education. It was on the program of the Department of Superintendence, which I pointed out was the largest professional educational meeting in this country.

Starting the Program in a Unique Way

MR. FORTUIN: We have started our program in a unique way. Last June, I believe, was the first time we tried it. We have something like 55 foremen living in the town of Nazareth. In order to bring this safety idea into the homes of this group we had the NATIONAL SAFETY NEWS sent to the homes of each and every one of these foremen and other members of the Safety Council in the plant. Now it was brought out earlier in the day that there are a great many men who do not speak English very well or do not read it as well as they speak it. The children of these men naturally read the articles out of the magazines to the parents.

After an investigation we found that the NATIONAL SAFETY NEWS was the only reading matter outside of the *Bethlehem Daily-Globe* that went into a great many of the homes. We feel that within a couple of months we have accomplished a great deal in a small circle of 55 families. We have quite a number of men come back to us after receiving this copy of the NATIONAL SAFETY NEWS and tell us how much the family enjoyed the various articles in the magazine, and it brought out this: they asked us just how some of these articles pertain to their particular jobs in the plant.

MISS TELFORD: *Safety Education* can be purchased now in single subscriptions as well as in the school membership. Do you suppose that some of your families, the children of the families could find something interesting in that sort of thing? A poster which is a part of each issue of the magazine. I am just suggesting that you add *Safety Education* as well to your NATIONAL SAFETY NEWS.

A. J. EALES (Bessemer): You mentioned something about having difficulty in your school board in support of this safety campaign. I don't see why you should have that difficulty. We have a community of not quite 4,000. We have our schools fairly well sold on safety to the extent that we have two schools, the elementary grade building and the junior and senior high schools. We have a bulletin that we send to the schools. It is changed at least once a week. Not only that, but I get into the schools for talks at least twelve times a year.

Last year the railroads had a school campaign. The agents at both depots asked me if I would give a talk. It happened that they came a month apart and we got in on that. In cooperation with the other plants in our community we have a joint safety meeting semi-annually, with a good entertainment along with it. We had so many children attending this meeting that we decided to hold a meeting for the children in the school during the day. They were let off an hour earlier in the afternoon for this event.

In the high school in our community instead of having a daily chapel program once a week, they enlist speakers to talk to them. Quite often I get in as a speaker on an occasion like that.

Then there are things in the community that the schools are interested in and you might help them out. We had a danger sign in front of our grade school building. They wanted a stop sign on the street there. I happened to be the burgess of the community and that helps some. We got them the stop sign; and incidentally we can get more out of the school board by cooperating in that way.

CHAIRMAN RENINGER: I have asked Major R. C. Haven to come and give us a short talk on what we can do in community work in addition to the school work. After he has given us that talk, it seems to me, if it is the opinion of this gathering, that we organize a committee of half a dozen or more to work out a program of what we can do in the small community where we have other industries besides the cement industry, to put across a community program. If you people think that is a good idea we can carry it out. We could work out a program, nothing elaborate, so that we could get this problem of safety in the schools, which means home safety and public safety. Major Haven will give us five minutes on what we might do in the small community.

R. C. HAVEN (National Safety Council): I don't know why the Major asked me to tell you men and women what you can do in the community, when you have more experience than I can give you in small community work. You fellows are really doing the job. That isn't applesauce, but it is absolute fact, and there are men sitting here who haven't spoken who have done wonders in their towns, both large and small. I don't believe there's another section that has thought out this idea or grasped this idea of going out into the community. There are a lot of things I can say, but if I am going to talk five minutes I have got to get down to brass tacks.

Put the School to Active Safety Use

The school is the common ground where people meet, it is the place to start activities, and it is the place where you work out your political and a lot of other problems. So if you are going to use the schools, use them. I don't know of another place you can use to better advantage. But don't try to teach school safety entirely. I wonder if you men have gotten to the point where you have sort of analyzed the accident situation in your community outside of your own plant. When you go back to your home town, start a little research work, find out where your accidents are occurring and then concentrate. It may be in the homes, it may be through automobiles, it may be through fire, or they may occur in other ways.

Find out about the parents and teachers' home inspection blanks, where you can send a little blank into the home. Perhaps it is your automobile accidents, and really that is the thing that is causing us more concern, as far as industrial safety is concerned, than the industries themselves. What does an accident mean to your factory if a man is killed by an automobile? It affects your labor community just the same as though a couple of sacks of cement fell on him.

Then your fire prevention. You would be surprised how many little fires start in your community that might burn the town down. You will find a lot of these things.

I haven't told you very much that you can do. The Major wanted me to tell you what you can do locally. I would go back, if I were you, get the men together in the plant and sit down and tell those fellows what you have learned here, the contacts you have made; and say, "Let's get together, let's go to the burgess or mayor and tell him the seriousness of the situation." That, of course, would have to come after you have found out just what your situation is. At this meeting a course of action can be decided upon.

It is pretty hard for me to stand up here and work out the details. I would much prefer to leave just one or two thoughts with you. The first is this: Don't go back to your home town feeling, "Well, I attended the Cement Section; I can report to the boss and tell him I was there and have done my duty." Remember that you are the keyman. You are the keymen who have been sent out from your community to bring back to that community something that will help them.

Then there is just one other thought. Did you ever analyze, did you ever stop to think what an accident really means? Suppose you went out here tonight to your hotel room and found there was a telegram for you saying that mother was struck by an automobile today, or perhaps your wife, or perhaps one of your children; have

you any idea what that accident would mean to you? Well, now, that is not an impossible possibility when you think there are between 20,000 and 25,000 people going to be killed this year by automobiles. What if you got that message? Men, just think of what an accident means and I believe that you will go back feeling that you are something more than just an ordinary man in your community.

You don't have to do that. All you need is to go back with a little energy and determination. Find out the accident situation, get the safety men together and the people, and then work out a little plan which the National Safety Council will be glad to help you with.

CHAIRMAN RENINGER: Those of you who have local safety councils naturally are tied up with them. You can have a little safety council of your own in your own community. What do you fellows think we ought to do? Do you want the Cement Section to work out the program with the help of the National Safety Council and the Education Division? Do you think we could furnish you with some information that you could use in your villages and in your towns? I have gotten to that point where I feel that in the cement industry we have gone ahead, we have shown the people throughout the country and we have shown the executives what we can do in the industry. Don't you think it is up to us to broaden out and help our own community?

D. ADAM (Lawrence): I have tried to the best of my ability to interest the local schools in safety. Once I invited the superintendents of the schools and the teachers to an evening show. In the afternoon we invited the school patrol under the supervision of the teachers to attend the theater. It is purely a sales proposition. You try to sell the safety idea to your men at the plant. In the same way you can sell the proposition to the school.

CHAIRMAN RENINGER: Does anyone have any recommendations to make?

A Committee for More Active Safety Cooperation

MR. FORTUIN: I have had this in mind for sometime: I don't know if it is exactly up to the Council itself, but someone has got to take the lead in it and if the Cement Section does, it will demand sufficient recognition to develop it into something bigger later on. Suppose we have a committee or a group to lay out a plan of procedure to extend over a period of time. In other words, to make it sort of a campaign to institute safety in the community. This information or data can be written up and a plan organized for it and that should be sent out to the various cement districts and in the next three months or in the next six months we, in each of our own individual sections, can endeavor to accomplish what is outlined therein.

R. S. HUEY (Universal): I don't know whether the scheme that is being worked in our town would work in most of these towns or not. Our town is probably a little larger than most of these cement communities. However, the activities of the safety work have been sort of taken over by the Chamber of Commerce and they have a program on accident prevention and safety during the winter. They have a meeting every month, with sectional meetings at this general meeting, where they have metal and woodworking, truck drivers schools and so forth, with a general meeting afterwards in which everybody participates. They have a first-class speaker of national importance come and talk to them. They have been instrumental in getting the men in industry and the police department and everybody else working together on this.

They started a campaign, a safe driver's campaign, in which every automobile owner was asked to sign a pledge to drive safely and this year they have cut the accidents down considerably. They had 22 last year. They have cut them down so there have only been six so far this year. They are working together with the school board and I think practically all this work is being done in our schools. In their English classes they have the pupils write "Look to the right and look to the left," and all

such things. In their arithmetic they are given the number of accidents and such things as that. It is brought home to them in the way Miss Telford has mentioned.

If you get some sort of an organization working like that, a committee which will get the interest of the community and get them out with a good program, you will certainly get results.

CHAIRMAN RENINGER: We weren't thinking so much of that; we were thinking of towns like Nazareth, or Mitchell, or some of the smaller towns of 3,000 or 4,000 population. For the big cities the National Safety Council has its organization, but it is to get some simple program for the smaller towns. If you men are interested enough we will go ahead with this and try to work out a simple program for the cities where probably they have one teacher in the schoolroom, or maybe two or three. Let us see if the Cement Section can't be a couple of jumps ahead of the other sections in this work, as it is in accident records. Let's have it to our credit that this plant in this district has started the safety work in its community. That is what I have in mind. If you feel that it is worth while and are willing to go along with it, we can get the Education Division to work out a program with us and we will shoot it to every cement company in the country.

MR. WEITKNECHT: I make a motion that the officers of the Cement Section constitute a committee to confer with the Education Division of the National Safety Council to develop a program and submit it to the cement industries where that program would be applicable.

(The motion was seconded, but to a vote, and carried).

CHAIRMAN RENINGER: I am very glad we had this meeting, I think a great deal will be accomplished.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Cement, Quarry and Mining Joint Luncheon

Wednesday, September 28, 1927

A. J. R. CURTIS, Chairman
Assistant to General Manager, Portland Cement
Association, Chicago, Ill.

The joint luncheon session of the Cement, Quarry and Mining Sections of the National Safety Council was called to order by the chairman, Mr. A. J. R. Curtis, assistant to the general manager, Portland Cement Association, Chicago, Ill.

CHAIRMAN CURTIS: Whether your problem is to find a substitute for gasoline, cure an illness or meet the competition of a foreign competitor, the orderly procedure is the same. First of all you must diagnose the situation, find out what the problem really means; secondly, you must devise ways and means to meet the situation the diagnosis has revealed—you must prescribe a remedy.

This procedure is adopted by anyone, consciously or unconsciously, that elects to accomplish things in an orderly and logical manner.

In safety work many industries have been taking headache medicine—doping themselves with a “cure-all” supposed to be good for what ails them. They have taken the dosage without thought about the fundamentals of the problem and without an adequate diagnosis.

The reason we have made such startling progress in safety work in the cement industry is because we have diagnosed our case and then found remedies for specific illnesses. We have done this by means of a fine system of statistical records and reports. This report system, inaugurated in 1919, shows us what and where the accidents are. The records indicate what season of the year a certain type of accident is likely to occur. They enable us to measure the efficiency of this scheme or that scheme in the promotion of safety in our plants and quarries.

Ethelbert Stewart, United States Commissioner of Labor Statistics, speaking before the Cement Section of the National Safety Congress in Detroit early this year, commented favorably on our statistical system.

“I find that statistics of the Cement Section of the National Safety Council are the very best that come to my office,” Commissioner Stewart said. “You are doing a piece of work that must inevitably result in a rapid decrease in your accident rate. I do not know whether or not you are making effective use of these figures, but they are significant and you certainly should be doing so.

“In the first place you have any industry devoted to the manufacture of one definite product—cement. Your product does not go, as would be true in the chemical industry, into everything from lipsticks to laundry soap. In gathering your statistics

you have something definite to work on and you have succeeded in doing the basic thing, that is, finding the man-hour exposure in your industry and relating your accidents to that. Statistics cannot reduce accidents, but they can tell you where the accidents occur. They can and do tell you where to apply your precautionary measures and where to spend your money. They make it unnecessary to spend money along several lines when most of your accidents are occurring along one or two lines. Comprehensive accident statistics are worthwhile and I congratulate your industry and the many individual manufacturers who are cooperating to make this statistical work so effective.

"I have been able to show others that you have reduced your accidents. Statistics form the basis for a lot of standard jokes like the mother-in-law joke and everyone thinks he can take a whack at a statistician and his statistics; but, nevertheless, if you are going to improve the accident in your plant you must know where the accidents occur and that requires statistics.

"Your statistics have made it possible for me to show others that you have reduced your accidents. I hope to impress you with the importance of continuing and further perfecting your statistical work, not only for yourselves, but for the influence it is going to have on the other sections of the Safety Council on your own and other industries."

We are so well sold on the diagnosis theory because we can take our limited means and get excellent results. We don't have to guess—we can take one direct shot and make it tell. We are able to do this because our records have revealed a specific situation—the case is diagnosed and we can take steps to remedy a definite problem that confronts us.

All mining and quarrying industries can make the same sort of case study. The experience of the cement industry points to the expediency of this method because in our industry we face problems in both of these divisions.

Let me give an example of what statistics have done and will do for us. Our records show a growth in screw conveyor accidents at a certain time of the year. For the past nine years we can trace a growth in lost-time accidents of this type at a certain period.

Instead of spreading our funds to battle all sorts of accidents at this given period we can centralize our efforts to combat screw conveyor accidents when they are again in the ascendancy. So we gathered a large number of opinions of experts on how to eliminate conveyor mishaps.

This symposium will be sent to all mills when the time comes. Plans will be made well in advance to meet the situation when it arises.

I believe that a large portion of accident success is based, as I have said before, on the diagnosing of the problem in hand and then prescribing remedies for the specific illness.

Now, we are to be favored with a brief address by a man in a position to be familiar with the inside details of the accident situation. Mr. W. W. Adams is statistician for the United States Bureau of Mines, Washington, D. C., and he has kindly consented to talk to us from the point of view of the Bureau. I take pleasure in introducing to you Mr. Adams.

Safety in the Quarry Industry

W. W. Adams, Statistician, United States Bureau of Mines, Washington, D. C.

Safety in the quarry industry is a matter of direct concern to 92,000 men who are employed in the industry and it is also of almost equally direct concern to their immediate families. Thus between 300 and 400 thousand people are personally affected by the accidents that occur in connection with the

annual production of stone in the United States and in connection with the crushing and other work that immediately follows its extraction from the earth. From 120 to 150 of these men are killed by accidents each year, and 14,000 of them are non-fatally injured.

Through the cooperation of the producing companies, the United States Bureau of Mines conducts an annual canvass of accidents and employment covering the quarrying of stone, and such subsequent work as crushing, rock-dressing, and the manufacture of lime and cement. This work began in 1911 and statistics covering the past 16 years are now available. These statistics are based upon reports furnished voluntarily by the producing companies on blank forms supplied by the Bureau of Mines. Each non-fatal injury reported to the bureau involves disability of the employee for more than the remainder of the day on which the accident occurred. In other words, the Bureau's statistics are limited to what are known as "lost-time" accidents. While many of these injuries cause the employee to lose only one or two days, some of them involve the loss of several weeks or months. Taking them in the aggregate, they average about 15 days per injury. Any company whose temporary injuries average less than 15 days each has a relatively safe plant, or is lucky, or is doing effective safety work. If deaths and permanent disabilities are drawn into the picture and given their customary equivalent weights in lost days, the average accident in the quarry industry represented a loss of 104 man days in 1925 and 94 man days in 1924. In this average each fatality and permanent total disability is considered equivalent to a loss of 6,000 days and each permanent partial disability 800 days, the last-named figure being borrowed from the reports of the Industrial Accident Commission of California until sufficient reports of this class of injuries accumulates in the Bureau's records to develop a new average.

An Intensive Study of Quarry Accidents

In addition to the Bureau's annual canvass of accidents which is based on reports from all producing companies in all states, or as nearly all of them as we can obtain, a special and much more intensive inquiry into quarry accidents has been under way during the past two years. This study is based on full and complete reports—a separate and detailed report for each accident—from a limited number of companies. Each of these companies employs at least 25 men inside the quarry. They are the companies that are participating in the National Safety Competition which is being conducted by the Bureau of Mines. Two such annual contests have been completed, namely, that of 1925 and that of 1926. One of the purposes of the safety contest is to determine which quarry has the smallest loss of time from accidents in proportion to total man hours of exposure. The quarry that establishes the best record receives a bronze trophy or statue known as the Sentinels of Safety, which is the gift of the Explosives Engineer magazine. Credit for providing the trophy and for very material aid in connection with the contest, is due very largely to the enterprise of Mr. N. S. Greensfelder, the editor. The trophy is held for one year by the winning company, and is then surrendered to the winner of the next year's contest. Each year the name of the winning company is engraved on a pedestal of the trophy and each employee of the winning quarry receives an engraved certificate of honor issued by the Bureau of Mines and signed by the director of the Bureau.

The Bureau's annual canvass of quarry accidents affords a broad picture of the accident situation as it affects the whole industry or any large portion or phase thereof; it also furnishes an annual account of the volume of employ-

ment required to produce the country's annual stone supply and of the total loss of life and limb as well as the loss in Man days that went into the cost of producing the stone. The more detailed reports furnished in connection with the National Safety Competition are usually supplied as a carbon copy of the report which the company is required to send to its insurance carrier or to the state compensation commission. In this way the Bureau is furnished with valuable detailed information on accidents with a minimum of inconvenience to the company.

It will thus be seen that the Bureau of Mines statistics of quarry accidents are collected by two methods from a common source, namely, the quarry companies. It will also be observed that the statistics differ in scope, geographically, and in the degree of detail with which the information is supplied. From these two sources of information and similar information from other branches of the mineral industry, it is apparent that quarry accidents occur less frequently and cause a smaller loss of time in proportion to number of employees than do accidents at metal mines or coal mines. In other words, quarry work is not as hazardous as coal mining or metal mining, considering each of the three industries as a whole. Moreover, differences also exist between the hazard of different kinds of quarries. Perhaps the chief distinction in this respect is between quarries that produce dimension stone and those that produce non-dimension stone. Quarries that produce crushed or non-dimension stone have higher accident rates than those that produce dimension stone. For example, the fatality rate for the non-dimension group, in and about the quarry, in 1925, was 33 per cent higher and the injury rate was 7 per cent higher than the corresponding rates at dimension stone quarries; in 1924 the rates were respectively 76 per cent and 18 per cent higher. A comparison covering all years since 1916 shows that, without exception, the group rates for both fatalities and injuries, have been higher at stone quarries producing non-dimension stone, the excess ranging from 5 per cent in 1921 to 118 per cent in 1920 for fatal accidents, and from 1 per cent in 1917 to 122 per cent in 1921 for non-fatal accidents. Moreover, possible differences in length of work day at the two classes of quarries have no material effect upon this relationship. This is shown by figures which have been compiled for quarries working uniform shifts, that is, eight hours, nine hours, or ten hours.

Increased Accident Frequency Unaccounted For

In crushed-stone or non-dimension-stone quarries, where no care need be exercised to prevent breaking the stone, it might be expected that the rate from accidents from explosives would be higher than that in quarries producing dimension stone that is intended to be used for building or monumental purposes. This, in fact, has often been the case, as shown by the annual reports which the Bureau of Mines has received from the producers of stone. It does not, however, fully account for the higher frequency of accidents at crushed or non-dimension-stone quarries. A comparison of the annual figures for the two classes of quarries during the past seven years, shows that some other classes of accidents also, as a rule, occur more often at quarries that produce crushed or non-dimension stone. Crushed-stone or non-dimension-stone quarries show higher injury rates for accidents caused by handling rock at the quarry face, also for accidents from falls or slides or rock or overburden. Haulage accidents also are usually more frequent at crushed-stone quarries. Accidents caused by falling objects, which records for earlier years showed were of more frequent occurrence at crushed-stone quarries, have been materially reduced during the past four years, and in 1925 the crushed-stone rate for this

class of injuries was actually lower than at quarries producing monumental or building stone. A somewhat similar situation prevails as to accidents from flying objects; the rates for this type of accidents have been high for both kinds of quarries, but during the past three years the non-dimension quarries have established the better record. Machinery accidents also are among the major cases of injuries at both classes of quarries, but in the past few years the crushed-stone quarries have reduced their injury rates from this cause and since 1922 these rates for machinery accidents have been lower than at dimension-stone quarries. The net advantage, however, still lies with quarries that produce dimension stone; that is to say, the injury rate covering all classes of accidents combined is still lower for the dimension-stone quarries.

Quarrying Less Hazardous Than Other Mining

Accident prevention is a national as well as local problem. It is therefore appropriate that national associations, such as the Portland Cement Association, the National Crushed Stone Association, and others, should undertake or maintain some group action looking to the prevention of accidents. In 1925, more than forty states contributed to the production of stone in the United States, and in more than 34 of these states accidents were suffered by the men who produced the stone. To the extent that quarry accidents are similar regardless of location of plants, it would seem that the national associations might with advantage undertake a study of the accident-prevention problem. It has already been said that the quarry industry is less hazardous than coal and metal mines, both as regards accident frequency and accident severity. This, however, is no more than might reasonably be expected because nearly all quarry work is done in the open daylight, whereas most of the operations at coal mines and metal mines are conducted underground, where the light, which is necessarily artificial, is often not adequate for maximum safety; also in the underground work, there is the additional hazard of falling overhead material. The quarry industry should therefore not be content if it merely maintains an accident rate better than that for the mining industry, but should strive to lower its rate from its own previous levels. This has already been done to some extent so far as fatal accidents are concerned, but not to any material degree as regards injuries of a non-fatal character.

Of the 92,000 men working at quarries in 1925, the operator's returns to the Bureau of Mines showed 52,000 working in and about the quarry pits and 40,000 working at the outside plants. About three-fifths of the accidents occurred to the men working in and about the pits. These accidents accounted for 101 deaths and 8,632 lost-time injuries. The fatality rate per thousand 300-day workers was 2.28 and the injury rate was 195. The injury rate was the highest on record since 1915, when the statistics for inside and outside accidents at quarries were first segregated. On the other hand, the fatality rates previous to 1925 were, in four cases, better, and, in six cases, worse than the rate in 1925. These figures show that more progress has been made in the prevention of fatalities than in the prevention of injuries. A comparison of these figures with those for outside plants shows that more progress has been made outside than inside the quarries, and this fact has contributed favorably to the record for the industry as a whole.

The number of days a quarry is in operation is largely a matter of contracts and weather conditions. Perhaps choice plays little or no part. Yet it may be interesting to know that it is apparently safer for a quarry to work full time than part time. That is to say, the accident rate per day diminishes as the number of days the plant is in operation increases. A quarry that is in operation a full year is likely to have a lower accident rate per day than if it

60 per cent of the total quarry workers in the United States. These facts are referred to because the cooperation of the company as well as the employees must be obtained to make safety work effective. A relative small number of companies have it within their power to give a tremendous impetus to quarry safety work that will benefit 80 per cent or more of the entire industry.

The accident rates for the whole quarry industry are but slight indication of what individual companies can accomplish. For example, the industry's accident-severity rate for work inside the pits, as nearly as it can be computed from available records, was 8.202 in 1925 and 6.931 in 1924; the corresponding group rate for companies in the National Safety Competition was 7.599 in 1925 and 7.760 in 1926. Yet in the 1925 safety contest, seven quarries out of 102 and in the 1926 contest fourteen quarries out of 118 operated their plants the entire year without a lost-time accident. In 1925 sixty plants or 59 per cent of those enrolled had accident-severity rates of less than 1 and in 1926 67 plants or 57 per cent had rates of less than 1. Thus it is seen that the group average of 8.202 in 1925 and 6.931 in 1924 for the whole industry, and the National Safety Competition group averages of 7.60 and 7.76, respectively, in 1925 and 1926 are by no means the best that individual quarries can do in the elimination of accidents to their employees. In fact, the 1926 contest showed that 97 plants, or 82 per cent of the total number, had accident-severity rates that were better than the group average; 21 plants, or 18 per cent of the total number, had rates that were higher and therefore worse than the group average. This means that 18 per cent of the companies were mainly responsible for the group average being as high as it was. Had it not been for the many good companies, the rate would have been much higher. The record, in fact, showed that the companies whose rates were better than the average had a group rate among themselves of 2.314, while the rate for those whose record was worse than the average was 38.695; 2.314 for the good companies; 38.695 for the bad companies, an average of 7.760 for both combined. The bad companies had a rate that was more than 16 times that of the good companies.

Comparing Accident Experiences Is of Value

The purpose of these and similar statistics is to make it possible for individual quarries to compare their accomplishments in accident prevention with what has been done by other companies. Any individual company may be remarkably successful in the elimination of certain classes of accidents and equally unsuccessful in combating other types. Neither the degree of success nor the degree of failure can be known without some standard of measurement. The National Safety Competition of 1926 has shown that while all of the quarries combined had a group rate of 7.760, yet 82 per cent of them had lower rates than that figure. The rates ranged from zero to more than 200. Rates for the individual companies have been published, but in such a way that the identity of each company is concealed. Each company has been advised of its own rate and of its relative standing among all companies. Copies of a circular containing these rates are available to any company upon request. Incidentally it may be stated that the circular also contains the rates of coal mines, metal mines, and non-metallic mineral mines. All of these rates have been calculated on a uniform basis and are therefore strictly comparable. The method of compilation is simple. Any company may easily prepare its own accident records in the same way. Those companies that see fit to do so will find that they are following a practice that has become standard not only in the mineral industry, but in other industries as well. Following such a prac-

tice, any company may readily learn how it ranks with other plants of the same type or with any other industrial unit.

It is hoped that the companies represented at this meeting may find it practicable to place their accident statistics on this standard and widely accepted basis. In the event that any company establishes a safety record better than those indicated in the National Safety Competition, the Bureau of Mines would appreciate it if the company making the record would inform the Bureau of the fact. The Bureau desires to learn of cases of this kind so that suitable public recognition may be given.

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Chemical Section

New Section Officers

Chairman, DR. LEONARD GREENBURG, U. S. Public Health Service, c/o Yale Medical School, New Haven, Conn.
Vice-Chairman, C. F. WHITEMORE, Western Electric Company, Chicago, Illinois.
Vice-Chairman, E. C. ROGERS, The Grasselli Chemical Company, Cleveland, Ohio.
Vice-Chairman, C. E. RICE, The Dow Chemical Company, Midland, Mich.
Secretary, WILLIAM A. BAXTER, The Newport Company, Milwaukee, Wis.
Poster, Slide and Safety Kinks Committee Chairman, H. L. MINER, E. I. duPont de Nemours & Company, Wilmington, Del.
Membership Committee Chairman, E. C. ROGERS, The Grasselli Chemical Company, Cleveland, Ohio.
Publicity Committee Chairman, CARL F. COFFELT, Victor Chemical Works, Chicago Heights, Ill.
Industrial Poisons Committee Chairman, S. E. WHITING, Liberty Mutual Insurance Company, Boston, Mass.
Program Committee Chairman, C. F. WHITEMORE, Western Electric Company, Chicago, Illinois.
Engineering Representative, A. L. ARMSTRONG, Eastman Kodak Company, Rochester, N. Y.
Statistics Committee Chairman, C. E. RICE, The Dow Chemical Company, Midland, Michigan.
Executive Committee, THE OFFICERS AND—
S. H. KERSHAW, National Safety Council, Chicago, Illinois.
I. V. KEPNER, Pennsylvania Salt Manufacturing Company, Philadelphia, Pa.
J. S. SHAW, Hercules Powder Company, Wilmington, Del.
DR. C. L. REESE, American Institute of Chemical Engineers, Brooklyn, N. Y., c/o E. I. duPont de Nemours & Company, Wilmington, Del.
PROF. C.-E. A. WINSLOW, School of Medicine, Yale University, New Haven, Conn.
JOHN ROACH, Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.
H. C. PARMELEE, Chemical and Metallurgical Engineering, New York City.
A. L. WATSON, The Koppers Company, Pittsburgh, Pa.
DR. H. E. HOWE, American Chemical Society, Washington, D. C.
L. A. DEBLOIS, National Bureau of Casualty & Surety Underwriters, New York City.

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Tuesday, September, 27, 1927.

S. E. WHITING, Chairman

Assistant Chief Engineer, Liberty Mutual Insurance Company, Boston, Mass.

The first session of the Chemical Section of the National Safety Council was called to order at nine-forty-five o'clock by the chairman, S. E. Whiting, Assistant Chief Engineer, Liberty Mutual Insurance Company, Boston, Massachusetts.

CHAIRMAN WHITING: I am very glad indeed to welcome you to the Chemical Section meetings at the Sixteenth Annual Safety Congress.

Those of us who had the opportunity yesterday to attend the General Meeting heard the invocation of the Reverend Dr. White on the general safety problem. He sought Divine assistance in solving the "unleashed hazards" that our modern civilization has created. I feel that the Doctor must have had this chemical industry particularly in mind because, as you all know, every month or so some chemist gets up some new combination of atoms or perhaps electrons and puts them into production in our factories. It is then up to us safety men to prevent our workmen from being injured by these newly unleashed forces.

I am not a chemist myself but I am speaking entirely by the book when we talk about new things. Here is a bulletin of a very prominent firm of consulting chemists, dated September, 1927. In a single paragraph it tells of one specific new development,—the expanding use of solvents. A list of fourteen relatively new solvents is given, but very little is said about hazards. They do mention benzol as a possible hazard and it is to the credit of the Chemical Section that something definite is generally known about the hazard of this solvent. It will take time to determine them all.

Most of the list we know only by names with some idea of their explosive possibilities as one hazard. There are also skin irritant possibilities and also toxic possibilities. Even Dr. Winslow, who has done so much for us on benzol, doesn't know all those qualities for the other solvents. It will take time to determine them all.

I think this section has been working along the entirely proper and practical line of investigating these new processes by actual field tests of air contamination and of the employee's health. Yet there is an inevitable waiting period before we shall know the actual facts. What you practical safety supervisors of chemical plants can do in the meantime I feel (as a layman) is this: I don't think you should wait until the specialist has told you the exact hazards of any new chemical whatever. I think you should not assume it is harmless, from either the explosive, the skin-irritant or the toxic standpoint. For example, many of us know that one particular new process

has recently led to a very serious industrial accident not far away from here,—a genuine catastrophe. We do not want to wait for such lessons as that before we correct any explosive hazard. We do not know that some new skin irritations may not crop up. We do not know that there may not be some more insidious systematic effects. Thus, some medical men are now even connecting so serious a disorder as cancer with skin troubles from certain oils. And as to any possible toxic qualities of these new substances, we haven't any answer at all as yet.

What are we going to do in the meantime? We can at least try to enforce every proper precaution against those perhaps remote possibilities. On explosion hazards, we can insist on proper control of temperatures and pressures, the elimination of sources of ignition and the adequate ventilation of dusts and vapors. As far as the skin of the worker is exposed, we can insist on protective clothing from head to foot. We can insist on proper hygiene of the workers and good housekeeping in the plant.

Another thing we can insist on is good hygiene on the part of the new process itself. The chemist gets out his new process and he is interested mainly in being sure that it produces a particular reaction with a particular finality of purity or whatever he calls it, and he isn't primarily interested in whether or not he spills dusts or vapors all around the plant, exposing the workmen to them. On the other hand, you look at the new process from the outside standpoint and can undoubtedly suggest mechanical ways of making that process itself more hygienic so as not to put the burden of protection entirely on the workmen,—or the janitor.

On the other possible hazard,—the toxic effect of new substances,—nobody knows how safe it is for a workman to breathe a contaminated atmosphere, contaminated in some new manner. Yet you do know that he has to breathe continuously and, therefore, you are entirely justified in asking your management to allow you to adequately ventilate all work rooms or to adequately protect the worker with respirators (if driven to it) so that the worker can maintain his proper birthright of breathing only God's pure atmosphere.

Taking up our program now, we begin with the statistical situation in the chemical industry as it has changed during the past year. This is presented by Mr. C. F. Whittemore, Health Hazards Department of the Western Electric Company, Chicago.

The Accident Situation in the Chemical Industry

C. F. Whittemore, Health Hazards Department, Western Electric Company, Chicago, Ill.

1. *Definition of Chemical Industry*

In outlining the accident situation in the chemical industry, we must first define the field covered by our accident statistics. Those who were at the Detroit Congress last year will recall Dr. Ethelbert Stuart's plea for greater uniformity in statistical practice. He felt that a sharper line should be drawn between chemical and non-chemical industries. While such a reclassification would aid the statistician, it is doubtful if an exact division can be made because the far reaching influence of chemistry enters so many industries not entirely chemical yet very closely related.

After all, we have a rather closely-knit group known as "The Chemical Engineering Industries," having in common an interest in chemical processes such as decomposing, electrolyzing, fermenting, and catalyzing. There are other processes of mutual importance such as compressing, humidifying, conveying, combustion, pulverizing, screening and mixing that bind this group of apparently unrelated industries more closely together. The products of the industries included in the following group may be, therefore, entirely different but the unit operations are basically the same:

Cement and Lime, Ceramics, Coal Tar Products, Coal By-Products, Electrochemical Products, Explosives, Cellulose, Fertilizers, Fine Chemicals, Food Products, Glue and Gelatin, Heavy Chemicals, Leather, Oils, Vegetable and Animal, Paint and

Varnish, Petroleum Refining, Pulp and Paper, Rubber, Soap, Sugar and Wood Chemicals.

2. *Scope of Statistics Compiled in Chemical Section of National Safety Council*

This chemical engineering group has been subdivided, however, in organizing the National Safety Council, some of the component industries being set apart, as for example, sugar manufacturing in the Food Section; leather in the Packer's and Tanner's Section; paper and pulp, petroleum, and rubber in separate sections of corresponding names. This leaves the following in our Chemical Section and the accident reports discussed in this paper apply to this group:

- Acid Manufacturing.
- Coal Tar Distilling.
- Dye Manufacturing.
- Explosives Manufacturing.
- Paint and Varnish Manufacturing.
- Smelting and Copper Refining.
- Miscellaneous Chemical Plants.

The miscellaneous chemical plants include the manufacturing of various pharmaceutical, soap, solvent, salt and cellulose products which might be classified further but such sub-division would be of doubtful value as there would be only one or two members in each group.

Summary Reports of Industrial Accidents

3. *Present Method of Compiling Data*

Every year each section of the Council asks its members for a summary report of industrial accidents for the calendar year just ended. A printed form is furnished for compiling (1) the average number of employees, (2) the total hours worked, (3) the number of accidents causing lost time beyond the remainder of day or shift, (4) the number of days lost as a result of these accidents, (5) frequency rate, and (6) severity rate for the entire company or for each branch if desired. On the reverse of this report blank each item is fully explained and a scale of time charges for deaths and permanent injuries is given. These reports are entirely confidential. In publishing information thus collected, the names of all participating companies are withheld and are known only to one member of the staff who compiles the statistics for publication. A key number is assigned to each member who may therefore compare his accident experience with that of other plants in a similar line of business when he receives the annual report.

4. *Cooperation*

Although the number of plants reporting this year is greater than last year, there is still room for improvement for the total number of returns corresponds to only about one-half the number of members. The reports requested are so brief, it seems as if many more responses should be received. Will every delegate present, please take one copy of the report blank home, and if his company has not reported before, read over the explanatory notes first to convince himself and then arrange to cooperate next year by sending to Council Headquarters, the figures covering his company's 1927 accident experience. The more data we have, the better picture we shall get of the true accident situation in the chemical industry.

5. *Outstanding Facts Revealed by Data for 1926*

Analysis of this year's summary report reveals the following outstanding facts relating to the Chemical Section for the year 1926:

Each injured person lost an average of 125 days.

The average number of days lost per person employed was 5.6.

For every 71 non-fatal accidents there was 1 fatality.

The number of plants reporting 1926 records represents an increase of 66

per cent over 1925. Last year 65 reported and this year there were 108 returns.

Accident frequency rate has been reduced over 12 per cent (from 20.91 to 18.26).

Accident severity has been reduced more than 15 per cent (from 2.71 to 2.28).

6. *Comparison of These Facts with Experience of All Sections Combined*

Although the true test of success or failure lies in comparison of each section's record with their own previous year's showing, it is also interesting to compare data for the Chemical Section with similar figures for all sections combined. Our average time lost by each injured person, 125 days, is considerably higher than the average of 78 days for the entire group, although the average time lost per person employed is slightly less than that for the council as a whole. Twice as many fatalities, 1 for every 71 non-fatal accidents have occurred in the Chemical Section as compared to 1 in 140 for the entire membership. This year's increase in companies reporting in our section 66 per cent, is considerably higher than the increase of 42 per cent for all sections. Our accident frequency rate reduction is lower, but compares more favorably with that of the whole council if we note that the Chemical Section's rate is only 18.26 compared to 24.59 for all sections combined. Our accident severity rate has been reduced more than that of all sections, 15 per cent, against 4 per cent, but in this case, there was more need for improvement in the chemical group.

7. *Conclusions*

In conclusion, the data obtained this year for 1926 show improvement in rates of both accident frequency and severity. There is a decidedly favorable trend due undoubtedly to organized and well directed efforts to create and maintain safe working conditions.

That such improvement can be accomplished without slowing up production has been shown by the American Engineering Council as a result of a very thorough study of trends in productivity and accident rates of about 14,000 companies employing in 1925 two and one-half million workers. A summary of this report was discussed by Mr. J. E. Hannum at the Newark meeting of the Chemical Section last April, and published in the August number of the NATIONAL SAFETY NEWS. The results of the same survey have also been summarized by L. W. Wallace in the September number of Mechanical Engineering. Their investigation has proved that material reductions in accident rates can be obtained simultaneously with increases in production rates. Such favorable performances were made in the acids and heavy chemicals, by-products coke, and explosives industries.

Discussion of Mr. Whittemore's Paper

CHAIRMAN WHITING: We have been making progress, according to Mr. Whittemore, during the last year in the industry as a whole. He points out an important flaw, however. Some of you gentlemen are not in this game of statistical competition and you ought to get into it. You may need this competitive argument sometime, especially if you are at the tail end of the list, with your management in trying to sell them on the idea of giving you further support in safety work.

I know some of the chemical industries have secured an astonishing reduction in their accident record. They seem to be too modest to get up and tell us about it, but they have proven it can be done. Some of you might like to ask Mr. Whittemore a question on this matter.

MR. WHITTEMORE: I have sample blanks on which your statistics can be turned in to Council headquarters and will give them out for you to take home.

CHAIRMAN WHITING: Please start the practice of supporting this statistical rec-

ord. It is bound to help you in the long run. Your figures will be treated confidentially. Do you want to come into this discussion on statistics, Mr. Greenfield?

C. W. GREENFIELD (du Pont Viscoloid Company, Arlington, N. J.): Not just now.

JOHN S. SHAW (Assistant General Manager, Hercules Powder Company, Wilmington, Del.): Mr. Chairman, I assume these average figures such as 125 days per man include the loading for permanent disabilities?

MR. WHITTEMORE: Yes. The usual assignments have been used, both the days actually lost and the loading for dismemberments, deaths, etc., as scheduled on the summary blank.

CHAIRMAN WHITING: I believe Pennsylvania Salt is sending in their statistics, and I would like to have Mr. Kepner say whether it is of practical assistance to him.

A Line on Where Accidents are Occurring

IRA V. KEPNER (Pennsylvania Salt Mfg. Company, Philadelphia, Pa.): I can't just say of what relative value these records are in selling the management, but they certainly do keep us advised as to our accident severities and frequencies. Very often it gives us a line on just where the accidents are happening and how effectively we are reducing them. We can compare our progress year after year.

I am sending my statistics to the National Safety Council, and when I look over the experience of the others it makes me feel that probably we are not so bad after all when we are compared with some of the others. Yet I feel when we do have an accident, particularly a fatality, we belong down at the bottom of the list.

I might say, patting myself on the back, that we are fifth on the list. I don't know who the other fellows are who stand 1, 2, 3 or 4, because they are only known by numbers. You each know your own number because the Council gives you the key. I would like to hear from the other fellows in the Chemical Section who stand 1, 2, 3 and 4. They are probably all in this room. I would like to know how they do it.

CHAIRMAN WHITING: We are ready to hear from Number 1, if he will admit it—or even from the highest number.

W. A. BAXTER (The Newport Company, Carrollville, Wis.) We also send in our accident experience but it is nothing of which I am proud when we compare it with some of the others. I was just wondering if I was doing this work properly. For example, I see one firm here that has 1,732 employees and they show only one temporary disability. I don't know how it can be done. Either I am a very poor safety organizer, or I don't compile these figures correctly or some of you fellows are cheating.

A lost-time accident, as I see it, is one where a man loses time beyond the same shift or day period. I have in mind that if you send a man to a doctor with a chemical rash and the doctor tells him that he will have to take a couple of days off, some of you might put him in another department where he can continue at work, but where the doctor says he should take a couple of days off, I list him as a lost-time accident. I would like to know what some of the other members of the Council do in that respect.

CHAIRMAN WHITING: On this question of "faking" records, I know that companies in various industries in their accident competitions do sometimes allow what you might call faking; that is, they will bring back a slightly disabled man who ordinarily would stay out a few days and give him a light job. That may be faking in one sense. In another sense it may not be faking at all; it may be the very best medical treatment for that man,—the best psychological treatment for that man may be to have him back on a job, to have him doing something to keep his mind off his injury.

The real fakers from the employer's standpoint are those who are drawing an employee mutual benefit, an insurance compensation and some private benevolent association's weekly stipend, all of which together give them better wages than they are getting when they are working. Naturally that fellow wants to loaf, but you don't want that to be put over on you

Again, referring to the bringing back of the partially disabled man and putting him on light work, what is the harm of it? It does at least make everybody talk and think more about accidents,—which is getting at the fundamental of accident prevention. So I don't think it is altogether illogical to have a man who is slightly injured come back to work in spite of the doctor's fears that he might be further aggravating that injury. Of course, you must use good discretion, but the doctor also must use discretion and not baby the man too much for his own medical welfare. Perhaps one of these people who do the faking will be glad to get up and tell us how they do it?

One railroad in the East in competition with another railroad actually brought back a man with a broken leg and sat him on a chair doing nothing, just to avoid a lost-time accident. There is no fairness in going to any such absurd extent, but keep in mind the psychological effect on the mind of the worker who comes back on the job after a minor injury. It is said that the Ford Motor Company follows such practice at times even with bed cases. They give that patient something to do while he is in bed, putting nuts on small bolts or any light job just to keep his mind occupied. This is just what the doctors call "occupational therapy," and it may really help in the problem of minimizing the period of convalescence.

Our next subject is upon what accidents happen in that holy of holies of a chemical industry,—the chemist's private sanctum. My impression as a layman is that once in a while these fellows blow themselves up. I recall one laboratory at an eastern college where a research man blew himself up and was killed and another such case in an engineering school. So we safety men who have the whole plant responsibility are properly interested in what goes on inside any laboratory. Dr. J. W. Stillman of E. I. du Pont de Nemours & Company, Wilmington, Delaware, is going to tell us about it.

Prevention of Accidents in Chemical Laboratories

Dr. J. W. Stillman, E. I. du Pont de Nemours & Company, Wilmington, Del.

In discussing this subject, for the sake of completeness, it will be necessary to review many precautions which are well known and probably generally practised. In one sense this repetition is of real value in familiarizing those who are responsible for the manufacture, handling and use of chemicals with the rules of safe procedure. It is proposed in this paper to make a rather complete survey of the operations which are common to chemical laboratories, giving suggestions as to steps which may be taken to avoid accidents and in a few cases illustrating the point by describing accidents which have happened when safety has been overlooked or ignored.

Of course, the first topic to be considered should be the design of the building to be used for laboratory purposes, but this varies so much, depending upon the purpose for which it is to be used, that it is difficult to outline a standard plan. One or two essential points can be mentioned, however. It is unwise to have laboratory rooms open out of another room which is used for laboratory purposes, because in case of fire in the outer room, escape from the other rooms might be cut off. The same thing applies to the arrangement of tables within the rooms. Aisles between tables should be open at both ends in case a sudden fire should make escape in one

direction impossible. All exit doors should open outward and fire extinguishers should be placed at accessible points, particularly good locations being beside doors or windows where they can be reached from the outside. Adequate ventilation is very necessary in the chemical laboratories where the fumes which are the product of many reactions are in most cases at least irritating. Hoods equipped with an exhaust fan should be a part of the permanent building equipment. Very attractive hood designs are obtainable made up with alberene stone. A new method which has proved to be very satisfactory is to have the exhaust flue built in behind the rear wall of the hood with intake openings in the form of slits about three-quarters of an inch wide and graduated in length so as to give a uniform draft. A row of these slits is placed in the back wall both at the level of the table top and at the top of the hood.

Precautions in Dealing with Poisonous Gas

In cases where there is considerable amount of a poisonous gas being used and where there is danger of the gas escaping through leakage or in the changing of apparatus, as for example when carbon monoxide is being used as a raw material for calytic reactions, a special ventilating system designed to exhaust the entire air of the room in a given time should be installed. This gas is usually prepared at or near the point where it is to be used and is a treacherous poison because it has no color or odor to act as a warning. The danger is well understood on account of the newspaper publicity which has followed the numerous accidents, which in many cases have been fatal, from the carbon monoxide expelled in the exhaust gases of automobiles. A wise precautionary measure is to have a gas mask, equipped for protection against the gas likely to escape, placed outside the laboratory and plainly marked so that if it is necessary to enter the room when it is filled with a poisonous gas, the equipment to do it safely will be at hand. Also, in case an accident should occur, those who are working with this gas should be provided with inhalation apparatus designed for the treatment of carbon monoxide poisoning and should be instructed in first aid methods.

Untidiness, which usually is the result of carelessness, is repulsive to almost everyone, but that it can be a contributory cause of accidents is many times overlooked. Neatness, which will of course promote greater efficiency in the worker, should be classified as one of the primary requisites of safety in the chemical laboratory. When chemicals are spilled, the remains immediately should be cleaned up. If stray particles of various kinds are allowed to accumulate over a period of time, mixtures may result which will of themselves start a fire, which, being communicated to scraps of paper or other waste, will spread rapidly. Special care should be exercised when using sodium, sodium peroxide, phosphorus, etc., to see that all strays be collected and disposed of.

It has recently been advised that if metallic mercury is spilled in handling, every effort should be made to have all of it cleaned up on account of its poisonous qualities. Mercury is used extensively in the laboratory as a confining and indicating liquid in gas pressure gauges and in gas analysis apparatus, and while it has been known that it is poisonous if taken internally, the idea that liquid mercury exposed in the open room would give a concentration of vapor which would be dangerous to the health when the air is breathed has caused some discussion. Frequently, in cleaning and handling the mercury, some is spilled on the table or floor and in the past no particular effort has

been made to clean up the spilled mercury thoroughly since it was considered entirely harmless. Now evidence¹ is brought forward which tends to show that sufficient mercury is volatilized from the scattered drops in the room to give a concentration of mercury in the air which will cause mercury poisoning. The poisoning develops slowly on account of the low concentration of mercury, but the lungs seem to retain it from the air breathed. If the evidence is correct, precautions should be taken to reduce the amount of mercury spilled to a minimum and to avoid keeping it in open vessels. In general it can be said that the floors and tables of the laboratory should not have cracks or depressions which will permit the trapping of waste chemicals.

The work table should be kept free from apparatus or chemicals which are not actually in use. When apparatus is set up it should be placed well back from the front edge of the desk. This will provide larger working space and also avoid accidental upsetting of the apparatus. Also when vessels containing hot or corrosive solutions are placed on the table, even temporarily, they should be set far enough back so that they will not be brushed off by a person passing by.

Carefully Label All Bottles

All bottles should be marked with a label which is easily legible in order to avoid the use of the wrong reagent as well as to prevent the contamination of the reagents when refilling the bottles. If a rule is adopted that the janitor is permitted to discard the contents of any bottle having no label, the habit of carefully marking the bottles will soon be learned by the chemists. Only small stocks of chemicals or flammable liquids should be kept in the laboratory. Unless a chemical is being used continually, a pound or half-pound should be a sufficient amount to keep on hand and a gallon of alcohol, benzene, ethyl acetate, etc., should meet all requirements for these solvents. The stock of reagents should be classified and arranged in a neat, orderly manner in a cool, dry part of the laboratory. The flammable solvents should be segregated and should be so located that in case of fire exit from the room will not be cut off.

Glassware for immediate use should be stored in a way to avoid breakage. Severe cuts are the result of reaching into a closet and coming into contact with the ragged edge of a piece of broken apparatus. Beakers, flasks and bottles can be taken care of by providing a large closet at the side of the room which is equipped with shelves and doors to keep out dust. Condensers and complete units of glass apparatus such as Soxhlet extraction apparatus should be kept in drawers, preferably with cotton on the bottom. No more apparatus should be placed in the drawer than can conveniently be arranged on the bottom. In other words, one piece should not be piled on top of the other, for then there is danger of breakage in opening and closing the drawer. Pipettes and burettes can be protected by equipping the drawer with strips of wood running lengthwise of the drawer in which are cut grooves just large enough to admit the piece of apparatus in question.

Large stocks of standard apparatus and chemicals for the use of the whole laboratory organization and selected according to the nature of the work being done should be kept in a central storeroom in charge of a competent stores-keeper. Excess stocks of either apparatus or chemicals when no longer needed should be returned to the central storeroom. If this is not practicable because of accounting difficulties, a group of chemists doing similar work should be provided with a storeroom or storehouse and the excess stock can be classified and kept here. Some one person should be responsible

(1) Dennis, *Ind. & Eng. Chem.* 18 (1926) 1205.

for this storehouse. An up-to-date record of the stock should be kept and care should be taken that explosive or flammable compounds are not allowed to accumulate to a dangerous amount.

To return to the central storeroom, there are one or two rules to be observed here. All volatile flammable liquids should be suitably protected and kept in a proper building located at a reasonable distance from other buildings. This building should be kept as cool as possible and should be well ventilated. A drain should be provided to carry off any spillage. Suitable fire extinguishers should be provided and are best located on the outside of the building.

It is customary practice to store chemicals by arranging them alphabetically according to their metallic constituents; for example, all nickel salts are classified under N and all sodium salts under S. It is debatable whether or not this is the best method. Included in the list of chemicals which are ordinarily used will be many oxidizing agents belonging to such classes as nitrates, chlorates, permanganates, peroxides, etc. The most of the compounds of this sort would not start a fire of themselves but on account of their ability to give up oxygen when heated, as a class they will promote and intensify a fire once it has been started. This is recognized by the postal authorities, and only a very small quantity of an oxidizing agent is permitted to be shipped by mail. The suggestion, therefore, is made that it perhaps would be better to take at least the extra supply of oxidizing agents out of their alphabetical classifications and place them together in a fireproof building, room or compartment.

Special Construction for Shelving

Glassware should be kept on shelves with raised strips across the front to prevent any pieces from being knocked or jarred off. No pieces should be allowed to extend over the edges.

Metallic sodium and potassium, on account of the fact that they react readily with the moisture of the air and ignite spontaneously, have to be kept under kerosene. The safest plan is to transfer the sodium or potassium, when received, to glass jars equipped with tightly fitting glass stoppers. Each jar should then be set in an enamel bucket for protection in case the glass jar breaks. If kept in tin cans, the kerosene may leak out unnoticed. A separate fireproof building should be provided for the storage of large quantities of sodium and potassium, and frequent inspections should be made to see that sufficient kerosene is in all the bottles.

Yellow phosphorus also requires special care in storage on account of its fire risk. Yellow phosphorus must always be kept under water in a similar manner to the sodium under kerosene, but phosphorus and sodium must be kept in separate buildings because of the danger of adding water to a sodium container by mistake. Care should be taken in winter to avoid breakage of the bottles through freezing of the water. A double container, as suggested above, is a wise precaution.

An accident which illustrates what may happen through the careless handling of chemicals can be described appropriately at this point. This accident occurred in the student laboratory at a large university and aroused a great deal of interest on account of the legal aspects of the case.² A young woman student was carrying out an experiment which called for the heating of a mixture of mercuric sulfide and lime in a glass tube closed at one end. The mercuric sulfide was issued to the students by an attendant in the storeroom. The lime was placed in bottles on the side tables and was obtained

(2) J. Ind. & Eng. Chem. 13 (1921) 1079.

by each student for himself. Some students were working on previous experiments which called for the use of potassium chlorate, which was also on the side table in bottles. It is supposed that the young woman selected the wrong bottle, because an explosion followed the heating and, as a result, the young woman lost one eye. The contents of all bottles on the side tables were examined after the accident and found to contain nothing but the reagent called for by the label. The unused portion of the mixture heated by the student was found to contain mercuric sulfide and potassium chlorate but no lime.

The student brought suit against the university on the basis that there had been negligence on the part of the instructors in not analyzing the contents of every bottle on the side table to see that they agreed with the label. The lower court awarded damages of \$25,000 to the plaintiff, but this was later reversed by the higher court when the decision was appealed.

The Lesson Taught by the Accident

The first lesson to be gained from this description is that too much emphasis cannot be placed on the proper labelling of containers, which has already been referred to. Next, it teaches that the operator, whether student, instructor or industrial chemist, should exercise care in selecting the proper container by noting the label before using the contents. It is obviously impossible to analyze the contents every time a bottle is refilled, but in refilling bottles special care should be taken to see that the material is the same as called for by the label.

As a result of this accident, many colleges have sought by various means to reduce the possibilities for such an accident. The danger lies not entirely in the selection of the wrong reagent from several placed at the disposal of the students, but also in the fact that there are students who, anxious to "see what will happen," will try mixing together various chemicals which they find accessible. One authority has gone so far as to recommend that colleges should exclude from their courses for beginners an experiment which calls for the use of a reagent which might be dangerous if mixed with any other reagent used throughout the course. This is quite evidently an impractical suggestion, but one institution has a plan under which a list of chemicals which cause danger reactions is withheld from the students except on permission of the head of the department and a signed statement by the student that he is familiar with the chemicals and their characteristics and will not hold the college responsible for accident.

This accident points the way to a service which colleges and universities can perform which will not only protect themselves from the results of accidents but will prove to be of great benefit to the chemical industry. In the training of chemists, there has been a general lack of instruction based on the question of safety, and this ought to be remedied. The so-called physical and chemical properties of the various common reagents which are to be the chemist's future tools are thoroughly studied but very rarely is mention made of the physiological properties of the same compounds. Certain compounds such as potassium cyanide which are especially dangerous poisons are warned against, and in the same way a few of the more flammable and explosive compounds are mentioned specifically. What is required is a general classification of chemical compounds with emphasis laid on their safe handling. It would be a hopeless task to pick out every combination of chemicals which would be dangerous, for in his daily work the chemist is called upon

to handle many unusual compounds, but these can easily be classified, however, according to general rules.

For example, it is well known that oxidizing materials on the one hand react readily with reducing materials on the other hand. Now, from the point of view of safety, it might be added that this reaction is usually accompanied with the evolution of heat, which may lead to spontaneous combustion, and in many cases if external heat is applied the reaction may proceed with the violence of an explosion. To return to the accident described above, sulfides in general are reducing agents and mercuric sulfide, therefore, belongs in this classification. Potassium chlorate is one of the outstanding examples of an oxidizing agent met with in the study of chemistry. So the accident which probably was caused by heating a mixture composed of a typical reducing agent and a typical oxidizing agent gives a very good example of the generalization laid down above. Neither one of the two components can be classified as a dangerous substance according to the usual standards, so that a study of safety based on the listing of dangerous substances would be futile.

Safety Instruction at the University

It seems to the writer that the college or university is the proper place for this safety instruction to be given, for it is from these institutions that the chemical industry draws its workers, and the new employee is not fitted to take his place in the industry where he may endanger other lives as well as his own, if he does not understand the materials he is about to handle. The chemical industry as well as industry in general has made rapid strides in the adoption of safe procedures in the last few years, but their task would be much simplified if the principles of safety could be learned at school at the same time and along with other chemical principles.

An accident which occurred several years ago in the laboratory of a large manufacturer of toilet articles, and which resulted in the death of two men, is an example of the dangers involved in the handling of flammable materials.³ The chemist and his assistant were carrying out a reaction which involved the use of ether. Both men were familiar with the ordinary course of the reaction, but in this case the belt came off the stirrer which resulted in local overheating inside the reaction vessel and ether fumes escaped into the room. The chemist had one of his assistants open the windows for better ventilation, and he stepped over and threw a switch controlling the stirring apparatus. This caused a spark which ignited the ether vapor in the room, and the resulting puff blew the man standing at the window through the opening. He was not seriously injured. The fire which followed caused burns to the chemist and the assistant working directly with him which resulted in their death the next day. The laboratory was practically a total loss.

Almost everyone realizes the extreme flammability of ether, but a point which is not often realized is that the vapors will travel along a surface, as for example, the laboratory table top, and a spark or flame at some distance from the source of the ether will ignite the mass of vapor. In using ether or similar volatile flammable liquids, no open flame should be allowed on the same table. If the ether is to be boiled or distilled, the heat from an ordinary incandescent bulb is sufficient for the purpose. Of course, electric switches or devices which may cause a spark should not be operated when ether or other volatile flammable liquids are being used nearby.

(3) J. Ind. Eng. Chem. 11 (1919) 490.

Compressed gases in cylinders here come to be included in the list of essential supplies for a laboratory. Among those most often used are oxygen, hydrogen, carbon dioxide, nitrogen, ammonia and chlorine. If welding is done, acetylene should also be included in the list, and recently a number of the less common gases have been made available in cylinders. One precaution which is applicable to all gases is that the cylinders should be kept in a cool place. If exposed to heat the pressure will be increased and the cylinders become a menace to safety. Whenever possible, tanks of compressed gas should be placed on the outside of the building and sheltered from the direct sun. Piping can then be run from the tank to the laboratory table with a needle valve control just inside the building wall. A corrosive gas such as chlorine cannot be conveniently handled in this way.

In using oxygen it should be remembered that oil should be avoided in all valves and lines. Also hydrogen and oxygen should not be used interchangeably with reducing valves or pipe lines. Not only do the two gases form explosive mixtures, but the hydrogen may contain traces of oil which is used in connection with the compression of this gas. To avoid the interchanging of connections, oxygen tanks are equipped with right-hand and hydrogen with left-hand threads.

Hydrogen Sulphide a Primary Reagent

Another gas which is coming into use in cylinders is hydrogen sulfide. This can be called one of the primary reagents of the chemical laboratory. Formerly it was prepared by the action of hydrochloric acid on iron sulfide in a Kipp generator, which, however, was not very satisfactory because the capacity of the generator was comparatively small, and in cleaning and renewing it more or less of the gas escaped into the room. Hydrogen sulfide has the unpleasant odor of rotten eggs, and, contrary to the general opinion, it is quite poisonous. During the war, a chemist was given the assignment of selling the waste nitre cake from nitric acid manufacture, and in doing this he frequently made demonstrations of the possibilities of its use. While working in a small, poorly ventilated room which was used as the laboratory for a company whom he was trying to interest in nitre cake, the chemist was overcome by the hydrogen sulfide gas and later died from its effects.

Hydrogen sulfide causes irritation of the eyes and respiratory tract and as little as 0.10 to 0.15 per cent in the air will cause death in one-half to two minutes.

Laboratories should be and generally are now equipped with a hood which is ventilated by a strong draft from a suction fan. With such equipment hydrogen sulfide, chlorine and other poisonous and corrosive gases can be handled in perfect safety. The hood should be used for all reactions in which irritating fumes or smokes are given off.

Chlorine is another corrosive gas, but chemists are quite familiar with its characteristics. The greatest danger from chlorine lies in the sticking of the valve at the top of the cylinder. Due to the presence of moisture, the chlorine may corrode the valve stem and then, when pressure is applied, the valve or its threads may be twisted off. If a valve does stick in this way, the tank should be moved out-of-doors to a place away from where people are working, before an attempt is made to open it.

Chemists should realize that they are dealing with materials which, when isolated, are not in themselves dangerous in many cases, nevertheless are hazardous to life and property when grouped together as they are in general chemical research work. It should be the duty of each chemist, if it has

not been a part of his school training, to learn the characteristics of his materials, with the idea of handling them safely in consideration of his fellow worker as well as of himself. Minor accidents should not be expected; they should be prevented.

CHAIRMAN WHITING: Dr. Stillman says he has left one idea with us. He is mistaken; he has left many ideas with us. I would like to ask whether or not the head of a chemical laboratory will permit the ordinary safety man to go into his quarters and make safety suggestions. What is the general attitude, not of you, Dr. Stillman, but of Chief Chemists in general toward the safety man going into his private quarters?

DR. STILLMAN: I am quite sure that the chemist is perfectly willing to have the safety man come into his quarters and even dictate to him if necessary. I know I have always felt that way and I am quite sure I can speak for others too. The chemist realizes, at least subconsciously, that he hasn't the safety training of which I spoke, and when somebody who knows the safety side of it but doesn't know the chemistry side of it goes into the laboratory, I think the chemist will be perfectly ready to listen to him.

Stopping Leakage in Chlorine Cylinders

C. E. LYON (Hooker Electrochemical Company, Niagara Falls, New York): I would like to add just a word to Dr. Stillman's remarks. In reference to the possible stoppage of leaks in chlorine cylinders about which he spoke, a water spray where there is a leakage of gas does not stop the leakage. However, in the case where a cylinder is tipped over on its side and the liquid runs out, water does assist, because evaporation of the hydrate is much slower than the ordinary liquid. In the case of escape of gas, there would be no advantage in adding a water spray.

CHAIRMAN WHITING: Would you recommend tipping over the cylinder so that the leak would be near floor level and make the liquid run out?

MR. LYON: In case of a bad leakage that is the only thing you can do, in any case where the entire cylinder is apt to leak out.

JOHN S. SHAW (Hercules Powder Company, Wilmington, Del.): I think that was a very excellent paper, Dr. Stillman. There is just one thing I want to add. One of our engineers recently found that the chemist in one of our laboratories overlooked his electric wiring. The chemist would continually buy more electric apparatus thus loading the circuit and he would forget all about the wiring. The insulation on the wires was just about gone when our safety engineer inspected that laboratory. I would also like to suggest in the design of the laboratory that it should be made too large because laboratories all grow small in time. I was very much interested in the suggestion that Dr. Stillman made in regard to a right-hand thread for oxygen and a left-hand thread for hydrogen.

On the West Coast a few years ago the poles were reversed in an electrolytic process for making hydrogen and oxygen, and during all of one shift the electrician pumped hydrogen into an oxygen gasometer and oxygen into the hydrogen. The result was that we bought some of those cylinders which had a fifty-fifty mixture of oxygen and hydrogen in them. When the welder started his work he was killed and others were injured. The cylinder blew up just like a bomb. It made a report about as loud as a wheel mill in a black powder works. It was very severe.

There is one more point. I didn't learn from Dr. Stillman how he picks up the mercury after spilling it.

CHAIRMAN WHITING: We are still waiting for the reply he promised us. Before he sums up we have a college professor here, and I know he will be glad to tell us what he does to prevent his students from being injured; Dr. Smyth.

PROFESSOR H. F. SMYTH (University of Pennsylvania): I teach in the University of Pennsylvania but not in the Chemistry department, although very close to it. I see a good deal of their work, and I see a good deal on the health hazards of their work which they do not realize. I was particularly struck with what somebody had to say about hydrogen sulphide. It is one of the most toxic gases which we have to deal with. That raises another point.

A good many people think about hydrogen sulphide as they do about other things. I saw a report the other day about some work on solvents used in lacquer, a subject I have been very much interested in. This particular individual said the solvent was comparatively harmless as he found from the result of his experiments, although conceding it might be very harmful in higher concentration but he claimed the bad odor of that solvent would be in itself a protection against it when in use industrially. That is not so.

I don't believe that anything smells bad enough to keep the average workman from accustoming himself to the smell and using it recklessly in the same way in which the chemist accustoms himself to the smell of hydrogen sulphide. It is a curious thing that in low concentration it smells like the devil, like rotten eggs, but not when it is in high concentration. You cannot depend on the smell of hydrogen sulphide to protect you and make you realize that you are handling a dangerous substance or to enable you to protect yourself with ordinary commonsense in the handling of it. Don't depend on the smell of any chemical unless it is highly irritating, unless it produces an immediate reaction on your mucous membrane; that is, makes you sneeze or chokes you up. Don't depend on odor alone to protect you from any toxic substance.

The Sense of Smell Not a Reliable Protection

I was going through a plant the other day. It was a very well constructed plant where they had taken very excellent care of the excess fumes. I had never been in a plant of that kind before where there was so little odor. There is a very definite odor to the solvent being used, and the safety man who was taking me through said, "I don't think you can smell any of it at all." Well, he couldn't smell any of it because he was in it every day. His mucous membrane was accustomed to it, but I knew what they were using for I could smell it. To depend entirely on the smell of any chemical or solvent to protect the worker is like leaning on a broken reed because you can't do it.

We handle very dangerous things with impunity and we think we are going to get away with it always. I was amused a few years ago when I was doing experimental work on anthrax spores. It is a very highly toxic spore. I was doing some experimental work in the use of disinfectants, and I had collaborating with me an instructor of the chemical department which was next to our department, and we took into the chemical department some anthrax spores in test tubes. When he heard of it he was horrified. Yet it is fourteen years ago since we have had any infection in our own laboratory from any bacteria which we handled, and we have handled a good many. In the chemical laboratory of which the head was so horrified at my bringing those spores into the laboratory, there is never a winter goes by but that we see fumes flowing out of the window. Usually they have chemical accidents every year; the man who worked with me had been overcome with gas. Yet, the head of that laboratory was horrified because I took some anthrax bacilli in a culture tube into that department.

Don't get so familiar with the dangerous things you are handling as to lose your respect for them. There is a very interesting monograph got out recently in which is emphasized that very side of it to the chemists—a monograph by Henderson and Haggard on Noxious Gases. It is very well worth reading for the chemist.

who doesn't realize that the gases he handles are very dangerous, provided they are not treated with respect.

E. J. RIEDERER (Atlas Powder Company, Wilmington, Delaware): I was rather surprised to hear the statement made that sulphide of hydrogen was found recently to be rather a dangerous gas. When I went to college some years ago, prior to 1900, we received a classification of the dangerous gases and among those were ammonia sulphide and hydrogen sulphide and we were told that we should never use them except under the hood. I fear the extensive education in the colleges in trying to give all the chemistry at hand in the four years' course, has caused the elimination of some important points which were taught twenty-five or thirty years ago.

CHAIRMAN WHITING: Regarding hydrogen sulphide, the Chemical Section has already issued a single-page sheet giving all you need to know about it. Evidently you safety men should post this sheet in the laboratories where the chemists can see it.

W. A. COOK (Travelers Insurance Co., Hartford, Connecticut): Dr. Stillman, you mentioned, and I think it is generally conceded, that an oxidizing agent is not particularly dangerous in itself. Yet I have had reported cases of potassium chlorate exploding of itself when exposed to air or heat.

DR. STILLMAN: I would not say off hand it would explode unless there was something present besides potassium chlorate.

Keep the Cylinders From Tipping Over

F. A. ADAMSKI (National Carbon Company, Cleveland, Ohio) In our laboratories we use some compressed gasses and they are shipped to us in various shaped cylinders, some squat and some tall, and these are used rather intermittently. Sometimes they are used only one day and then they are set aside. Should there be some means provided for these cylinders to be fastened up so that they cannot be tipped over?

What danger would there be of the head being knocked off in cases where they do fall down? There is also, I think, a danger of the cylinder falling and hitting some one. Can anyone suggest some means for making an attachment for the cylinders to the work tables or walls or to some other place?

W. F. SIEVER (Youngstown Sheet & Tube Company, Youngstown, Ohio): In our place in Ohio we have a means of transportation for such bottles. They are placed on certain trucks which have a strap of iron connected around the top and which makes it impossible for the cylinders to fall off. We also have a general rule that if for any reason the cylinders cannot be tied to some supporting railing they should be laid down on the side and the caps provided against the breakage of the tops of the valves must remain on the bottles unless they are in actual use.

With permission I would also like to relate a little incident which may serve as a means of passing to you a safety idea which is to see that these bottles are exhausted of their gasses before they are returned to the manufacturer, especially those of oxygen and hydrogen. We had an accident in Youngstown which was caused by one of these bottles being declared as scrap and sent to the junk yard. In the process of being junked the bottle was put under shears and clipped in two and the man who used the shears was very severely injured because the bottle was still under high pressure.

CHAIRMAN WHITING: That is a very excellent and practical point. Is there any other question for Dr. Stillman? If not, I will ask him to close the discussion—and please don't forget about the mercury.

DR. STILLMAN: Well, I am not going to try to tell anybody how to chase a drop

of mercury around the floor and catch it. My suggestion will be around the other way a little bit and that is: If the table top, for example, is provided (as many of them are these days) with a raised edge, and the center of the table is cupped just a little bit, mercury will be deposited in that depression so that you can get it up. The same thing applies to the floor. If it has no cracks or depressions, that is to say, if it is a cement floor with a base board as part of the floored surface there won't be much danger of the mercury getting in. The danger in mercury is that it gets into the cracks in the floors and table tops where it is allowed to deteriorate. It gets in down there where it is impossible to get it out. But as far as trying to catch an elusive drop of mercury, I am not an authority on that subject.

I am glad to be set straight on the point of the chlorine. I introduced that rather tentatively because I didn't have the information which I should have had. It only came to me as hearsay.

Finally, on the question of the cylinders of compressed gasses, at the laboratory with which I am connected, we have found it very successful to have, as I suggested in my main paper, a cover provided on the outside of the building in which to accommodate a single row of cylinders and to have the cylinders placed individually side by side with a pipe running through the wall from the inside of the building to those bottles. You have a coupling thread to meet the standard type of cylinder and that coupling is so situated that it holds the cylinder tight against the wall and it cannot move. In that way the risk is avoided of the cylinder tipping over. Also, if the gas is not actively in use, the rule is that it must be returned to the storeroom.

Speaking of accidents caused through gas cylinders tipping over reminds me of one which occurred a few years ago. A man had become so used to handling these gasses under high pressure that he had become very careless and he would just wheel the bottles on a truck and dump them against the pile. Finally the whole row tipped over like a bunch of dominoes and the last one exploded. No one knows why it did explode and luckily it didn't communicate with the others. It was also fortunate that it didn't hurt the man. That is what may happen, however, under those conditions.

CHAIRMAN WHITING: I am glad to have this talk on the handling of gas cylinders in a proper way because I know one case where a cylinder let go and knocked the man's head off, literally.

Before going to another excellent paper which we shall have this morning, I want to state that the Nominating Committee for next year was appointed some weeks ago. It consists of Mr. I. V. Kepner of the Pennsylvania Salt Manufacturing Company as Chairman, Mr. A. L. Watson formerly of the Hooker Electrochemical Company and Mr. Crass of the Grasselli Chemical Company. They are expected to report their nominations for our new officers at the meeting tomorrow.

The question of solvents is becoming an extremely important one and we have a high authority here to tell us how we can prevent dangers in handling solvents, particularly from static electricity. Mr. A. A. Backhaus, of U. S. Industrial Alcohol Company will speak to us.

Dangers From Static Electricity in the Handling of Solvents

A. A. Backhaus, Production Manager, U. S. Industrial Alcohol Company,
Baltimore, Md.

Frictional or static electricity has long been known. Rubbing a glass rod with silk, a stick of amber with wool, stroking a cat's back to hear the crackle, shuffling over a carpet to give another person a spark shock, these are all familiar examples of methods whereby static may be produced.

The long time required to ascribe this phenomenon as the probable cause of mysterious fires occurring in the handling of flammable liquids and gases, is another illustration of mental inertia.

Many years ago Professor Monroe recognized static as a probable cause of so-called spontaneous ignition. (*C. E. Monroe—J. Am. Chem. Soc.*, 21, 317—1899). It is, however, within the last 15 or 20 years that the subject of dangers from static electricity in industry has received general attention. The advent of the automobile brought with it the handling of gasoline in enormous quantities, by many people and under various conditions. It is not surprising that under these circumstances the dangerous little static spark had many favorable opportunities. The literature references given at the end of this paper contain sufficient proof that static and flammable substances make a dangerous combination.

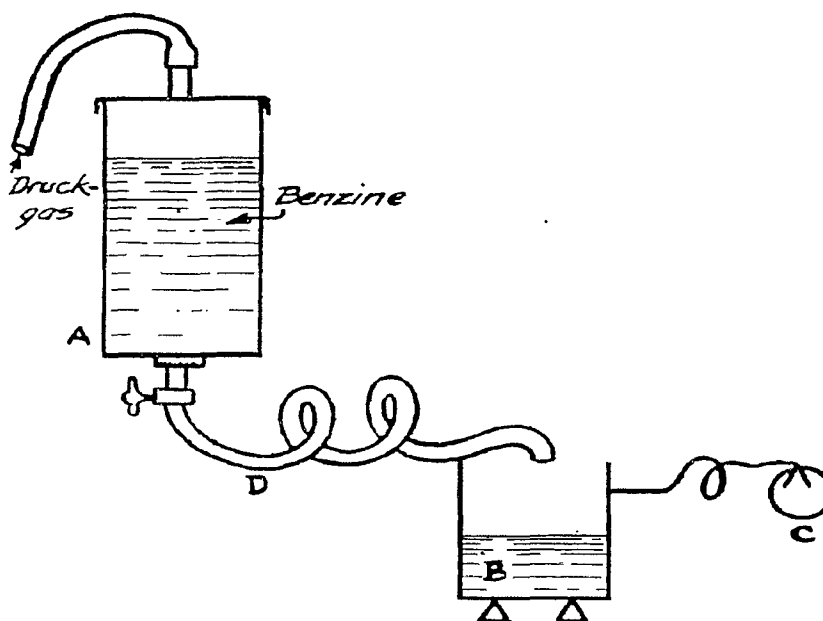


Figure 1. Apparatus Used by Dolezalek to Develop Static.

Fires and explosions constitute the dangers from static in the handling of solvents. Only those substances which are flammable and which have vapor pressure characteristics to produce explosive mixtures with air are dangerous.

Many solvents used in industry are flammable and produce vapors which form explosive mixtures with air, consequently, static is a possible source of danger in handling solvents. In general, static may develop in the handling of solvents as follows:

- 1—Liquid solvent flowing through pipes or tubing.
- 2—Liquid solvent passing through a gaseous medium (e.g. air).
- 3—Solvent vapor issuing from an opening into a gaseous medium (e.g. air).
- 4—Gas passing through liquid solvent.

The list of conditions thus enumerated is small. However, practically all handling of solvents comes within the range of these operations. From the fact that static fires have been confined to relatively few solvents, it must be

concluded that dangerous static arises only under certain limited conditions. If it were possible to define accurately these conditions, it would not be difficult to prescribe preventives.

Handling solvents through pipe lines or tubing is universal practice. What danger, if any, is involved?

It is a well known fact that when some liquids flow rapidly through small pipes electric potential will develop. Dolezalek (*Zeitschrift Chem. Ind.* 35, 166, 1912), and later, Holde (*Berichte d. Deut. Chem. Ges.* 47, 3239 1914), and others, have demonstrated experimentally that electrical charges will develop in this way. Figure 1 shows apparatus used by Dolezalek. Using gasoline and petroleum ether in a similar apparatus, potentials of 50 to 2,200 volts were obtained by Holde, in copper tubing 2.5 mm. diameter and 95 cm. (about 3 feet) long.

Method to Avoid Static Fires in Dry Cleaning Plants

According to Bruno Muller (*Chemiker Zeit.* Feb. 1, 1923 p. 97-98) a potential of at least 300 volts is required to give a spark strong enough to ignite gasoline.

Assuming that a potential of 300 volts is required to ignite the ordinary solvents used in industry (carbon bisulphid with its very low ignition temperature would undoubtedly ignite more easily), the question as to whether a particular solvent is likely to develop dangerous static while flowing through pipe lines must be related to its electrical conductivity.

To avoid static fires in dry cleaning plants in Germany, M. M. Richter recommended the use of magnesium oleate. It is stated that a concentration of 1/20 per cent of this soap is sufficient to prevent dangerous static in washing wool in gasoline. The soap increases the electrical conductivity sufficiently so that the charge will "drain off." Specific conductance of the gasoline soap solution is of the order 1×10^{-10} .

Bruninghaus (*Recherches et Inventions—Vol.* 7, 735, 1926) has shown that under certain conditions the presence of metal powder will render gasoline non-electric. He concludes that the substance which causes static inactivity is a substance which increases conductivity.

In view of the importance of electrical conductivity in this study a search was made to find specific conductance data for the common solvents. Unfortunately, data were found for only a few. These are shown in the table.

Specific Conductivity of Liquids (Reciprocal Ahms)

Gasoline ¹	2×10^{-12} (15°C)
Benzol ²	2.5×10^{-12}
Methyl Alcohol ³	0.2×10^{-4}
Ethyl Alcohol ³	0.103×10^{-4} at 25°C
Propyl Alcohol (N) ³	2×10^{-5}
Iso Amyl Alcohol ³	1.5×10^{-5}
Acetone ¹	0.321×10^{-4} (25°C)
Ethyl Ether ³	1×10^{-5} or smaller
Water ³	0.9×10^{-4} at 18°C

1—(Chem. Zeit. 148 (1911) p. 1375)

2—(Holde, Ber. 47 (1914) p. 3239)

3—(Jones & Lindsey, Z. Phys. Ch. 56 p. 129)

- 4—(Walden, Z. Phys. Ch. 54 (1906) p. 128-130)
- 5—(Keyes & Winninghoff, J. A. C. S. 38 (1916) p. 1178)
- 6—(Keyes & Winninghoff, J. A. C. S. 38 (1916) p. 1178)
- 7—(Walden, Z. Phys. Ch. 54 (1906) p. 128-130)
- 8—(Holde, Ber. 47 (1914) p. 3239)
- 9—(Kendall, J. A. C. S. 38 (1916) p. 2460)

An examination of the table shows that many solvents are fairly good conductors. Such solvents when flowing through pipe lines are safe statically. With liquids whose specific conductivity is low, dangerous accumulation of static may be avoided by using pipe lines which are good conductors and well grounded.

What has been said thus far applies to the handling of solvents in liquid form and confined in pipe lines. Under this condition there is little danger from static with conducting solvents.

Uncertainty Regarding a Safe Relative Humidity

The real danger starts where the pipe line ends. Here the fireworks may begin. If the line ends in the air and the stream of liquid falls, a new condition is encountered. Under these conditions high static potentials may develop with any liquid, even water. Possibilities of static from this cause are very thoroughly covered in a paper given by Naylor & Ramsey before the Petroleum Section of The National Safety Council in 1923. There is no simple grounding method of taking care of and rendering harmless static produced by liquid spray. The simple safety measure in this case is to avoid static by avoiding the spray, which can be done by discharging the liquid at the bottom of the receiving vessel or tank.

If conditions are such that liquid spray cannot be avoided, the only safety measure is to condition the air, so that the electric charges on the droplets will dissipate themselves. Ionizing the air for example with ultra violet light or X-rays, or humidifying the air will render such static harmless.

There seems to be uncertainty as to what is a safe relative humidity. In Wm. D. Milne's very interesting paper on "Fire Hazards in Churns and Spreader Rooms," read before the Rubber Section at the Twelfth Safety Congress, a relative humidity of 40 to 45 per cent is said to give a "safe" atmosphere.

The exact relation between humidity and static dangers seems not to have been covered experimentally. It is the intention of the author to investigate this question.

Dangers in the Use of Hydrogen Gas in Air Navigation

The third general method encountered in handling solvents covers solvents in vapor phase, i. e., in gaseous form. Some very interesting work has been done in connection with the study of static produced by gases. The use of hydrogen gas in air navigation involves dangers and accidents from static ignition of hydrogen gas. Articles by Nusselt and by Pothmann appearing in 1922 in the *Zeitschrift des Vereines Deutsche Ingenieure* are very interesting. The following is translated from Nusselt's article:

"Although hydrogen is used extensively in industry, an unusual and undesirable property of this gas has become evident in connection with its use in air ships. In the hangar the gas bags are filled with hydrogen gas

delivered through pipe line from the gas works. The distributing pipe is usually laid in a trench in the hangar and connected with the supply main. The distributing pipe has a number of branch outlets to which hose connections are made for filling the individual gas bags of the air ship with hydrogen. It was frequently observed that hydrogen gas, blowing out through leaks would ignite spontaneously. This occurrence had been observed by Count Zeppelin in Friedrichshafen and in his first air ship hangar pails of water and wet blankets were kept on hand to extinguish such fires. It was further observed that on opening valves on compressed hydrogen cylinders, flames would issue. Naturally, these spontaneous fires resulted in loss of air ships. In one case, after a newly built ship had just arrived in a new hangar, replenishing of gas bags was in progress when suddenly flames shot out of the water drain of the filling header and destroyed ship and hangar. In another case, two marine air ships were in one hangar. A sailor had just finished filling a gas bag in one of the ships. After detaching the connecting hose from the gas bag, he laid the open end on the floor in the hangar, contrary to orders. The valve on the main pipe was not tight, so that some hydrogen bled out of the open end of the hose. Suddenly flames shot out of the open end of the hose and both ships as well as hangar were destroyed by fire. As these cases increased during the war the Reichsmarineamt created a commission to study the spontaneous ignition of hydrogen."

The Conclusions of Nusselt

The work done by Nusselt in connection with the problem is summed up in the following conclusion which he draws:

"The results of my experiments may be summed up briefly as follows: In spite of many attempts it was impossible to cause spontaneous ignition of pure and clean hydrogen from a leak in a line. Spontaneous ignition can take place only when dust particles flow out with the hydrogen. Because of the friction during discharges, the dust particles become electrically charged. Sparks from these charged particles lead to the ignition of the gas."

The results published by Pothmann covering his study of static with gases, particularly hydrogen, also how that clean gas is non-electric. However, when a liquid or solid is present in the jet of issuing gas static charges will accumulate.

The steam jet, utilized in the old Armstrong hydroelectric machine, will develop static of high voltage. The invisible portion of the jet at the opening from which the steam issues is not charged. It is only after condensation takes place that static charges develop, presumably due to friction of the droplets through the gaseous medium.

The Use of Air For Agitation

There are many anhydrous liquids which will not generate dangerous static flowing through pipes; likewise, gases in motion through the air will not develop static unless solid or liquid particles are present.

Very little practical information is available covering the fourth condition listed at the beginning of this paper. The use of air for agitation is a common practice in chemical industry. Air is extensively used for agitating alcohol to render the contents of a tank uniform. To my knowledge, no accident has ever

resulted from this practice, due probably to the fact that alcohol is, relatively speaking, a good conductor.

It is doubtful if this practice is a safe one in the case of solvents having low conductivity.

A scientific investigation of this problem would be very helpful.

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Report of the Committee on Static Electricity—National Safety Council Proceedings, 1925.

Static Electricity in Chemical and Other Industrial Plants—C. C. Perry, National Safety Council Proceedings, 1925.

Handling Solvents—L. T. Wright, National Safety Council Proceedings, 1925.

Danger of Ignition From Steam Generating Static

CHAIRMAN WHITING: I think all of you handle solvents more or less which might catch fire unexpectedly from this static source. I know Mr. Backhaus would be very glad to answer any question on the details of static. I would like to ask him one in regard to dry cleaning plants where they use steam jets as a fire protection methods. Possibly you have them in some of your chemical plants where you have an appreciable vapor leakage in a room and you want to smother it. Is there danger of ignition from the steam generating static?

MR. BACKHAUS: I believe there is an element of danger in that practice. In a condition of that kind you usually have a very high concentration of the solvent vapor. If the atmosphere has a vapor concentration above a certain critical concentration then that vapor will not explode. There is a low limit and a high limit above which or below which the mixture is not explosive, and outside these limits you could have a high development of static from the steam jet and still not get an explosion. But there is no doubt that there is an element of danger in the use of steam for extinguishing fires.

CHAIRMAN WHITING: Could Mr. Armstrong of the Eastman Kodak Company tell us any of their experiences in the handling of solvents?

A. L. ARMSTRONG (Eastman Kodak Company, Rochester, N. Y.): I would like to say first that I sat in on the New York State dry cleaning laws. I was on a board in Rochester that went over these laws and they have written into their laws that in all dry cleaning plants they must maintain a humidity of sixty per cent. Previous to that law being passed I think it was definitely proved by the dry cleaning industry that forty per cent relative humidity would kill the danger of static from benzine and gasoline which were exclusively in use. They don't use much acetone in cleaning and dyeing works.

I know of only one explosion and that occurred about three weeks ago in Rochester in a dry cleaning plant. I was there about 25 minutes after the explosion occurred, and we learned definitely that a steam humidifying jet was not provided in the dryer. We have a similar cleaning plant for the cleaning of filter cloths and in our ventilating system we put a low pressure steam jet back of our fan and maintain a humidity of about sixty.

Use of Chains to Drain Off Static

If steam is fed in back of the fan, I do not believe you need ever fear static coming from your steam because the steam would have to pass through the fan with the air and it would be thoroughly mixed and would give you a proper relative humidity in all parts of your room.

Another thing which came up in our plant was the use of chains to drain off static. They are very extensively used. They are used by the Standard Oil Company. In fact they use a chain in the center of their pipe and pass the liquid over this chain, and in some cases they don't drag a chain on the ground any more as they used to do. It is claimed that the chain takes all the static out.

We have a process where it is necessary to handle dust at a very high velocity through a pipe and this generates much static, so much so that we get sparks two,

three and four inches long. We had to stop operation and spend practically a month on research before we found out why we couldn't eliminate the static. The reason for this was that the chain which we had inside the pipe was not solid, that sparks would build up and would jump from one link to the other. We replaced that chain with an ordinary stranded copper cable about an eighth of an inch in diameter. All our groundings are being done with that type of cable now.

Another weakness we found is the practice of merely laying on of a ground. If you attach it to the pipe and lay it against the container into which your solvent is flowing it will not give you a good ground. We put a regular lug on the end of our cable which is soldered on, and we drill through the pipe and solder in an eighth inch bolt with a lock nut and use a wing nut, so that we have a perfect ground at all times. That is absolutely necessary because I can say from actual experience with acetone that any static spark that is visible to the eye will ignite acetone vapors. Now, that is a pretty small spark but it will actually do it.

Difficulty In Getting Quality of Hydrogen Wanted

E. C. ROGERS (Grasselli Chemical Company, Cleveland, Ohio): Several speakers have referred to the matter of hydrogen. I just wonder what hydrogen users do to insure that they get what they order when they order hydrogen. Here is an example of what I mean: We have ordered ninety-nine per cent hydrogen and we might get back anything from what we ordered to a tank containing as much as fifteen per cent oxygen. With those things going on we are apt to have some unhappy experiences. I am just wondering what to do to insure ourselves that we get what we order. If we test it we are apt to blow up a chemist in the act of testing.

A. B. NIXON (Hercules Powder Company, Parlin, N. J.): We test every tank of hydrogen by merely taking a small gas sample in a large open-mouthed bottle and then applying a flame to it. It is absolutely safe, and if it explodes it can't hurt anything because the bottle is wide open.

CHAIRMAN WHITING: Another static problem is that of handling sulphur. Mr. Kepner, will you tell us your experience?

I. V. KEPNER (Pennsylvania Salt Manufacturing Company, Philadelphia, Pa.): I brought this question up some years ago in reference to the problem we had in handling sulphur. We receive our sulphur in ships, and it is loaded from the ships into the hopper drop cars—railroad cars—and taken up to our storage bin where it is dropped. Time after time we have had explosions and they were really severe and generally caused a fire. I have told this two or three times but I will tell it again for the sake of some of you who probably haven't heard it yet. We were at a loss to know what had caused these explosions so we had the underwriters come down to investigate the fires and they said it was static.

The Problem of Handling Sulphur

We got the electrician and had him ground all the bins and then we thought everything was properly taken care of. The underwriters came down and said that is fine, captain, you will never have any trouble now. We didn't have the next day. We dropped the car as usual and everything was fine and we thought we were all set. After we thought we were sitting pretty it blew one of the employees clear off the bridge and set his clothes on fire. We didn't know what to do about it. We had our fire hose and everything handy ready to put out the fire after it started but no one could give me any real data on it. We didn't know what it

was. They said static, but how were we going to take care of it if we were already grounded?

Some years ago I presented the problem at our Wilmington midyear meeting and thought perhaps some one might give me a solution of this mystery. One of the boys from the Hercules Powder Company spoke of a ship they had which was unloaded with a clam-shell bucket. He said, all at once the ship took fire and there was a terrific explosion and the ship burnt to the water's edge. Some chap conceived the idea of spraying the sulphur as it was falling. They tried this out and have had no more explosions since. I thought it was a good stunt and I took it back to the plant. The pipe fitter got a couple of automatic sprinklers and rigged them up and turned on the spray where we dumped our sulphur and we haven't had an explosion since. Now all our bins at the various plants are all equipped with the same sprays and that has been the answer to the problem of static in the handling or dumping of sulphur.

If any of you have a similar problem I wish you would try it out. It worked for us and I am sure it will work for you. It has saved us a lot of money, and I think it has only cost about five dollars per head.

Method of Correcting the Problem with Sulphur

MR. ARMSTRONG: We had the same problem with sulphur and we used low pressure steam to correct it. I would just like to add one thing on static and that is the choice of metals. If there are any of you people who have a lot of grease on your scrubbing tables this will help you. It has been the general practice to use zinc and some have tried out aluminum. An aluminum or zinc chute for dust or materials which will build static charges, will not carry the charges away due to the fact that in a very short time it oxidizes and you have zinc oxide or aluminum oxide which are not good conductors.

CHAIRMAN WHITING: Are there any other questions? Those of you who are handling solvents must keep in mind the fact that because you haven't blown up yet is no proof that you haven't any static and Mr. Backhaus' recommendations should be put into force. Have you anything to say in closing the discussion, Mr. Backhaus?

MR. BACKHAUS: No, except something on this question of compressed gasses. I might relate an experience in our own laboratory in connection with compressed acetylene. We were using a small cylinder of this in the laboratory and it was standing up on a little pedestal about two feet off the floor when not in use. For some unknown reason it fell down and in falling it hit the concrete floor and the valve broke off. That was followed by a terrific explosion although the amount of gas involved was relatively small.

Now, we don't know what caused it but my own supposition of it was that it was static. The high velocity at which the acetylene issued from the small opening of the valve generated enough static to cause the explosion of the mixture of air and acetylene.

CHAIRMAN WHITING: Before we close, there is a question asked of Dr. Stillman. Will you please reply.

DR. STILLMAN: The question is: "Do you consider a routine laboratory or a research laboratory the more hazardous and why?"

A research laboratory may in some ways be more hazardous for it is dealing with new problems all the time and in that way meeting things which are not familiar. The plant or routine laboratory on the other hand has a process more or less familiar and hazards which are more or less known, if it is a routine labora-

tory in the sense of a control laboratory in the plant and I should say the hazards in that laboratory are not any greater than in the plant itself.

This question brings up something which I meant to mention before. The chairman at the opening said that the chemist in turning over to the plant a new process in many cases did not inform the plant of the dangers involved or the character of the materials being manufactured. It seems to me that such a situation is a case of the chemist falling down on his job. He has not given the complete information which is necessary. The suggestion that those of us who are connected with research laboratories should take home with us is that we should furnish all such information we have when a new process is turned over to the plant.

CHAIRMAN WHITING: I hope the safety man will ask the chemist for full instructions on safety, of any novel process or apparatus.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session was called to order at nine-forty-five o'clock by the chairman, S. E. Whiting.

CHAIRMAN WHITING: We have a little routine work to do before we get at the technical papers. The election of officers for the next year comes first, and I will call for a report from the Nominating Committee.

Report of the Nominating Committee

We, the Nominating Committee, appointed by you to select a suitable personnel of officers to serve the Chemical Section for the next fiscal year, have attended to that duty, and after careful consideration submit the following names in nomination:

Chairman: Dr. Leonard Greensburgh, U. S. Public Health Service, School of Medicine, Yale University, New Haven, Conn.

Vice-Chairman: C. F. Whittemore, Western Electric Co., Chicago, Ill.

Vice-Chairman: E. C. Rogers, The Grasselli Chemical Co., Cleveland, Ohio.

Vice-Chairman: C. E. Rice, The Dow Chemical Co., Midland, Mich.

Secretary: Wm. A. Baxter, The Newport Co., Milwaukee, Wis.

Chairman, Posters, Lantern Slides and Safety Kinks Committee: H. L. Miner, E. I. du Pont de Nemours & Co., Wilmington, Del.

Chairman, Membership Committee: E. C. Rogers, The Grasselli Chemical Co., Cleveland, Ohio.

Chairman, Industrial Poison Committee: S. E. Whiting, Liberty Mutual Insurance Co., Boston, Mass.

Chairman, Program Committee: C. F. Whittemore, Western Electric Co., Chicago, Illinois.

Chairman, Statistics Committee: C. E. Rice, The Dow Chemical Co., Midland, Michigan.

News Letter Editor: Chairman, Vice-Chairmen and Committee Chairmen.

Engineering Representative: L. A. DeBlois, National Bureau of Casualty & Surety Underwriters, New York City.

Chairman, Publicity Committee: Dr. H. E. Howe, American Chemical Society, Washington, D. C.

Executive Committee:

The officers and

S. H. Kershaw, National Safety Council, Chicago, Ill.

Ira V. Kepner, Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

J. S. Shaw, Hercules Powder Co., Wilmington, Del.

Dr. C. L. Reese, American Institute of Chemical Engineers, Brooklyn, N. Y.

Prof. C. E. A. Winslow, School of Medicine, Yale University, New Haven, Conn.

John Roach, Deputy Commissioner of Labor, State of New Jersey, Trenton, N. J.

H. C. Parmelee, Editor, Chemical and Metallurgical Engineering, McGraw-Hill Co., Inc., 10th Ave. and 36th St., New York City.

A. L. Watson, Koppers Company, Pittsburgh, Pa.

CHAIRMAN WHITING: Are there any other nominations for officers.

(A motion was made, seconded, put to a vote and carried.)

MEMBER: I move that the secretary be instructed to cast one ballot.

(The motion was seconded, put to a vote and was carried.)

CHAIRMAN WHITING: We are now ready to go on with any other committee reports. There is one committee that has certainly worked hard and that is the Membership Committee. This is the committee that must keep our section alive by getting new names. That is a difficult job and it isn't altogether appreciated as much as it should be. I would like to have a report from the man who has been the chairman of the Membership Committee for ten years. He deserves a great deal of credit and appreciation for retaining that burden under protest for all this period. I would like to have Mr. Kepner, who has been doing that work, tell us about the present status of our membership.

Report of Membership Committee

As chairman of the Membership Committee of the Chemical Section, National Safety Council, and because I happened to have been one of those concerned with the formation of the Section, it gives me great pleasure to report the progress which has been made in the growth of our memberships.

From a membership of four in 1915 the growth of the Chemical Section has been most encouraging, and although our cancellations a few years ago kept pace with our new memberships, at the close of the last Annual Congress, held in the City of Detroit, Mich., the Chemical Section had 195 members. However, during the past year we lost five members by cancellation; but, to make up for this an extensive membership campaign was inaugurated and our memberships were increased by 143, making a total membership, as of September 1, 1927, of 333.

As I am now retiring from the Membership Committee, after being its chairman for the past ten years, I want to take this opportunity to express my thanks and appreciation to the Chicago Staff Officers, and to the members of the Section who have served with me on the various Membership Committees, for their help, for without their efforts the Chemical Section would not be what it is today—one of the most active sections of the National Safety Council.

IRA V. KEPNER, Chairman, Membership Committee.

CHAIRMAN WHITING: Gentlemen, you have heard the report of Mr. Kepner's work, and it is Mr. Kepner's work largely because he could never get anybody else to help him very much.

C. L. YORK (General Electric Company, Schenectady, N. Y.): I move that we give Mr. Kepner a rising vote of thanks.

CHAIRMAN WHITING: It is moved that we give Mr. Kepner a rising vote of appreciation for his work for all those years. If you are in favor of that motion please rise.

(The members all arose.)

CHAIRMAN WHITING: Our next paper was assigned to Mr. J. M. Rowland, who prepared a portion of this report and was then called away for about a month, so that he could neither finish the report nor attend this meeting. Fortunately, however, Mr. John Shaw, assistant general manager of Hercules Powder Company, has consented under a ten-minute notice to read Mr. Rowland's report.

The Safe Preparation of Tanks and Other Chemical Apparatus for Repairs and Inspection

J. M. Rowland, Chief Engineer, Hooker Electro-Chemical Company,
Niagara Falls, N. Y.

We are all familiar with the old saying, "It is the unloaded gun that fires and kills." Like the unloaded gun is the "empty tank." A tank may be filled with a liquid which when drawn off will leave the tank filled with a gas which the liquid

has evolved. The tank may seem to be empty, while its gas contents are far more dangerous than the liquid.

In 1917 a tank car of benzene was being unloaded at one of the chemical plants manufacturing war munitions. The unloading had just started when the car was struck by lightning and the contents ignited. The dome was open to permit the insertion of the suction pipe and the tank was full. It burned furiously for a few minutes, shooting a column of fire and black smoke, and then went out. The moment the fire stopped the tank appeared to breathe, draw in fresh oxygen, and the fire started again. This was repeated several times, each time the fire diminishing, until finally it failed to re-ignite. Had the tank been nearly empty when struck by lightning, it would have contained such a large volume of gas that there is little doubt but what it would have exploded, doing serious damage. As it was, measurements made after the fire showed but slight loss of the benzene.

In preparing a tank for inspection or repairs, our first thought should be for its gaseous condition, the invisible, intangible substance that may travel a long distance to flash back a stream of fire from a riveter's forge or locomotive and blow our tank to pieces. On the other hand, this same invisible substance may be of such a nature that it lurks within the walls and it is not until a man has entered through a small opening that he finds himself in an atmosphere of suffocation or poison. Having unloaded the tank and drained the last dregs of what it was presumably carrying, we now stop and think about its internal atmosphere. If we know the nature of the liquid that was drained from it we may know that the gas given from that liquid is flammable, and undoubtedly the tank was vented when it was drained and probably sucked in some air, and the mixture of this air with the gas might make a highly explosive compound. On the other hand, we may not know what the liquid was, whether or not it would evolve a gas, and are totally in the dark. What are we to do? Just one thing. Consider it a loaded gun until we have swabbed the barrel and know the gun is clean.

The Most Important Natural Supply Is Water

Man's supplies were created before he was put on this earth to live and work for chemical plants and railroads and the most important of nature's supplies is water. We find it particularly useful for our present problem in its liquid state and as steam. We may have to modify it somewhat in special cases to prevent injury to our particular tank, but in most cases we can use it as it comes from the pipe line. Our problem now is to make sure that no dangerous gas known or unknown exists in the tank. We might wash the inside of the tank with a hose, but cannot be sure that this would do the work thoroughly; so instead we flood the tank and in so doing the water occupies all the space and drives the gas out. When we do this we must be careful about the gas we are driving out, it may be flammable, flash back and explode the tank when it is only partially filled, or if the tank is in a building, it may spread dangerous fumes. We should close the tank and pipe the gases to a safe place outside the building, or if it happens to be a tank car move it to a safe location to do the flooding.

When the tank is flooded the gas has gone and we have now a tank to deal with filled with water plus gas as the water has absorbed and which the water may give up when it is drawn off, so we must use care in sending this water to waste. When the water is all gone the tank is empty again, but the gun barrel may not yet be swabbed clean. However, we can more safely squint through to see the dirty spots. We may find our tank contains a slime or sludge that will not mix with water and, now exposed, continues to give off more gas. We can give it one, two, three or more floodings if we wish, but yet the sludge remains and fumes continue. Now we resort to steam, draw off the water to expose the slime and sludge and introduce live steam into the tank giving it a free outlet through our vent pipe. Many sub-

stances that will not mix with water cannot withstand the seductive heat of live steam and merrily change into a gaseous state and go out the vent pipe with it. In most cases these simple home remedies will suffice, but if the patient does not respond then call the doctor, this time a doctor of chemistry, to diagnose our particular tank and prescribe the treatment, because a remedy in one case might mean injury in another.

In cleaning our tanks and chemical apparatus we must not lose sight of the materials of construction and must be guarded in the cleaning treatment that we do not injure them. If it is stoneware, we must be careful with steam because sudden temperature changes will cause internal strains that may break it. If it is steel, carrying strong sulphuric or mixed acid, the chemist will rightly tell us that the diluted acid will quickly attack and injure the steel, therefore, we must clean it so quick and thoroughly that the weak acid does not have time to do its destructive work or, better still, neutralize it early in the process of cleaning. If it is rubber lined equipment, we must not use steam and if we use hot water it should not be hotter than 150 degrees F. because the rubber lining may be softened or injured. So it goes for the special materials and special uses, each one having its own characteristics.

Use of Tankage for Liquified Gases

There is one use of tankage and chemical equipment quite different from the rest and that is for the liquefied gases, such as ammonia, carbon dioxide, chlorine, sulphur dioxide and others. These gases are handled in steel and shipped sometimes in tank cars and at other times in smaller containers and handled in plants in pipe lines and tankage. These gases, due to the temperature and pressure to which they are subjected, are condensed into a liquid and handled as such. When the gas is discharged from such a tank or container the pressure is reduced and the liquid boils to evolve more gas. In order to boil, the liquid must absorb heat and if the boiling is rapid it cannot always get heat fast enough through the steel shell to satisfy it, with the result that it freezes into an ice inside the container and then evaporates more slowly, with a reduction in pressure to practically atmosphere. This is generally evidenced by the sweating or formation of snow on the outside below the liquor level. One might judge from the gas pressure that the container was empty, actually, it may be half or three-quarters full. Under such conditions the container should be closed and allowed to stand and when, after standing, it does not build up any pressure all the liquid has evaporated.

The tunnels and sewers of the chemical plant sometimes offer the most difficult conditions because of the impossibility of stopping the flow through them and the unknown nature of the gases formed by the combining effluents from different departments. Such conditions should be met by forced draft ventilation and the precaution exercised by the Bureau of Mines.

It would require a book filled with chemical formulae, reactions and instructions to adequately cover all the conditions encountered in this field. It has been the object of this paper to touch the high spots in a general way to introduce the subject for discussion and in the preparation of tanks and chemical apparatus for inspection and repairs to use caution and to urge that we do not forget the "Unloaded Tank."

CHAIRMAN WHITING: Mr. Shaw, do you wish to add any personal discussion at this time?

MR. SHAW: We have been very much interested in the danger arising under just the conditions which are outlined by Mr. Rowland in his paper. A partially filled or an empty tank, especially in the handling of solvents of the petroleum type, is dangerous. The railroad switchmen have told me in our yards that they are more afraid

of an empty tank car than they are of a car that is full. I saw a brakeman with his lantern one night running along the top of a train of tank cars, and when he came to a certain one, he stopped. He got down and ran along the road bed past several more tanks and then climbed up again on the train. I wanted to know, of course, why it was he did that. He said the reason he got off the train instead of running over all the tanks was because he was afraid. He said they had some terrific explosions from empty tanks at some time or other.

In regard to the cleaning out of steel tanks which have contained acid, of course we wouldn't use steam. Ionization would be so rapid from the weak acid formed that it would attack the steel so quickly it would destroy the tank. It has been our custom to drain the acid tank and, depending on its size, a certain quantity of soda ash would be dumped into the tank and then a large stream of water would be run into it with which to dissolve and mix it. We fill the tank to overflowing so that the top steel sheet of tank, caulking and seams and so forth will be neutralized as well as the sides and the bottom. After that we let the tank stand full of weak soda water for a few hours. We then drain it and get in it with a large stream of water, usually a fire hose, and wash it very quickly. If there is any sludge, we generally manage to break that up with a stiff high pressure stream of water. If there is any doubt about leaving sour water in the tank afterwards, we again go over it adding a little more soda ash, etc. Of course these last remarks are not so much for safety as for saving the tank.

Work Carried on in Too Routine a Manner

CHAIRMAN WHITING: Looking at this tank problem from the standpoint of an insurance company, we get the distinct impression that everything goes on happily for years and then some combination comes up with a tank, whether a railroad tank car or a fixed tank in the plant, when some extraordinary operation is under way, such as repairs of leaks or cleaning of any form. The impression we get from that work is that there is not sufficient technical supervision given to it to make it absolutely sure that you will not get into trouble.

You go through that work in too much of a routine way. There have been a number of very serious tank accidents, and by that I mean involving the lives of two or three men and perhaps considerable property damage, where some little element of safety has been overlooked. For example, I don't know that every operating chemical company has a rule requiring the putting of a life rope around a man when they put him into a tank. If you do not put the life rope on and if by chance there is some asphyxiating gas released from the sludge or residue a very serious situation develops right there with that unconscious man in the tank. Another man almost instinctively goes into the tank after him just as a man would dive into water to rescue a drowning man. This second man may be overcome. Finally a lot of men arrive and realize that something intelligent ought to be done but they don't have time to work out a safe method of handling the situation. They are in a serious jam.

It certainly is a very wise practice to have a procedure carefully outlined and supervised for every such operation whether you know the tank is empty or not, because as Mr. Rowland has said, an empty tank is the most dangerous of all, and he is right. I should like to hear from the operating men as to what precautions should be taken. There is a man with whom I have just spoken who said he never had a tank accident. I would like Mr. Rogers to tell us why he never had or never will have this trouble and what precautions he takes to prevent it.

E. C. ROGERS (Grasselli Chemical Company, Cleveland, O.): Mr. Chairman, I think we have hit upon a solution of the question of preparing tanks for repair work, a question that is about as interesting and perplexing as any question ever brought up and with far more than the average operating hazards.

In cleaning a sulphuric storage tank the first thing we do is to put the work in charge of a man who knows his job—a foreman. We don't leave it to any workman. We insist upon proper supervision. First. The tank is then drained. We open the manhole, allow the tank to stand for a while, remove the clean-out patch, rig up a V-shaped trough up to the clean-out hole which is run to a pit or a lead-lined tank on the wagon. The men work from the outside through that clean-out hole with a long-handled hose, drag all the mud they can into the trough which will suffice ordinarily where you just want to get rid of your mud. That is just a question of taking the sediment out.

If you have to repair the tank you have to go farther. After we get what mud we can scrape out we turn on a fire hose and stir up all the mud we can around the corners and then we drain that off, then we let the tank stand. After that we go in there with sponges and sponge it out, prepare it for the repairman and he repairs it. The danger of course is in the sediment which might accumulate around the edges or in the corners. When a man goes in there with a hoe he stirs that up and thus makes it dangerous. We also provide our men with ammonium carbonate and even with bottles of ammonia and we have very little trouble from it.

CHAIRMAN WHITING: Eastman Kodak has a good number of tanks, I believe. Mr. Armstrong might tell us about their practices.

Teaching the New Man to Be Extra Careful

A. L. ARMSTRONG (Eastman Kodak Company, Rochester, N. Y.): Our practice in cleaning acid tank cars and acid steel tanks is practically the same as outlined here. We go a little farther than the supervision in regard to having the men appreciate what will happen in empty tanks unless care is taken. We put these men into a class and education is given to them practically all the time.

When a new man comes into a job he can't go into the plant until he has a thorough knowledge of what will happen under certain conditions. We find in our plant when we have trouble that the only thing we have to do is to find out who has been doing something that is contrary to general practice, and I think that holds good pretty well along the entire line. These men know before they go to work exactly what will happen, in a general way of course, when different chemicals are mixed—when water is turned into the acid or the acid into the water. They have a full appreciation of it, and that is gotten over to them in a laboratory by giving them actual demonstrations.

For emergency cases such as have been spoken of, we have installed at every point where the tank cars are handled, where chlorine cylinders are handled or where inflammable vapors are handled, the All Service type masks. These masks are in glass cases and are never used for anything but emergency work. If they are ever used once they are never put back into that case. There are nothing but absolutely new masks in there and then we know that a man isn't going to a tank car unless he has a new mask on. In our 25 years of handling acids we have never had an accident. I believe, due entirely to the fact that the man on the job really appreciates the dangers attendant upon this sort of thing. I think that is the real answer. If a man knows what he is doing he won't go into the tank and do the wrong thing.

A. L. THOMAS (E. I. du Pont de Nemours & Company, Gibbstown, N. J.): The gentleman spoke there about using the masks in the glass cases. When your men go down into those tanks, do you furnish them with a gas mask then?

MR. ARMSTRONG: Our men all have life lines on them when they go in and there are two men on the job at all times. We have used them for the last twelve years, and the masks in the glass cases are more for emergency work than anything else. The men are all furnished with regular masks and they can have a new one when-

ever they want it. These masks are checked up once each week so that we are sure they have a new one when they should have a new one.

The emergency masks are only for emergency purposes. For example, a man might disobey orders sometimes, as we all know they do at times, and he might go into a benzol tank or into an acid tank and be overcome and then we would use one of these masks. We have them four and five in a glass case, depending upon the amount of work we do at that particular point and so the men can grab these masks and go in and take care of a situation of that kind should one arise.

MR. THOMAS: I thought that was what you meant but I thought somebody might misunderstand it and that was why I asked you about it.

CHAIRMAN WHITING: Don't either of you gentlemen use the fresh air hose masks.

MR. ARMSTRONG: No. We don't use fresh air hose masks and I am not very keen on them.

CHAIRMAN WHITING: Doesn't du Pont use them?

MR. THOMAS: Very seldom. We have discontinued the use of them.

Discussion About Types of Masks

MR. ARMSTRONG: There is a new type of mask put out by a well known concern. It is the French type of mouthpiece which does not cover the eyes, it just fits over the nose and mouth. They make a harness for that mask and it is very light. Our men like it quite a bit because they can see what they are doing and also see where they are going. I think it is far superior to the mask which fits over the entire face. That one is so disagreeable to use.

I would like to say a word in regard to the fresh air hose type which you speak about. They are about the hardest proposition to keep in repair and it is difficult to know they are going to work properly, when you need them quickly. We have practically discarded all of them.

CHAIRMAN WHITING: I am surprised at that because of course the chemical mask has to be maintained and you can't tell by a physical inspection whether it is in workable condition or not. The fresh air hose masks can be inspected and it is visible whether they are workable or not.

MR. THOMAS: There was an air mask made in New Jersey a few years ago which was a very good one, but they didn't seem to get enough money to finance the thing.

CHAIRMAN WHITING: Do any of you use a life line around the man?

MR. ARMSTRONG: We use a life line in every case. We never allow a man to go into a tank without one regardless of the fact that it has been cleaned out and inspected. Our repair men always work with a life line on.

CHAIRMAN WHITING: Is that your practice, Du Pont?

F. J. O'CONNOR (E. I. du Pont de Nemours & Company, Wilmington, Del.): Yes; our men always do.

CHAIRMAN WHITING: Could you give us any more information, Mr. O'Connor?

MR. O'CONNOR: I would like to ask a question. On a tank car which has had solvent in it and which has been subjected to one, two or three washings, what is the final determination for allowing a man to enter the car for repair purposes? I mean what test of the inside of the tank is made to show whether there is any more gas in it or not. I would like to know whether one washing is sufficient or are three washings necessary?

CHAIRMAN WHITING: That is a very good point. Mr. Shaw, what have you to say on that?

MR. SHAW: We are very much interested in that too. I understand that U. G. I.

of Philadelphia have an instrument which makes a very accurate and delicate determination. Up to this time, so far as I know, we have depended on the time element after several floodings. We would wait to make sure it was safe. I would like to call on Mr. Voke, who has charge of one of our ships of the naval stores plant. He is ship's supervisor.

F. W. VOLK (Hercules Powder Co., Brunswick, Ga.): It has been our experience that it is not necessary to flood every tank. I have in mind solvent tanks in which petroleum solvents have been carried. Flooding might be necessary, but usually we steam them from 16 to 24 hours, using live steam and we find that is sufficient. We have never had a case of a man being overcome yet. I want to point out to you gentlemen that if a man is overcome in a tank with only a manhole for egress, he becomes an octopus. It is a very difficult proposition to get him out of that tank. The best way to do it is to put a mask on a man and put him in there and then hoist the man out.

I would like to ask information from anyone. Do you consider it is dangerous practice to caulk a tank, from the outside?

CHAIRMAN WHITING: Who is ready to answer that question?

Caulking Tanks Filled with Solvents

F. W. LAW (Standard Oil Company, Whiting, Ind.): We have caulked our tanks when they were full of solvents; that is, where there are leaks present. We have found that there was no danger; that is, we haven't run into any danger yet from this caulking of tanks.

CHAIRMAN WHITING: Have you ever had any ignition started at the leak due to friction sparks?

MR. LAW: No, we haven't.

CHAIRMAN WHITING: Would you consider it serious if it did ignite? I mean, if it were a very small leak.

MR. LAW: We do not. Our caulkers use a wet sack over the tools which is an extra precaution. In our can house many times we have leaking gasoline cans,—the five-gallon cans. They solder these cans while they are filled with gasoline. We have never had any trouble yet from this source that we are aware of. Everybody has the idea that gasoline is very dangerous. Of course it is dangerous, but the real danger is not when the tanks are full but when the tanks are empty.

When we have repairs inside tanks to be done by our boiler makers, we use the test lamp, but we have found that even though we use test lamps there is still a danger in the tanks due to the fact that we may have wooden supports to our roof which after the tanks are flooded or steamed and it may be a relatively hot day with the sun beating down on the tank roof, the oil or gas show up in the timbers above. It may vaporize after you make the test with your lamp. The gas collects at the top and we have had several explosions even after the test lamp has been used. Even vent pipes do not always take away this gas fast enough.

CHAIRMAN WHITING: If you have had a leaky tank, you would caulk it? Would you also braze it or solder it if necessary?

MR. LAW: No, sir; but it is not our usual practice to empty the tank for caulking only.

CHAIRMAN WHITING: What is your practice on the empty tank, if you have to put a man into it?

MR. LAW: We steam it, fill it with water, steam it again and let it stand for twenty-four hours.

CHAIRMAN WHITING: In that steaming, have you a ventilating opening at the bottom as well as the top or only at the top?

MR. LAW: If there is an opening at the top we open the top as well as the bottom in order to get complete circulation.

CHAIRMAN WHITING: Do you use a power drive ventilation or blower of any kind?

MR. LAW: No. I would like to ask a question about a lead-lined tank. We have agitators which are lead-lined. The lead lining lies against the shell of the tank. Oftentimes the lead-lining cracks and some of the gas or oil gets in back of this lead lining. We have been wondering how we could get this out. We have drain lines underneath which are supposed to drain this stuff out, but oftentimes our lead is so tight against our outer shell that it pockets the stuff in between the lead lining and the shell with the result that we are taking a chance when our lead burner goes in there to repair it. You see, he might run into one of those pockets and probably cause a serious explosion.

CHAIRMAN WHITING: That is a very interesting question to get an answer for. Before you quit, what is your practice with regard to protecting a man when he does go into a tank after it is cleaned and tested? I am referring to the rope or mask.

MR. LAW: We have a rope which we use. We are not using masks.

CHAIRMAN WHITING: Do you have a second man outside?

MR. LAW: We have a man up on top with a harness at all times.

Making a Test of the Tank Air

CHAIRMAN WHITING: Who can answer that question on a lead-lined tank which has become cracked slightly allowing some of the solvent to get in back of it? What would you do then; I mean, before you would send a man to weld the crack together?

J. S. SPICER (Pennsylvania Department of Labor and Industry, Harrisburg, Pa.): I would like to ask that gentleman what he meant by the test light. Does he mean a light that is put into the tank or do they take a sample of the gas to the laboratory and test it there?

MR. ARMSTRONG: That test lamp is nothing more nor less than taking a sample of the tank air and going to the laboratory and firing it. A better test for your tank car, however, I believe, is the Orsat test. You can take an Orsat reading of your vapor in the tank and you can get the actual concentration providing you run a blank first. There isn't any question about it. I think it is superior to the test lamp or anything else that you can use.

I would also like to say that we would not consider it a very good practice to caulk any tank from the outside if it contained any flammable liquids of any kind. The gentleman said they never had any trouble, but personally I wouldn't do that from what I know, and I wouldn't want to ask anyone else to do it.

CHAIRMAN WHITING: I presume Mr. Law refers to very minor leaks, and wouldn't attempt it with a bad leak.

MR. ARMSTRONG: Not with leaks of any kind.

MR. CHAIRMAN: I agree with Mr. Armstrong. I wouldn't caulk a tank containing a flammable liquid. Empty it and flood it with water, steam it and fill it full of water again, then you are safe. Why not go the whole way? You might say that you have no tank into which to transfer the contents of the leaky tank. Well, you should have ample equipment; pump the solvent out of the one tank into another. That is the safe way.

CHAIRMAN WHITING: That is a very interesting difference of opinion. Of course Standard Oil has had a vast experience in handling of solvents. Would you like to come back at him on that, Mr. Law? Is it the regular practice at all Standard Oil locations?

MR. LAW: It is in the Standard Oil of Indiana.

W. C. REIBLING (American Tar Products Company, Cicero, Ill.): I would like to offer a suggestion for that lead-lined tank. You might be able perhaps to get rid of the liquid by heating it from the outside. I wish Mr. Armstrong would state here what he said yesterday about the full tank catching fire. We don't want to have the idea that the only tanks to be considered dangerous are the empty tanks.

CHAIRMAN WHITING: Before Mr. Armstrong answers that, I would like to call your attention to the bulletins of the Interstate Commerce Commission. It was suggested at our meeting last year that every one of you men subscribe to this service and distribute the I. C. C. bulletins to your practical operating men. You will find in them repeated stories about full tanks and empty tanks getting into trouble. If a full tank gets afire it may not always blow up, but it will burn up and boil up and will extend its trouble over a wide area.

Experimenting With an Explosive Condition

MR. ARMSTRONG: Yesterday in the discussion on static electricity in the Engineering Section, the point was brought up that probably it would not fire a full tank if the tank did get afire; that is, that the fire wouldn't be very dangerous due to the fact that you could put it out. I think there are a great many firms all over the country who operate these cars and feel that they are not in danger due to the fact that they have too rich a mixture in the tank if it is at least three-quarters full. They think it is too full to cause an explosion.

I can speak from experience and tell you that we felt very much the same and we had felt so for a good many years. We had a flash in the mouth of a tank which was within ten or twelve inches of being full. Afterward we ran experiments to prove it. We found that with a tank partly filled and under the right conditions we could get a flash down into the tank. Immediately after the flash we would get a cooling and partial vacuum which draws fresh air into the tank and this gives a good explosive mixture and you then get a terrific explosion. We had one.

CHAIRMAN WHITING: Enough to wreck the tank?

MR. ARMSTRONG: You bet your life. We got enough to wreck the tank.

MR. COOK: Mr. Chairman, in regard to the test lamps, I happen to have on file the names of two men who put that information out. I would be glad to send that out to anyone who would be interested. I believe the device tests the concentration vapors in the atmosphere. As I understand it, you can see a visible flash inside the test lamp if there is such an atmosphere. I would be interested to know how reliable such a test is supposed to be. Of course, it is much more simple than using an Orsat or other determination. I have no experience on the reliability of such a test lamp.

The Test Lamp Not Dependable

MR. ARMSTRONG: I would say in answer that I have known a test being run over a number of years which was similar to the test lamp, and it has been proven that it was not reliable. I have information which you wish to get with regard to knowing whether or not you have an explosive mixture or whether you have a mixture which will burn, whereas the Orsat apparatus is on the same principle as the apparatus used for determining the amount of benzol and other industrial poisons in the air. If you run a blank on your air before taking your test you can read it; the whole performance doesn't take over three minutes. An Orsat can be carried around any place in the field and the work can be done very handily.

On this question again of caulking a full tank car, it would be mighty interesting if some of you gentlemen would get the latest report on the propagation of flame put out by the Underwriters' Laboratories. They have spent a great many years run-

ning these tests and they will give you data which I think will prove to any one that it is dangerous to caulk a full tank car.

MR. LAW: I don't want you to get me wrong. I don't mean tank cars at all. I am referring to storage tanks.

CHAIRMAN WHITING: Why do you make that distinction between caulking a stationary tank and a tank car from the safety standpoint? You are referring to a field tank, for example?

MR. LAW: Yes, field tanks.

MR. RIEDERER: As far as acid tank cars are concerned on the railroad tracks, I believe that matter is taken care of by the Interstate Commerce Commission ruling. Either Tariff Number 1 or B 9 explains that. If a tank containing acid leaks, and it is marked defective, it must be followed by actual repairs. It is up to the owner of the tank car to thoroughly clean that as a rule because the concern repairing the tank car is not in a position to do so. At the same time I would like to mention the fact that almost everybody is familiar with the Interstate Commerce Commission's ruling that the tank car should receive not only the sixty-pound test but should always have a thorough inspection after twenty years' service, and that must be done every year.

Interstate Commerce Commission May Act

In the future, undoubtedly there will be more of that kind of work going on than in the past. A tank car will be ruled out by the Interstate Commerce Commission if it is not tested every year. I am mentioning this at this point because the majority of tank cars built since 1910 are getting near the twenty-year period.

CHAIRMAN WHITING: It is very well to call attention to the new ruling.

MR. ROGERS: I would like to ask how the sulphuric tank cars are cleaned out.

MR. SHAW: In the same way you would a storage tank in your plant. Put some soda ash into it and fill it up with water. If it has much sludge in it you will have a job on your hands. You will have to use a very quick stream of water and lots of it and you will have to wash it out quickly, you don't want any weak acid to lurk there. Then fill it up with water and let it stand.

MR. ROGERS: We have started on a new method. We have a drum and fill that up with lime and we have a pump attached to the water and we run the lime into the water and when we get the tank partly filled we turn air through the same line which agitates the mud. We then blow the whole thing out and this method cleans it quite thoroughly and it avoids a whole lot of trouble. This method also prevents deterioration of the steel.

MR. SHAW: We have done this where we have had much sludge in the tank car or in the storage tank. We pump in the soda ash and water fill it up with mixed acid or sulphuric acid which the tank contained and we agitate this with the air pump. We then pump it out to a settling tank and separate it later. After that we go after the tank in the usual way of water and soda ash. I don't like lime for the reason that it is not as easy to get out of the tank as the soda ash is. It is a hard to get rid of.

A Satisfactory Way of Getting Mud Out

A. B. NIXON (Hercules Powder Company, Parlin, N. J.): We have found a very successful scheme of getting the mud out and also getting agitation at the same time. We do it by taking a fire hose without a nozzle on it and letting about six feet of it almost touch the bottom and then tie it at the top and turn on a full blast of water. That causes the hose to swish around the inside of the tank and it cleans it out in very good shape, and the weak acid is drawn off.

CHAIRMAN WHITING: That is a good practical way. Nobody has said anything about an electrical hazard in connection with such work. I assume you must have to see what you do inside of a tank and therefore you need a light. What is the safe answer to a light inside of a tank? I will tell you right now that you can kill a man with 110 volts if you use in a tank an electrical extension lamp that isn't properly designed. Of course you have the flash hazard as well as the shock hazard. What are you doing about that? How are you going to light the interior of any tank?

Lighting the Interior of the Tank

MR. RIEDERER: Mr. Chairman, we use a cable which is placed inside of a half-inch rubber hose. The lamp connection is absolutely gas tight and it has the wire cage over it. We use a standard safety extension cord; it is so heavy that the fellow wouldn't take it and stick it anywhere because it can't be handled that way. It is purposely made so that he will not use it indiscriminately. It can be run over with a wagon and not be harmed on the inside. I agree with you that it is possible to kill a man with 110 volts. We killed a man with 85 volts. We had to go to that extreme and we have to use cable that will fit through a half-inch rubber hose.

CHAIRMAN WHITING: I think you all know that the modern type of extension cord has no braiding on it any more than tires of automobiles have braiding on the outside, but they do have a high grade of mechanical rubber which will stand the abuse which Mr. Riederer mentions. That will give you safety from spark or shock from the cord itself and then the lighting device can be a vapor-proof lamp in a good substantial holder.

MR. NIXON: Wherever our tanks permit and where it usually takes a large opening or two openings from the tank, we use a flood light from above to light the interior of the tank and it doesn't go into the tank at all.

MR. LAW: We have now adopted a thirty-two volt transformer for feeding lights that go into tanks or tank cars.

CHAIRMAN WHITING: That is very good practice. There is no question but that there are plenty of 110 volt death cases on record in places where the man's body was very well grounded, as it is in a tank.

MR. NIXON: Does 32 volts remove the danger absolutely?

CHAIRMAN WHITING: I don't think anybody can answer that question. Theoretically it doesn't remove the hazard because it is the current flowing through the body rather than the voltage that kills a man. You might get a fatal current even at 32 volts but I should think that it is highly improbable. However, you will certainly get a milder shock under the identical conditions than you would get from 110 volts. But it is not positively known whether you can kill a man at 32 volts or not.

Problem in Cleaning Varnish Tanks

MR. SMITH (Pittsburgh Plate Glass Company, Pittsburgh, Pa.): We have a problem in cleaning the varnish tanks. The varnish is collected on the side of the tank and in feeding the varnish skins and these skins collect on the side of the tank and in collecting there become quite a thick layer. Of course we have to go inside and clean these tanks. I was wondering, however, as to the efficiency of a forced draft on the tank because when a man scrapes down this skin the solvent is underneath and the tank is filled with toxic fumes. Would a forced draft be efficient in a tank of that type?

CHAIRMAN WHITING: Has anybody had any practical experience in that respect? You know that electric light companies in working in street man-holes very gen-

erally use forced ventilation for protection. Of course that is only a small volume to ventilate. Again, you can have your forced ventilation on the masks if you use masks. In that way you can pump air to the man and not merely to the tank.

MR. SMITH: In that case you will have the trouble of getting your air hose smeared with varnish, and this could prove a serious difficulty.

CHAIRMAN WHITING: Have you tried steam?

MR. SMITH: Well, steam would cause water to get mixed up with the varnish at the bottom of the tank.

A Mask Should Certainly Be Provided

MR. ARMSTRONG: I think it is a pretty general practice to use a fresh air hose in all tanks. I think that ninety per cent of the firms that have this problem stick a three-quarter inch compressed hose in and in addition to that a man should certainly be equipped with a mask.

MR. SMITH: We do equip them with a mask but it becomes inefficient after a man is in there an hour. We have to change our feed to the mask and we have to have a second man on the outside of the tank to take care of any trouble that might arise. But if we can get away from the mask the man is allowed to work freer.

MR. ARMSTRONG: I don't believe you can.

CHAIRMAN WHITING: What is the size of those tanks?

MR. SMITH: About 1,700 gallons.

CHAIRMAN WHITING: I should think you could ventilate a tank of that size with power enough back of the blower.

MR. ARMSTRONG: I would suggest that he use an All Service type mask which records the amount left in the mask and the man inside can always tell whether he is safe or whether he is in danger by simply glancing down at the canister, and he could then put a new one on. They now have a canister with two tanks. That is the simplest way, I should think.

CHAIRMAN WHITING: But what about starting an explosion after scraping down the tank, by a friction spark, if you don't keep that vapor down?

MR. ARMSTRONG: If it is as he says, that there is wet varnish back of the skin and he pulls it off, I don't believe that it would be possible to introduce sufficient air to keep portions of that tank below an explosive mixture.

Tanks Uniform in Size and Well Ventilated

B. G. EDGECOMB (Mountain Varnish & Color Works, Inc., Toledo, O.): We have had considerable experience in the cleaning of varnish tanks. We built a plant about eight years ago and have been cleaning of tanks a great deal since. We had used tanks which ran as high as twelve to fourteen feet deep and this is rather a hazardous thing to clean out by getting into them. In working out a new scheme we made all of our tanks of the same volume or capacity and all of the hole and at the bottom we have an eight by ten manhole plate at the front. In cleaning those tanks we don't have any terrible difficulty. We run an air hose in at the bottom manhole plate and let that contribute all the time they are cleaning the tank. It is about a three-quarter compressed air hose.

CHAIRMAN WHITING: Regarding this question of any possible difference from a safety point of view between solvent tank cars and field storage tanks, both Mr. Shaw and Mr. Armstrong want to be on record that they do not recognize any difference from the safety standpoint and that both types should be handled by the same safety methods.

Has anyone used the following method for cleaning the film from the sides of a tank in the case of any hydro-carbon oil? It was told to me by a man who used to work for the Barrett Manufacturing Company. He said that they would put in a mixture of some chemical like cresol and that would saponify the film of oil so it could be rinsed off. That was the principal way they depended upon in getting the sides of the tank really clean. Has anyone had experience in that method?

MR. ROGERS: I would like to ask someone what method they have used in regard to sulphuric chamber systems. I refer to the procedure of unpacking a hot or a cold tower. It is a dirty, rotten job and it can be dangerous. I would like to ask what is the best method to use.

CHAIRMAN WHITING: That is up to you, Mr. Shaw.

Fatal Accident While Gaging a Field Tank

MR. SHAW: I haven't had any experience in chamber plants, in cleaning a tower. There might be a volunteer in the room who might offer something.

CHAIRMAN WHITING: Can anyone answer Mr. Rogers' question? It looks as though you will have to work that out yourself and give us your answer next year.

MR. ROGERS: We haven't any difficulty with it whatever but I just wondered if there wasn't a better method in use than the one we are using. We are always looking for a chance to improve our methods.

CHAIRMAN WHITING: I want to put the following into the records: Two men were outdoors gaging a field tank of a crude oil refining plant. The two men were both asphyxiated right on the top of the tank while they were gauging that tank. I couldn't get the technical details of the case, but I was told that it was caused through hydrogen sulphide poisoning, which, as we know, is very quick in its action. One of the men was gauging and was overcome. His companion went for help and the man who came back to help him was also caught. They were both killed, possibly by hydrogen sulphide. This was while working at an outdoor job where you would ordinarily think a man was entirely safe.

MR. COOK: I happened to investigate that accident shortly after it happened and it was pretty definitely determined that the hydro carbon vapors themselves were the cause of the fatal asphyxiations, rather than the presence of any hydrogen sulphide. Down in certain regions in the oil fields of northern Texas there have been about half a dozen such fatalities which were largely due to hydrogen sulphide poisoning. In these tanks crude petroleum was stored. In the case that you have reference to, the first distillate from the tanks themselves is what caused the asphyxiations. It has been fairly definitely determined that it was the hydro-carbons themselves.

CHAIRMAN WHITING: Why were the fumes so concentrated that the men couldn't get away from them?

Atmospheric Conditions May Have Played a Part

MR. COOK: The atmospheric conditions on that night were particularly adapted for such an accident. There wasn't a breath of air stirring. Apparently the first man who died remained on the top of the tank longer than he should have. He perhaps put his nose rather close to the gauging pipe, and the second man who died went up to help him and exerted himself in helping the man who originally keeled over. The thought was that it was very likely that as much as three- or four-tenths of a per cent of hydrocarbon vapor was present at the top of the

tank. I think that it is not generally realized that a low concentration of hydrocarbon vapors will cause asphyxiation.

CHAIRMAN WHITING: It will cause unconsciousness and then if a man remains there he dies. It doesn't kill him instantly, of course.

MR. COOK: It is merely asphyxiation and not a poisoning.

MR. NIXON: In connection with the danger of asphyxiation or of similar phenomena on outside tanks and outside exposure, I might mention that in 1916 in San Diego the Hercules Powder Company were working with kelp. We had a battery of probably seventy tanks in which fermentation was carried on with kelp as the first step. It was recognized that there was danger to a man on the top of the tanks who might be taking samples and in doing so might lean directly over the opening. However, no man ever went up on the tanks alone.

Fumes Overcome Men Outside the Tank

The laboratory was 200 feet away from those tanks and one night a man started from the end of the laboratory for the tanks and fell over. A man saw him fall and when he saw the man didn't get up he thought the man had injured himself when he fell. He went out to help pick the man up. This man also went over. It was fortunate that when the next man arrived there, the wind had changed and the third man was not overcome. This will show what can happen even in the outside atmosphere. I don't know what gas it was. We have tried to find out since then. There was some carbon monoxide given off, as well as some hydrogen sulphide. I never knew exactly what caused it.

C. E. RICE (Dow Chemical Company, Midland, Mich.): Mr. Chairman, much has been said about tank cleaning and when it is safe to work. Personally, I think a tank is never clean. The best answer to the question as to when a tank is clean is when a superintendent of a plant is willing to go in himself. I think many times when we send a workman to work in a tank we ourselves are found standing back beyond the death line. As I say, a tank is clean and safe for a workman to go into whenever the safety man and the plant manager are willing to go in with him. That is a thought worth thinking about.

MR. SHAW: How are we going to tell?

MR. RICE: You ought to know. That is the job of the plant manager and the safety men. Nothing so far has been said this morning in regard to steel, lead and copper metals absorbing vapors. I have had one or two instances where carbon bisulphide, anilin oil, chloroform and carbon tetrachloride were carried in tanks and which rendered them unclean and they can't be cleaned. A steel tank will absorb these. I don't know of any way to clean these tanks and to my mind a used tank is never clean.

Tank Valves Are Not Always Reliable

A. W. SKERRY (E. I. du Pont de Nemours & Company, Barksdale, Wis.): There was one question which I don't think has been touched on in this morning's meeting. We have been discussing the cleanliness of the tank. We will now take it for granted that the tanks are cleaned, but we don't know whether all the connections to those tanks and from those tanks have been thoroughly closed that no material might enter.

We have found out through experience that you cannot depend on the valves to stop off liquids from going into our tanks. We have found that we must blank off with a solid blank all the connections to and from the tanks. This does not mean only incoming the acid or liquid valves which may have been handled, but

it also means the discharge valves from the tanks which may allow drippings to back up into the tank. Another thing I would like to call to your attention is that if you have air agitation piped to the tank that air line must also be blocked off because there is a chance of a small amount of acid or some foreign material being in the air pipes and a gush of air coming back might do some damage. So in summing up this question, it appears to me from the experience I have had, that the only way in which you can insure a tank being clean after you have had it cleaned is to break off all connections from that tank and be sure not to trust the valves.

CHAIRMAN WHITING: Is there any further discussion? We will have to close very shortly. Incidentally this is our round table as well as our first paper. I can assure you that from what I have heard; as an ordinary insurance man I will never go into a tank or anywhere near it.

At the last Congress you may recall we had a very excellent paper on the treatment of chemical burns based on research at the Henry Ford Hospital. Dr. Davidson told us then that he had not gone into the question of chemical burns in the eye, but only of chemical burns on the body. We are very fortunate indeed to have now the report of further investigations which have been made at the Henry Ford Hospital on the particular question of chemical eye burns, by Dr. K. W. Cosgrove.

The First Aid Treatment of Chemical Burns of the Eye

K. W. Cosgrove, M. D., and W. B. Hubbard, M. D., Henry Ford Hospital,
Detroit, Mich.

The important chemical burns of the eye, like those of the skin, are mainly due to acid or alkali. It has generally been taught that the best method of treatment of such injuries is the use of some neutralizing agent, either alone,¹ or following irrigation of the eye with water.²⁻³ A year ago, Davidson⁴ showed conclusively that the intensity of an acid or alkali burn of the skin is increased by the use of a neutralizing agent and demonstrated that dilution is more effective than neutralization as a first aid method.

The experiments on which this report is based follow closely the work of Davidson on chemical burns of the skin. The eye differs from the skin in presenting a continually moist surface. When an irritant is applied to the eye, there is rapid outpouring of tears which tends to dilute and mechanically remove the offending material. Also the eye has no horny layer to protect it.

In any attempt to save sight after a chemical burn, the cornea of the eye is the important area. The cornea is the clear window in front of the eye. Any opacity of this area causes loss of vision. The cornea is made up of several transparent layers. On the outer surface is a layer of epithelium limited below by Bowman's capsule. Beneath this are stroma cells which are limited on the inner surface by Descemet's membrane. To cause an opacity of the cornea, the injury must penetrate through Bowman's capsule. If the injury penetrates entirely through the coats of the eye, collapse of the eye results. Therefore, the extent of permanent damage in the eye resulting from a chemical burn is directly related to the depth to which the burn is allowed to penetrate. There are three things which control this: (1) The strength and character of the chemical. (2) The length of time before initial treatment. (3) The type of the initial treatment.

There is considerable confusion in the literature about the best method of treatment. This fact and the fact that there has been no controlled work done, made it seem desirable to study the effects of various treatments in the labora-

tory where conditions could be controlled. Rats and rabbits were anaesthetized and the irritant instilled into the eye. At a set time by stop watch, the initial treatment was given. This treatment consisted of irrigation from a rubber syringe with water or other solutions. The eyes were observed at 12 hours and every day for at least two weeks. Some of the eyes were examined microscopically. Control eyes without treatment were also observed. The time before treatment was varied to determine the length of time a given chemical could be left in the eye without causing a permanent opacity of the cornea after various treatments. It must be borne in mind that the rat's eye differs from the human eye, not only in thickness of the cornea, but in having a smaller amount of tears. So that the severe results noted in the rat would not be seen in the human. A drop of a chemical in the human eye would within a second be diluted at least 10 times by the tears. Also the human eye is larger and a drop would not necessarily strike the cornea and interfere with vision before it had been diluted. The time increment, therefore, must be considered as only relative for clinical purposes.

Sulphuric Acid

The action of concentrated solutions of sulphuric acid on the cell is the splitting off of the O and OH ions with resultant carbonization. Acid albumens are also formed.

Concentrated or 95 per cent sulphuric acid in the eye without treatment completely destroyed the eyeball. The rat died in 48 hours, the destruction having penetrated to the brain, carrying infection with it. When the acid was neutralized with 2 per cent sodium bicarbonate after 10 seconds of burn, a similar destruction occurred, death coming in two or three days. The eyes treated by vigorous washing with water after a similar length of time were not collapsed, but resulted in very marked scarring of the cornea. None of the rats died.

Using 50 per cent sulphuric acid, the control eye showed very marked scarring of the cornea. Seven out of eight eyes treated with sodium bicarbonate in 10 to 15 seconds were similarly scarred. Of the eight eyes irrigated with water, seven had normal eyes in two or three days, one only showing some opacity of the cornea. Using 30, 20, and 10 per cent solutions similar results were obtained.

A graph was made of the relative time a solution can be left in a rat's eye with two treatments before causing a permanent opacity. This shows that the period of safety is lengthened 10 to 25 seconds by treatment. These added seconds give us a greater possibility of saving sight. It further shows that at any length of time after a burn water is better than neutralization, of course, excepting a period of burn sufficient to cause complete destruction, after which neither treatment is of any benefit in saving sight.

Nitric Acid

When nitric acid comes in contact with the skin it gives a characteristic yellow xanthoproteic reaction. The removal of nitric acid before serious damage has been done is more difficult than sulphuric acid. Using a 68 per cent nitric acid, the untreated and the eyes treated with two per cent sodium bicarbonate all were completely destroyed. The eyes treated with water irrigations showed marked scarring of the cornea, but none were destroyed. After a burn of 15 seconds, or longer, the eyes were destroyed despite the treatment. Similar results were obtained using a 30 per cent solution of nitric acid to produce the burn.

With 20 per cent nitric acid, the control rats showed very marked scarring of the cornea. After a burn of from 5 to 20 seconds, 60 per cent of the eyes treated with either water or sodium bicarbonate solutions resulted in transparent corneas. However, the water treated eyes cleared up two to three days before those in which sodium bicarbonate was used. The eyes irrigated with water showed some slight permanent opacity.

Ten per cent nitric acid can remain in a rat's eye five minutes and result in a clear cornea if treated with water irrigation. If the acid is neutralized after a similar time, a permanent opacity results.

Phenol

The problem here is somewhat different than in the two preceding groups. Although commonly spoken of as an acid, carbolic is only very slight acid to litmus. It is, however, a protoplasmic poison. It precipitates the cell proteins loosely, allowing the poison to penetrate deeply, causing death of the cells. The question is not one between neutralization and irrigation, but between various irrigating solutions. Water, alcohol 25 per cent, sodium sulphate and glycerine solutions, were used as treatments. As carbolic is not soluble in water in suitable strengths, the fractional solutions used to produce a burn were dissolved in glycerine.

Using 87 per cent carbolic, the untreated eye was completely destroyed. Eyes treated immediately after the burn resulted in clear corneas when water or sodium sulphate four per cent were used. Using Alcohol 25 per cent, the cornea showed some slight permanent opacity. When the acid was left 10 seconds or longer before treatment, 60 per cent of the eyes treated with water resulted in transparent corneas, only 25 per cent after alcohol irrigation and 10 per cent after sodium sulphate treatment.

A 50 per cent solution of carbolic in glycerine left in the eye without treatment, caused a very opaque cornea as an end result. After a burn of 10 seconds or longer, 30 per cent of the eyes with any treatment had transparent corneas in three to five days. The treatments used were water, alcohol, sodium sulphate and glycerine; 20 and 10 per cent solutions gave similar results.

Sodium Hydroxide

The caustic alkali combines with the cell proteins to form alkali albuminates and with fats to form soaps.² The action is rapid on the unprotected cell as found in the cornea. The rapidity of action makes it difficult to obtain an eye useful for vision with any treatment.

The eyes not treated were destroyed after a burn with 40, 20, and 10 per cent solutions. The eyes neutralized with two per cent acetic acid followed a similar course. Only 60 per cent of the eyes washed after a similar time were lost, the remainder having permanent opacities.

Lye

Commercial lye (impure potassium hydroxide) often accidentally gets into the eye and causes quite severe burns. Its action is similar to sodium hydroxide only less penetrating. Powdered lye was placed in the eye and when no treatment was given, resulted in destruction of the eye. When irrigated with water immediately, a very slightly cloudy cornea resulted, whereas, with acetic acid two per cent treatment, a very cloudy cornea followed. After 10 seconds of burn with any treatment there was marked scarring of the cornea.

Ammonium Hydroxide

The action of ammonia according to Sollman¹ is a penetration through the outer layers of the epithelium to form fluid in the lower layers with death of the cells. A 28 per cent solution was used in the laboratory to produce burns. Acetic acid two per cent and water were used as treatment. The cornea was destroyed when no treatment was given. When the alkali was neutralized with acetic acid two per cent even after one minute of burn, a cloudy cornea resulted. However, when the eyes were irrigated with water any burn up to four minutes duration resulted in transparent cornea. After five minutes sufficient damage had already been caused to result in permanent scarring.

Lime

The use of lime, plaster and allied material, is widespread and often results in considerable loss of vision when it comes in contact with the cornea. If quick lime gets into the eye, the process of slacking produces considerable heat which in itself produces a severe burn. In addition to that, insoluble calcium carbonate is laid down in the cell, causing marked loss of vision. Barkan, Barkan² and Wolff³ advise the removal of the lime through irrigation with water and later dissolving the calcium carbonate with neutral 10 per cent ammonium tartrate.

Metallic Salts

The most frequent burns seen from metallic salts are from silver nitrate, copper sulphate, zinc chloride or arsenic. Metallic salts combine with proteins to form metallic albuminates and an acid.⁴ The free acid exerts its own action on the cells, giving us a double local effect. The salts of mercury, zinc, copper and silver form soluble compounds allowing the effect to penetrate deeply.

Silver nitrate and copper sulphate may be controlled with sodium chloride irrigation using one to two per cent solution. This forms harmless chlorides.

¹Refer to Bibliography following the paper.

Arsenic acts as a corrosive very slowly so that a considerable period of time elapses before permanent damage is done. Mechanical removal with water readily prevents loss of sight.

McCord and Kilker⁵ have advised the use of sodium bicarbonate as a treatment for zinc chloride burns of the skin. Innocuous zinc carbonate is said to be formed. This treatment would also be applicable in the eye.

Discussion

It has been demonstrated by the experiments that neutralization of the caustic acids and alkali cause increased damage to the cornea. This added damage may be the result of heat produced locally by the chemical reaction. Also there is the theory that water supplies the hygroscopic caustics with the necessary H. and O.H. ions, thus preventing their withdrawal from the cell. Free O. and O.H. ions in the cell are incompatible with cell life.

Subsequent Treatment

The method in common practice today is the application of a bland ointment in the eye, three or four times daily. Unless the discharge and slough is extensive, no irrigation of the eye is necessary. The bland ointment prevents roughened lids from doing damage to the cornea and promotes rapid healing. Atropine is used to place the ciliary body at rest. Cold compresses and salicylates are used to decrease pain.

Conclusions

(1) It has been shown that, regardless of the concentration of a chemical, or of the time interval, the best result is obtained with irrigation and that neutralization definitely causes damage.

(2) Experiments show that neutralization is not of added benefit after thorough irrigation and causes more damage when done before washing than washing alone.

(3) The mechanical removal of the chemical is the most important factor. This is shown in the experiments with carbolic which substance is not soluble in water.

(4) The tremendous importance of time before first aid is given has been demonstrated.

(5) It has been further shown that after a certain time of exposure for any concentration irreparable damage has been done.

Practical points are suggested by the experiments as to the best first aid methods. Numerous drinking fountains placed so that no time would be lost would be advisable. Time before initial treatment is a big factor in saving sight and if every man could be taught to run as fast as possible to a drinking fountain and open the eye in the running water when a chemical has gotten in his eye, we feel that both the loss of sight and time would be very greatly decreased.

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Tears Would Assist In Cleansing the Human Eye

A number of lantern slides were exhibited by Dr. Cosgrove who pointed out in detail the relative damage to the cornea and other parts of the eye that result from the chemical burns under the two methods of treatment.

CHAIRMAN WHITING: These were not human eyes, but animal eyes. How would the result be with the human eye?

DR. COSGROVE: I have never been able to determine the human eye because the tears would neutralize the material and it would be diluted by the tears, and it would be impossible to say accurately. Of course you might do it if you took out the tear glands or something like that, but we haven't any human being who would want to be practiced on the eye. The interval of exposure would probably be more like minutes than seconds.

In closing let me impress upon every one of you and let every man in every factory who has anything to do with chemicals know that it isn't the treatment that is given but it is the length of time before the treatment is given that is important. Of course I have shown that neutralization is not as beneficial as water. but water, if it is not present can't be used. If you have a neutralizing substance present it would be better to use it immediately rather than wait any length of time for water.

CHAIRMAN WHITING: That is certainly a splendid contribution to our knowledge on the subject of eye burns, and it has the same practical application which we have from Dr. Davidson's work that water which we have most everywhere in the plant is sufficient and preferable to any neutralizing solution. We are fortunate in having some discussion on this subject by Dr. Hubbard.

Initial Treatment of Chemical Burns of the Eye

Discussion by W. B. Hubbard, M. D., Henry Ford Hospital, Detroit, Mich.

The time factor in treating chemical burns cannot be too strongly emphasized. A slight delay before first aid treatment may mean the difference between a useful and a blind eye. Keeping this in mind, the first aid treatment must be the most convenient method. Water is the most convenient and, as has been shown, actually lengthens the time interval of safety.

The effect of the solutions used in treatment was noted on control rats. No damage was done to the control eyes. As alcohol burns of the eye might occur by accident, or by treating injured eyes, experiments were done to note the strength and time necessary to produce burns. Various dilutions of grain alcohol were placed in the eyes and observed as in the other experiments. It was found that dilutions up to 75 per cent caused no permanent destruction of the epithelium of the cornea.

The benefit of neutralization before or after washing was considered. Experiments were done on rat eyes in groups of 13 with nitric acid, 20 per cent, and with sulphuric acid, 50 per cent. The first group was neutralized and immediately washed with water. The second group was washed and neutralized immediately afterward. The third group was washed, and the fourth group was neutralized. Neutralization followed by washing resulted in more serious damage than with washing alone. The results were very similar to those obtained by neutralization alone. Neutralization immediately after a thorough irrigation gave the same results as obtained with irrigation only. We concluded that neutralization before irrigation was harmful, and that it was of no benefit afterward.

Occasionally iodine eye burns are seen. Experiment with this drug showed that irrigation was a better treatment than neutralization. There was practically no difference in the results obtained by removal with alcohol, 25 per cent, and with water. Neutralization with starch solution resulted in severe destruction.

A Drinking Fountain Within Ten Seconds

In advising the use of drinking fountains in the first aid treatment, it must be considered that in burns of both eyes a man may not be able to run. In that emergency, the man should be helped to a fountain, or water should be dashed into his eyes. In placing drinking fountains the ideal would be one within ten seconds reach of every workman. Each fountain should be placarded directing the workmen to use the fountain in case of chemical eye burn.

After our experiments were practically completed and our opinions formed, we discovered that water alone was being used in a Detroit Willard Battery Service Station, where a water hose is turned on a man's eye immediately after an acid burn. They report very good results from this treatment. Few cases, however, receive proper treatment, as the following typical case shows: Mr. B. D. was employed by the B. M. Co. He was struck in both eyes by a flying spray of hydrochloric acid. He was treated 15 minutes later at the First Aid station with a few drops of some solution, probably a weak alkali. From the time of the accident, vision in both eyes was blurred, and at the end of one month, he presented himself at the hospital. At that time vision in each eye was only 0.1, and small, fairly superficial permanent opacities were present on the cornea of both eyes. From our experiments we feel that washing with water in 10 to 15 seconds would have prevented any loss of vision.

An Example of the Proper Treatment

An example of proper treatment is the case of Mr. S. K.: boric acid solution was being instilled into his eye for a mild infection. By mistake, phenol drops were used. Realizing some mistake, he rushed immediately to a tap and thoroughly irrigated the eye with water. Examination of the eye after several weeks showed only a small opacity, and vision was only slightly impaired. Had the acid been allowed to remain in the eye until removed by tears or until neutralization was possible, complete loss of vision may have resulted.

Delay in first aid treatment of chemical burns of the eye must be avoided. Any available solution, which is not harmful in itself, is of more value immediately, than any other treatment in five minutes.

CHAIRMAN WHITING: Thank you very much, Doctor. There are several questions which I should like to ask, and undoubtedly others would like to ask a question. Before our speakers reply, we shall be very glad to hear from Dr. Smyth of the University of Pennsylvania.

DR. SMYTH: I don't know that I have anything further to add. I think this is a splendid contribution and I listened to Dr. Davidson's paper last year and was glad to see the follow-up work on chemical burns of the eye. I felt they would get the same results with the eye as with the skin. I think they deserve a great deal of credit for bringing out these points which cannot be emphasized too strongly—immediate and thorough washing with water. If you don't have water handy then use the next best thing you have.

CHAIRMAN WHITING: The Chemical Section certainly appreciates very greatly having such research presented directly to us in their initial stages, and I think that undoubtedly the papers will be reprinted and made available for distribution later. Is there anyone else who would like to begin by asking a question?

CAPTAIN G. R. G. FISHER (Illinois Manufacturers' Association, Chicago, Ill.): I would like to ask Dr. Cosgrove if, in treating an eye burn such as has been described and which has been thoroughly irrigated, would it be of any avail or would anything be gained by putting in a drop or two of castor oil before sending for the doctor.

Castor Oil Would Probably Be of Benefit

DR. COSGROVE: Of course oil in the treatment of burns has always been recognized, and as I say, we have used a bland ointment in the Ford Motor Company that was placed in the eye of the person at the first aid station before he was sent to the main hospital. Castor oil wouldn't be of any damage and it would probably be of benefit.

H. JACOBSEN (E. I. du Pont de Nemours & Company, Newark, N. J.): I would like to ask Dr. Cosgrove something in reference to barium in the eye.

MR. SMITH: Hot barium brings several other chemicals to my mind with which we have had trouble and have had to combat and I should like to know from Dr. Cosgrove whether he has any knowledge of sodium sulphite, sodium sulphate, barium sulphite, barium sulphate, hot sulphuric acid solutions, and those last solutions were hot—boiling.

MR. ARMSTRONG: Silver nitrate?

CHAIRMAN WHITING: I would like to ask how long the washing should be continued. I would also like to ask this question: What do you do if the man closes his eyelids so vigorously that you have difficulty in getting any irrigation into the eye? If he is helpless in your hands, what are you going to do to get that irrigation in if the eyelids are tightly closed?

Various Additional Questions on the Subject

Here is another question: The first-aid kits which are available in most first-aid stations have either castor oil, argyrol or the ordinary eye-wash. Should any of those be given after the thorough irrigation and before sending the case to the eye specialist?

MR. COOK: Was potassium iodide solution tried out in washing cases of iodine burn, and is it a much better solvent of iodine than water?

CHAIRMAN WHITING: Any other questions?

G. R. STEARS (Western Electric Company, Cicero, Ill.): I would like to know what the best first aid treatment is for hydrated lime dust and sulphur dust in the eye.

CHAIRMAN WHITING: Any more questions? Doctor, you might begin to answer them now, if you will.

DR. COSGROVE: Mr. Jacobsen asked about hot barium. Of course anything hot is going to cause a burn and I don't know anything personally about barium, but I think the general rule which applies to most everything is the removal with irrigation of water preferably or with anything handy. That would be the best thing of course in a heat burn. In a heat burn we have a different thing to contend with and yet it is not such a serious thing. Heat will only penetrate a certain depth, depending upon the amount of heat, and it doesn't have to be stopped. It stops itself. I don't know anything about what the effects of barium would be on the eye, but irrigation would be of benefit.

F. A. SMITH, JR. (Titanium Pigment Company, Inc.): I asked about sodium sulphite and sodium sulphate.

DR. COSGROVE: Sodium sulphate in solutions up to ten per cent were used in the laboratory and caused no damage. I couldn't say as to anything stronger than that. I know nothing about sodium sulphite.

Of course when you come to hot sulphuric acids you have the heat again and you can only deal with it by irrigation. The solution with irrigation will cool the heat and prevent some of the burn, but when the heat strikes you the burn is there and you can't do anything except to treat it with the ointment or oil, whichever you prefer.

How Long Should the Eye Be Washed?

The next question was: How long should an eye be washed? As a rule, a syringe full of water was what we used. A syringe would contain probably about four or six ounces. I should say that it wouldn't take more than ten to fifteen seconds of washing in a drinking fountain to remove all that was there. Of course, when a person gets something in the eye, there is what we call blepharospasm, or a tight closing of the lids, and the lids can be opened forcibly by the fingers if a

man is unable to open them himself. I am not familiar with what is present in first aid kits.

CHAIRMAN WHITING: Boric acid eye-wash and castor oil. Sometimes there is argyrol in the kit.

DR. COSGROVE: Castor oil would be the most efficient, although olive oil would be more efficient than castor oil.

CHAIRMAN WHITING: Would you recommend the use of some soothing oil before sending the eye case to the specialist?

Have a Bland Ointment In the First Aid Kit

DR. COSGROVE: I think it would be of benefit in the first aid kit to have a bland ointment. The ointment commonly thought of is yellow oxide of mercury, but that shouldn't be used. It is irritating and should not be used in a burn. An ointment which contains a small amount of antiseptic is good, such as a weak solution of bichloride or any mercury solution put up by any of the pharmaceutical manufacturers. There are some of them that contain butesin, which has a certain amount of antiseptic picrate, that would give a certain amount of anesthesia in the eye and prevents the pain. The only time I can see that an eye wash is necessary in a burn of the eye is when there is considerable slough and it is dirty with it. It should then be washed out. If there isn't any slough it shouldn't be washed. The original wash is necessary, but if there are other washes following, it is liable to irritate more than soothe the eye.

CHAIRMAN WHITING: Silver nitrate was also mentioned.

DR. COSGROVE: Silver nitrate is neutralized by a saline solution—a salt solution. It can be normal saline or it can be one or two dilutions of normal, then the neutralization of nitrate doesn't cause any damage. It is much better and the action of it is stopped quicker than by the removal with water. Of course, if you do not have a salt solution, water is the best thing. Water is always taken if you haven't got the saline solution.

Dealing With the Scar on the Cornea

Regarding the scar on the cornea, we have tried several things. I personally have never seen any benefit occur from much that you can do. Sometimes injections of normal saline increases the circulation of the eye and in the cornea and reduces the scar to a minimum, but once a scar is on the cornea, always a scar.

Potassium iodide was not used. I don't know anything about it as a solvent for iodine. It is quite unlikely that it would be the best thing, as we have shown by carbolic acid that it is the mechanical removal and not so much the dilution. I don't know how potassium iodide would affect the injured eye. It would not affect the eye that was not injured. That is where we come up against alcohol and the use of phenol. We already have an eye injured. We know that alcohol up to seventy-five per cent does not damage the cornea, but we have an injured eye and we put alcohol into it and we cause more damage. I believe the next question was about hydrated lime. Was it not?

MR. STEARS: No, it was hydrated lime dust and sulphur dust.

DR. COSGROVE: I am not familiar with sulphur dust. Hydrated lime would of course react with the cornea and form calcium carbonate. That can be removed.

CAPTAIN FISHER: I would like to ask the doctor if in a neutralizing element for strong alkalis it would be wise to say that two per cent solution of acetic acid would be sufficient in general.

DR. COSGROVE: I guess I didn't make myself clear, but that was what we used, two per cent of acetic acid for strong alkali and stronger solutions of acetic acid would be more damaging than two per cent. Two per cent would be good to use to neutralize it. I wouldn't like to have anybody use acetic acid of any strength in the eye.

Winking the Eye Also Would Benefit

CHAIRMAN WHITING: I want to ask the doctor whether the patient should be instructed to wink the eye during the irrigation. Would that be of any material help?

DR. COSGROVE: You mean when it is being irrigated? Yes, that would be of material help.

A. L. WATSON (The Koppers Company, Pittsburgh, Pa.): There is one point on which I am not quite clear, and that is whether or not it is the opinion of the speaker that there would be any advantage in the irrigation process of having a neutralizing agent in the water or whether it would be better to have the water without any neutralizing agent whatever. You spoke, for instance, of using a syringe full of water and that perhaps that was sufficient. Would there be any particular advantage in employing some neutralizing agent in the syringe full of water?

DR. COSGROVE: That question came up at one time and we had done several experiments using probably less neutralizing substance than water and we turned around and repeated those experiments and did further experiments using the same amount of neutralizing solution as we used water with the results that I gave you. In the results I gave you, we used the same amount of neutralizing substance as we used water. Does that answer your question?

MR. SMITH: In the average first aid stations there are not always physicians or nurses available. How is this ointment to be applied? It is simple enough to drop drops into the eye, but it must be more difficult to get the ointment in the eye satisfactorily.

DR. COSGROVE: The ointment comes in a small tube with a little nozzle on it and the lid is just pulled down like that and a little ointment is squeezed in the sack and the eye is closed and you can rub it a little bit like that if you wish. It is very easy to apply. It is just as easy to apply as the drops.

CHAIRMAN WHITING: In a few cases of exposure to chemical burns such as plaster, in building and general construction work, the drinking fountains will not be available. I would like to ask the doctor whether he would consider it adequate to have a wide-mouthed bottle of water on the job so the water could be spilled into the eye, using the bottle as an eye cup.

Use a Wide Mouthed Bottle to Spill Water Into the Eye

DR. COSGROVE: Yes, that would be adequate, providing the water got into the eye and not on the clothes alone. If there wasn't a drinking fountain around, the man could stick his head into a pail of water.

CHAIRMAN WHITING: A plasterer has no water near and he has to take his first aid with him, but would you consider a four-ounce bottle of water would be adequate?

DR. COSGROVE: That would be plenty.

DR. P. H. HOURIGAN (Larkin Company, Buffalo, N. Y.): We have always used this plain water treatment in the general plant. We instruct them to use the

water any place they can get it and there is generally water some place in a bottle, pail or tub. Up to two months ago, we haven't had any serious burns. We happened to get caught, however, with a bad caustic case two months ago, and the men worked this treatment, but the caustic did considerable damage to the eye, but fortunately did not destroy it.

Castor Oil Is Used in New York

Most of our first aid kits contain castor oil. I think the official kit in the state of New York contains this castor oil. After everything is washed off, they use castor oil. While the doctor may think it is a simple thing for anybody to put this ointment into an eye, it is not. It is easy to a doctor because he knows the eye. It is hard for a layman or even for a nurse to do this unless she is specially trained to do that work.

Regarding that collapsible tube, we find that at least fifty per cent of them when squeezed will first throw out a waxy, thick and hard matter instead of a soft ointment. Something has happened to it since it left the manufacturers and you have an irritant if it is placed in the eye. Castor oil as a practical thing seems to be the best.

DR. COSGROVE: Castor oil is perfectly all right. Of course, some tubes will spoil, there is no doubt about that. Something changes in them, but I think it is just as easy to put that ointment into the eye as it is to put the drops in. Our first-aid man at the Ford Motor Company uses an ointment all the time and he doesn't have any difficulty with it.

MR. RIEDERER: Would there be any effect from the use of a rancid oil? In the years gone by it was understood that the use of rancid castor oil was more detrimental than useful. It is said they use five per cent carbolic acid in the oil in order to prevent it from becoming rancid. I know that I have used five per cent in eye treatments and it has been all right. But I understand that olive oil stands perfect for years and never becomes rancid. Is that correct?

MR. COSGROVE: It sounds like a very good principle. I haven't had any personal experience with rancid oil. I don't know what it forms or what it would do under the circumstances.

W. E. DEUEL (E. I. du Pont de Nemours & Company, Carney's Point, N. J.): Referring to the question of the tube of eye ointment, I would like to say that I always insist when a new tube is used that it should be squeezed a little bit and first wiped on the forehead of the man or on a piece of gauze, but not placed into the eye. I would like to ask the doctor what the treatment is for burns or injuries with reference to argyrol, lunargen or two per cent mercurochrome.

Neosilvol Preferred In Injuries

DR. COSGROVE: We have used both mercurochrome and argyrol ten per cent and neosilvol ten per cent. I prefer to use neosilvol in injuries. Sometimes in using argyrol where you have a lost corneal epithelium you will get a brownish scar from the use of argyrol. I have never yet seen a pink scar from the use of mercurochrome, but that might be possible. I prefer neosilvol, but the only trouble with it is that it is not stable and you can't keep it for an indefinite time. It is not as practical as mercurochrome, which you can keep for a period of time. Mercurochrome is stable.

CHAIRMAN WHITING: Are there any other questions? One speaker said, "Stick your head into any pail of water you find." If it is a fire pail, you want

to be sure there is water in it before you do that. One man actually stuck his head into a fire bucket and found a dead rat floating in it.

ADJOURNMENT.

Thursday, September 29, 1927

The third session was called to order at nine-forty o'clock by the chairman, S. E. Whiting.

CHAIRMAN WHITING: We have a pretty long program so we had better get started immediately. We are going to have "Chemical Plant Safety" discussed from several standpoints and then there will be a general discussion. First, we are going to hear from the "Plant Management Standpoint of Chemical Plant Safety." Mr. A. B. Nixon, Superintendent of Hercules Powder Company will address us.

Plant Management View Point of Safety

A. B. Nixon, Superintendent, Hercules Powder Company, Parlin, N. J.

No one can deny that the subject of safety has received a well deserved proportion of attention at the hands of practically every division of our vast business, industrial and community life. I don't know that I can make any material contribution to the vast amount that has been written and spoken about this very interesting and important subject. I do feel, however, that too often in a consideration of safety, we ignore the relation of the safety factor to the other important factors of our every day life.

In some places we still see the safety subject handled with a vast amount of hurrah and noise, during the continuation of which, everything seems to take second place to the subject of safety and "Safety First" is truly a real thing. However, when the big noise has died down we are apt to find that much of the enthusiasm has been left behind.

Safety is an important factor in our life and must be recognized, but in a fairly well balanced life it is not the most important factor. Sooner or later we must realize that it is relative to the other problems of our day.

Perhaps no one and nothing is or can be absolutely safe. Progress is made by a certain degree of chance taking. We make our advances by stepping out ahead of experience. It is true that progress comes faster to those who make full use of old experiences, but any new venture is beset with difficulties and unknown hazards.

Our lives and bodies are endangered by some agency from the time we are born until we die. In spite of this constant danger we want to live. We could avoid some of the dangers incident to the great automotive traffic of today by refusing to use the automobile; we could avoid all the risk of railroad wrecks by refusing to ride on the railroad; we could avoid the hazards of industrial activity by closing our factories; we could avoid the risk of ptomaine poisoning by refusing to eat; but who wants to do without these things? In such a list of activities, safety is an important consideration and we should be careful to see that every reasonable precaution looking towards safety is taken, but in none of them is it perhaps the most important consideration.

We are dependent upon leadership perhaps more today than ever before. Some one or some group must continually help us to properly evaluate the several factors which enter into our every day life. The theoretical or ideal leader might be compared to the mythical prudent and reasonable man whom the law holds out as an example. Neither of them exists. However, there are several qualifications which to some degree are essential to leadership.

1st, there must be the ability to recognize the existence of a problem.

2nd, there must be the ability to think these problems through so that the relation of any particular problem to all other problems will be understood.

3rd, and following these in order, there must finally be the ability to plan the attack for the solution of the problem.

The individual does not live who can measure up 100 per cent to these requirements. Such a man would be absolutely unselfish, absolutely honest in every particular, broadminded to the Nth degree and omniscient. We are all selfish to some extent. We are narrow minded in the consideration of some subject and I fear that we are not always honest with ourselves and others. Just the same I am satisfied that the man who is able to circumscribe his actions the greatest percentage of the time by these precepts and considerations will be to that extent a better foreman, a better leader wherever he may be found, and no man can lay claim to real leadership who does not exhibit to some extent these qualifications.

All of the factors and problems which enter into any business are necessarily subservient to the basic purpose of the business. Now one and then another may be more important and may seem to be temporarily in need of stressing but we find them all linked together, each depending upon the other. Safety must always bear a relative position to the other problems and likewise the consideration of all factors must of necessity give a consideration to safety.

Most plants of progressive industrial establishments are fairly well equipped with mechanical safeguards. No plant is perfect in this respect. We all have room to advance in this direction. Those with the older plants are probably farther from the ideal for in the construction of a new plant many details of design looking toward ultimate safety can be economically provided while often the history and experience in the risk is not such as to warrant the cost of a change in existing equipment.

Accidents Continue Despite Mechanical Safeguards

Yet with all of these mechanical safeguards our industrial accidents go on. Sometimes I am inclined to believe that the multiplicity of mechanical safeguards has led us to believe that our plants are fool proof. There is nothing so dangerous as a "fool proof" guard. Our real safety job is first to lay out our plant in such a way as to make operations reasonably safe and then to realize ourselves and bring home to the men those hazards that still remain.

The real development of safety standards has only started when mechanical guards are provided. The real approach to safety has to do largely with the development of a safety sense on the part of the foreman and individual workman. A danger to be avoided is a general impression that safety considerations are the province only of the safety committees or safety engineer. These are only a means to an end. They are merely tools looking toward the ultimate education of the workman.

Many methods are in use, looking toward the propagation of the safety sense among the workers. All of them are valuable in the right place and they all have their advantages and I need not take the time to illustrate these various methods of approach. No matter what system you use or how good it is, it can be seriously handicapped if not completely spoiled by a single faulty regulation.

As a nation we must have laws in order that we may conduct ourselves individually and collectively in a manner which promises to be best for the common good. Likewise in industrial establishments we must have certain rules to guide our actions. We must have some sort of a system in order that we may get the most effective use of the energy which is applied to the work.

We are loud in our criticism of our law makers for the volume of prohibitory

laws which they turn out each year. But how many of us give sufficient heed to the volume of prohibitory rules that may be given out in our own establishments each year?

Certain rules and regulations which formulate an operating system are necessary. These for the most part should be rules for doing things and not against doing them. They should be kept to a minimum consistent with uniform practice.

Such care in the formulation of regulations breeds confidence and the men will know that you understand what you say. Then, if you are careful to see that no slight violation passes unnoticed they will understand that you mean what you say.

A few good general safety rules, energetically enforced, mean more to the development of a sense of safety than a multitude of detailed instructions. Once this sense of safety is developed, the individual will think of more detailed safety measures for his own particular problem than you could ever formulate for him.

We are frequently asked to evaluate the result of certain changes in procedure, certain safety campaign policies or what not. We find plenty of published records showing the wonderful achievement obtained as the result of certain particular efforts, let it be wage payment plan, safety campaign, plans for the prevention of losses or what not. We find a surprising similarity in the result achieved by all substantial establishments, no matter what particular problem seems to motivate the dominant study. In general, I feel that it is impossible to accurately evaluate the contribution of any one of these factors to the general progress that has been made. No matter where we start before any real progress has been made all factors have to be touched and all contribute to the result, and there is grave danger ahead for any of us who attempt to make any one of these factors appear as the dominant cause.

Your business may be large enough to warrant a special power division, a safety division, a production division, a general purchasing department etc., but nevertheless the success of the whole business and the separate divisions of the organization and the individuals who make up this organization will be proportional to the degree that each subordinates itself or himself to the general purposes of the enterprise.

CHAIRMAN WHITING: Will you kindly use the backs of your registration cards on which to make notes for any discussion which you desire to bring up on these four subjects this morning. We will have the main speaker on each subject first before we get into the general discussion.

The next phase of the subject will be as from the standpoint of the medical department and we shall hear from Dr. Hourigan of the Larkin Company.

The Medical Department

P. H. Hourigan, M. D., The Larkin Company, Buffalo, N. Y.

I have been asked to tell in five minutes what factor the medical department should be in the safety movement, so it will only be possible to touch the high spots, skim over others and neglect a great deal.

In a group of men such as I have noted here, men who have come from an activity that the future of the world, especially in this country, either in peace or war depends upon; men who think as you men think and as the last speaker has shown he thinks; men who have a fine sense of proportion and relationship; men who go after the facts—all the facts—and then list them and do not guess—why, a man is justified in being a little fearful of what he says or does in front of you. So.

I am rather reminded of the story of a question which was put to a great English financier as to why in their great English monetary system they had such a small piece of money as the half-penny and farthing. He was reputed to have answered: "It was put there to afford a Scotchman an opportunity to make his charity." And I need a little more than Scotch charity.

Of course the medical department is basically interested in the individual. We sense our social relations and the economic problems that surround us, but we feel that all your activities are in the final analysis for the benefit of the individual whom God created, and so that is quite natural. We have brought man into the world as a babe and we feel that interest which all feel in a babe.

We have seen them taken off handicapped with injuries in middle age and we have seen the family and industry deprived of the great value of his later years; so that notwithstanding the talk of the last speaker we insist on the final analysis, it is the individual that is the big factor.

What Is a Good Physical Examination?

Now, as to what the medical department can do in the safety movement. Of course, what we first do is to have physical examinations. Along that line, how can we help? In many ways. Let us consider a general physical examination. The first thing you look at would be a man's eyes. I mean that you see a man's eyes—and I notice in this crowd as I look about that almost every other man needs a pair of glasses. The general situation of the country is that 50 per cent of the people need eye glasses or rather eye correction—that is, 50 per cent of the people don't see well. Those eyes should be checked up by medical examinations and the medical service should consist in evaluating that eye, and in supplying the corrective lenses in an economic way for the workman. Then if the man is put to work, the department should know of the condition of those eyes and should consider it in their activities.

A man past 40 years of age is myopic. He must be fitted with glasses to do his work. If his work consists of handling something near, he must have glasses to correct his vision. He is myopic and can't see far. If his duties take up a line of work which requires a man to see far that is another condition. If the children have been neglected in their school years and they have the amblyopic or blind eye, that thing must be taken into consideration.

If you stop to think, in the state of New York we have probably the most liberal compensation law of the whole world. Notwithstanding the fact that before last year it did occupy that position, an Industrial Survey Commission credited—I won't say credited exactly, but after three years' survey they increased the compensation. In the state of New York an eye costs 165 weeks at \$20 a week. Twenty-eight is considered industrial blindness or a total loss of an eye.

When you injure an eye as much as 28 the injured man gets something like \$20, and when you figure the cost—and the clever industry puts the cost back on the department—if you damage that eye and it is figured back in the cost of insurance it will come, although spread out, to something near \$10,000. That is put on the wrong side of the cost in your department.

While you have a factor that does get a cost of what damage to an eye will be, yet society all along insisted that you either take care of the individual and his eyes or you pay the penalty. Industry in the state of New York, in union with labor I believe, is quite willing to assume the costs of industry because of accidents to the individual or diseases contracted because of the industry. I don't believe that attitude is going to be lessened.

Now we come down to the examination of your teeth. You can see big loose fangs and pyorrhea around the gums and bad tonsils. There is no question about it, many of the things about the body which make that man a danger to you when he

lives with the rest of the gang might be already in him. There is the heart: A man with a weak heart or a poor heart should not be put to work on certain types of jobs. If you have an industry that such a type of man would be a danger to, that man should not be accepted. Of course we in our organization have an opportunity for spreading a man to one place or another. We reject very few, but the decision depends upon the community problem of industry and all that.

We have the lung problem and that is a big problem. It is a problem which industry must recognize. There is the dust hazard to such an individual—the dust damage, the injury by fumes and irritating gasses. All activities and industries are telling you about the dust conditions and also remedial measures to take, in South Africa, England, Australia, to recognize fibril silicosis, and how those diseases are contracted. Laws are being introduced into legislatures in this country and I believe some have been passed already which make silicosis or fibrosis compensable. In our industries you can meet the problem. You have here the brains and you have the courage. If we don't meet the problem as we should meet it in this country, it is going to be met as in the old country, it is going to get into the development of a bureaucracy, and that is a state function or state activity, and there is none of that here which can compare in any way with the measure of efficiency which the men in our industries can display.

The Case of the Man With Weak Lungs

The examination which shows weak lungs should mean that that man shouldn't be put on a job where there is a dust hazard, and if you in your industry have that exposure the men in your department will help you to recognize it and will help you to see what it is doing to your men. Checking up on the men will mean that the poor-lunged man shouldn't be put into that hazard, and the man who is developing that fibrotic condition of the lung will afterwards have a superimposed tuberculosis. If that man is put on the job and he suffers from the effects of that dust he should within two years at the most be changed from that exposure. Statistics have shown that it takes from three to five years to create that fibrotic condition. Of course, then it is easier for the industry to recognize that exposure and to take measures for the gradual purchasing of new machinery to see that the new machinery eliminates that hazard.

That is part of what physical examination can do. There is much else which can be said along the line of weak backs, of hernia, of varicose veins and of degenerative changes of age in the workman. Then comes the matter of how we aid you in solving problems, as Dr. Congrove showed you yesterday, by handling at the right place the contact of injury of the eye and by helping you along with those problems, then when you get to the dispensary the immediate care of the injury lessens the effects. I think the compensation statistics show that 50 per cent of the costs were for infections after the injury. A very minute injury should be handled immediately in order to have the infection factor eliminated. Of course, this would lessen the danger and it would add to the safety, then the follow-up care of that case would be the proper thing, and the best service is the cheapest service in any line.

The best type of doctor and the best kind of surgery and laboratories are the cheapest, you all know that. Then comes the activity of the medical department as is shown in its relations with the sick benefit. Basically, a man is controlled by necessity. If you will take up the matter of sickness, or take up the matter of injuries which are outside of compensable injuries, if you take up the matter of operation outside of compensable operation and will help a man to solve those by your sick benefit associations, you are going to lessen the amount of claims you get of conditions in his body from compensable causes.

A survey of our state shows that only seven per cent of the working men carried any health protection or protection for required operations. So it is beholden to industry that they should think over this situation where only seven per cent of their workmen have anticipated sickness or necessary operations.

I think I have started enough.

CHAIRMAN WHITING: You have started many things, Doctor. Will you sit up here because they may ask you some questions later. We will now take up the question of safety from the standpoint of the foreman. Mr. L. C. Streeter, Superintendent of the Chicago works of the du Pont Company will address us on that subject.

Chemical Plant From the Standpoint of the Foreman

L. C. Streeter, Superintendent, Chicago Works, E. I. du Pont de Nemours and Company, Inc., Chicago, Ill.

The majority of chemical plant foremen are recruited from one of two sources. First, the efficient workman with considerable experience on his job is promoted to a foremanship; or second, a man with technical training—more or less thorough—is put in charge of an operation. Either type of man has a very clear idea of the fact that he is dealing with chemicals which, if not properly handled, are potential causes of very serious accidents. The first man gets this idea through practical experience; the second, through education and training.

For the purposes of this discussion, we must assume that some thought has been given to the appointment of the foreman by his supervisor. We must assume that he is not picked up at random, rather that he is selected with great care, due consideration having been given to his qualifications for the particular work.

Accidents which occur in the area under the leadership of an incompetent foreman—incompetent because of lack of experience and training—are in my opinion, directly chargeable to management.

Given, then, a foreman, a man trained and experienced in his particular line of work, how does he view this whole safety problem?

Now my assertions are the results of my own observations in handling labor and foremen during the past twelve years, in four chemical plants owned by one company. They represent one man's opinion, and many of these opinions, I know, are debatable.

The foreman wants to earn more money. He wants promotion. He wants to step over the line from punching the clock to receiving a salary check. To attain these ends, there are just three avenues open to him—cut costs, increase production, improve quality. Any one of the three—any combination of the three—always results, or always should result, in prompt recognition. In any well-organized department where outstanding achievement does mean quick recognition, there is quickly developed a healthy spirit of competition between various groups.

We all know that there is an inherent sporting instinct in any normal group of men. Our gang ought to be able to do its job just a little bit better than any other gang on this plant. And the foreman, if he has the qualifications to make him a good foreman, is quick to seize this tool of friendly competition to further his own interests.

If we grant, then, that a competitive spirit can be fostered in the men, immediately there develops a spirit of friendliness. The men become something more than cogs in a wheel. There is a human interest developed, the value of which is incalculable. We don't want any member of our team to get hurt. We want no accidents to happen to our friends. The seed of the safety idea is right there. The foreman cannot cut his costs with one or two men in his crew partially incapacitated.

tated by injury. He cannot increase his production if he is shorthanded. He cannot improve the quality of his product if his gang is spread too thin to catch defects.

Accidents must be fought; safety must be followed up, to keep in the race. Your good, first-class foreman in a chemical plant is very alert. He is constantly asking questions. He wants to know always "Why?" And to accomplish anything along safety lines to protect his own men, he is constantly asking "How?" He must think along safety lines exactly as he thinks along production, cost and quality lines.

The first question that he will want to ask is, "What is the attitude of the men on top in this corporation?" The foreman must be thoroughly, one hundred per cent, sold on the idea that his company, from the board of directors down through the president, vice-presidents, departmental managers, plant managers, superintendents, etc., all want safety in the organization. He is very quick indeed to detect any insincerity in the safety movement—spasmodic bursts of enthusiasm, inspirational speech making, rallies. To the average foreman, a very large percentage of this sort of thing is pure hokum. All of these things may have their places, but 99 per cent, I believe, of the enthusiasm of a foreman for safety is engendered by his observation of the quiet, everyday, regular, sane, living of safety by his superiors. Precept and example—99 per cent example.

Practical Safety Work Teaches a Big Lesson

The plant superintendent who stops in his plant inspection long enough to turn down an exposed nail—to move an obstruction away from a fire escape—to do any one of a thousand little ten-second jobs of this sort, has done more good than an hour's speech-making will do.

I do not believe that many of us appreciate as we should that the foreman catches his stride from his superior, and that the men down the line get their gait from the foreman. The sincerity of officials in a safety campaign is to my mind by far the most important single element in determining the success or failure of that safety movement.

The foreman must be made to thoroughly understand that safety pays. He knows that the company is in business to make money, and for no other purpose. It must be demonstrated to him that it is actually cheaper in dollars and cents to spend money to prevent accidents than it is to pay for accidents. We all want him to believe that the top boss is a good scout—that he wants to conserve his men from purely humanitarian reasons. But he can be sold on this idea much more easily if he knows it pays the company to play safe.

Now let me get down to cases. We'll assume that I am a common, ordinary, garden variety foreman, that all of you gentlemen have executive positions and that every one of you has a better job than I have,—but we are all together, working on the same chemical plant. We are talking safety and it's time for the foreman to have his say.

I am sold on safety. I believe in it. I've got a good gang of men. I'll back them against any gang in the plant. I am thoroughly convinced that the top men in our company really want safety. I believe most of you men do also. There are some of you that I am doubtful about, but I believe the general idea of safety is pretty well instilled into the minds of our organization. However, there are some of you who have heard this safety business talked so long that familiarity has bred contempt. And lastly, I believe that safety pays. I believe it pays me individually to do my work safely, and I know that it pays me individually to see that my men work safely.

1. I want some rules to work by—rules that you will subscribe to. I want rules that will work—

A. Don't tell a man never to enter a tank without a life line, when his work

makes it necessary for him to go down into a tank in which his life line is going to get so hopelessly tangled up with agitator blades that he can't get out of the tank without cutting the life line, even if there is no accident. Think of the plight of the poor fellow if there should be a fire or an explosion.

- B. Don't insist that a welder wear goggles all the time he is welding or cutting, and then expect him to weld or cut one hundred per cent of his time. Let's give him something else to do part of the time to rest his eyes.

Make your rules workable rules, and then stick to them. No rule is much better than one habitually broken. Let me and my gang help formulate the rules. Bear in mind that the man who starts the motor, who does the charging and discharging, who operates the control mechanism, knows a whole lot of things about his particular operation that none of you can ever know. Use our brains as well as our muscles. Consult us.

2. Then what are we going to do about the man who breaks the rules? Are we going to have penalties for unsafe practices? What are the penalties? Are they to be the same for each person, regardless of past history? Personally, I believe we ought to have penalties for infraction of safety rules, but I am not at all sure that I would treat John the same as I would treat Joe for the same offense. I believe every case should be judged on its merits. As has been aptly said, discipline has a place in safety work, but in the long run we foremen must lead our men into safety—not drive them.

Rules that Are Practicable Every Day

3. When my area is inspected by the plant safety inspection committee, I want to be present. I thoroughly resent being written up in reports with copies broadcast throughout the organization, without a chance to defend myself. You don't know the conditions in my area as well as I do. Give me a chance to explain.

4. I want to be in on the safety meetings. I think there is a lot of bunk in many meetings because the man who knows best the subject under discussion is not present. I want an opportunity to tell the management what ought to be done by the management to make my area more safe—and if I can sell my idea, I want action, quickly. That's what the management demands of me.

5. I am going to take time to go around with my new men and tell them the whole story—what it's all about, where we are going, why we do it and how we do it safely. And if I do spend some of my time on safety work, in the instruction of new men, etc., I don't want to be criticised because I can't be two places at once. I am paid to do what my boss wants me to do. If he indicates that he resents my taking time from straight production to be devoted to safety work, I'll have to let up on the safety work.

6. And when the accident comes, I want to be in on the investigation. Send your committee—send your safety engineer—send everybody interested. But don't forget that none of you is as interested in the accident as I am. Get my ideas as to just what happened. Get my ideas as to how to prevent its recurrence. Write all the reports you want to, but pay a whole lot of attention to mine.

In conclusion: I can sum up everything I have said before in a mighty few words. Be assured that the foreman—the worth while foreman—will back you up on all of your safety work, provided he knows that you are one hundred per cent back of the safety movement yourself.

CHAIRMAN WHITING: Another viewpoint on that problem is that of the insurance carrier which, I dare say, most of you think is a nuisance, but sometimes a necessary one. Mr. A. S. Johnson, of the American Mutual Liability Insurance Company will tell us about that.

Chemical Plant Safety From the Standpoint of the Insurance Carrier

E. C. Jacobs, American Mutual Liability Insurance Company, Engineering Department, Providence, Rhode Island

At the outset let me explain that the insurance carriers' standpoint will be confined to the engineering standpoint, and touch somewhat upon the underwriting aspects of chemical coverage.

It is to the interest of the carrier as well as to the interest of the assured that the insurance engineer study the accident situation at the assured's plant and make recommendations, which, if carried out, will reduce the loss experience and consequently lower the assured's premium costs. This outline will touch upon the various methods of arriving at the premium rate, discuss the insurance safety engineer's activity within the chemical plant, and present a short resume of some of the more important items of accident prevention which apply particularly to a majority of chemical plants.

To establish a proper rate, the first essential is to classify the risk in accordance with the products manufactured and the processes of manufacture. With the enormous and rapid developments started during the war, it was necessary to establish a new method of rating chemical risks. A study of the problem by the Rating Bureaus of several states and the representatives of several of the insurance companies, comprising a technical committee, brought forth a system of rating that is known as the Chemical and Dyestuffs Rating Plan. This plan was adopted by most of the states on April 1, 1921. The plan provides for the classification of risks where the primary and governing hazards are of a chemical nature, although chemicals and dyestuffs may not be manufactured, including the bottling or canning of materials which are flammable, poisonous, caustic or corrosive, such as naphtha, potassium cyanide, ammonia, carbon bisulphide, etc. The plan measures the hazards by considering first, the flammable or explosive nature of substances used or manufactured, and, second, the hazard created by or during processes of manufacture. The plan contemplates the establishment of a single rate to cover all the chemical operations of a plant even though the operations are very complicated. A discussion of the complications and the relation of predominating and secondary hazards is purely technical and need not be dealt with here. It is, however, very essential to note that a great many chemical risks have their classification assigned from the Manual of Compensation Insurance and do not come under the Chemical and Dyestuffs Rating Plan. Such industries include acid manufacturing, paint and varnish manufacturing, smelting and copper refining, etc., and they comprise such a large proportion of this Section that the Section has little interest in a more detailed picture of the chemical rating plan than has already been given.

The basic rate established by either of the plans should produce a premium commensurate with the expected losses for the chemical operations of a plant which represents the average of that industry. The same Industrial Compensation Rating Schedule that is applied to other manufacturing plants is then used to modify the rate on the basis of a comparison of mechanical plant hazards to the average for the industry. The application of the Schedule Rating Plan allows credit or exacts charges by measuring the accident hazards which exist on elevators, power transmission, moving parts of machines, points of operations of certain machines, and, foot, leg and eye protection in some industries. It also provides for credit for standard safety organization, first

aid, dispensary or hospital. Schedule Rating offers the Chemical Industry the same incentive for safety work that is offered other industries. You will note that the premium credits or charges are immediate, and not earned on the basis of the actual accident loss experience of the individual plant.

The rate so obtained is subject to further adjustment by the Experience Rating Plan on the basis of actual loss experience. If the accident prevention work has succeeded in reducing the accident losses below those expected by the Schedule Adjusted Rate a further decrease in rate is allowed; and, conversely, if the safety work has been unsuccessful with a resulting loss experience greater than that anticipated by the Schedule Adjusted Rate an experience charge will apply. These rating procedures should indicate clearly the motive of the Insurance Safety Engineer in his strenuous efforts with a manufacturer to have him make every possible effort to reduce his accident frequency, severity and losses to a minimum, so that the risk may benefit from such efforts by a reduction in insurance cost.

The Safety Program a Part of the Production Program

During the period of growth, while the rating problem was being solved, the Insurance Engineers were making a study of the accident hazards in the chemical business in order to carry out their motive. These studies served as a basis for focusing the engineer's attention on the more typically hazardous features of the business so that as much assistance and advice as possible along accident prevention lines could be given. Partly due to the rapid change and development of the industry and the resulting lack of accident experience, and partly due to suspicion in a very secretive industry, much of the seed sown by safety engineers fell on sterile ground. This made the struggle for safety very hard and it was only after a discouraging and uphill fight for cooperation that safety interest and activity on the part of some chemical plant managers brought to the accident situation a new aspect. It is now progressing in the right direction.

The Insurance safety engineer has struggled to get the safety program made a part of the production program. It is a part of the production manager's business to know the cause and responsibility for all items of waste, a large percentage of which are lost time and cost from accidents.

Accident prevention, like any other line of endeavor, is conducted best when thoroughly organized. A standard form of safety organization is outlined in the Schedule Rating Plan. It contains the essential features but must be adapted to individual plant conditions.

The engineer recommends that great care be exercised in selecting the person to make plant safety inspections. The importance of this position and the work that the inspector does have not been fully appreciated in many places. Whether the Insurance safety engineer is endeavoring to establish a safety organization, is inspecting the plant for accident hazards, or is determining the conditions to apply the rate-making procedure, his motive is always to assist his company's risk to reduce the endless chain of losses from personal injuries and the lost time and physical suffering of employees.

In order that this paper may be constructive the third section of its outline will be a short resume of some of the more important items of accident prevention, which are common to a majority of chemical plants.

The maximum of success in accident prevention work necessitates a study of such tabulations as a classification of accidents by causes, a second classification showing who was responsible for each accident, another classification by either department, location or process, and a fourth by machines or materials

used. Statistics alone will not prevent accidents but a study and analysis of them are essential in determining what to do and where to direct the effort.

Carelessness advanced as a cause for accidents has retarded accident prevention work. Carelessness is not a cause, it is an alibi. Investigate accidents to determine their cause and responsibility. Until you do so, to get true facts the efforts of the safety committee are trebled.

Many of the plants now used for the purpose of manufacturing chemical products were constructed during the war or immediately after its termination. Some are inadequately ventilated and lighted. In some cases there are defects in plant construction to the degree that the most hazardous operations are not physically separated by fire walls or other suitable physical protection, or isolated from other departments in the plant. A large dyestuffs plant used a series of ball mills of the mush room type, for the purpose of pulverizing dyes. This equipment was located in the end of a long wooden building one story in height. At the other end, packing and blending operations took place. Two men were regularly employed on the ball mills. Fifteen men were engaged in the other operations. The departments were not physically separated, but labor did not interchange. A flare in a ball mill blew off part of the roof and side wall. One man was killed and two seriously injured. In this case instead of exposing two men to the hazard, seventeen men were exposed at least to some degree. Later the grinding operations were isolated from the remainder of the plant and located in a building constructed for this purpose.

Conditions such as this increase the accident possibilities as well as the fire hazard.

The Serious Hazard of Poison Gas

Another serious hazard is poison gas, which is well illustrated by a condition found in a plant making among other chemicals a very poisonous gas. The process building is of wood construction, with windows and skylight ventilation. The finished product is piped to a small wooden shed adjoining the building and is open on three sides. The steel cylinders used for shipping the product are filled by means of valve connections. A strong odor of the gas was noticeable near the shed and inadequate measures had been adopted to safeguard the worker. He was expected to stand in such a position that the wind would carry the gas from him. He should have been provided with a proper gas mask. Exposure to poison gas of employees from other departments by allowing them near those buildings is decidedly hazardous. Every effort should be made to study plant construction and operations with a view to isolating the greatest accident and fire hazards in such a manner that the workers in other departments will not be exposed to these hazards, and the number of workers who are connected with these hazardous operations should be reduced to a minimum.

In many chemical plants, unnecessarily dirty and ill-smelling conditions have kept away the better class of unskilled labor. This has had an adverse effect on the accident situation. Ignorance and bad habits are responsible for many accidents. Where these conditions prevail labor turnover will continue high and the class of help remain low. Clean up unfavorable working conditions to improve the labor situation. It will be reflected in the accident record.

Conditions conducive to the good health of the workers should be provided, and a check on their health should be maintained. Physical examinations should be given all new employees and a periodic re-examination at frequent intervals of all employees engaged on manufacturing process. Examinations should be made by a competent physician.

Process men should be subjected to daily inspection to detect symptoms of chemical effect upon them. Yearly physicals are not enough.

Washing and bathing facilities that are adequate for the needs should be provided and used.

Clean working clothes and underwear should be furnished to all process men. Daily changing from work to personal clothes is good business from the safety and health standpoints.

Much might be said on the attitude of plant supervisors toward the safety program. It means success or ruin. A favorable attitude should be established at once so that there may be no question about it in the minds of the safety committee. If the plant management has decreed that accidents shall be reduced and has organized a safety department, and is personally represented in that work by the safety supervisor, he should expect to receive automatically the cooperation of the supervisory force. To be sure the safety supervisor, by his ability, must continue to prove his worth to the supervisory force and not be carried on their shoulders. All too many safety supervisor's jobs degenerate into a clerical position of keeping the records and recommendations made by the Insurance engineer and operating force. They lack initiative, knowledge and ability to direct and lead.

Responsibilities for All Types of Plant Workers

Too many superintendents and safety supervisors avoid their obligations by issuing a long list of rules and regulations for employees. The conduct of employees is the direct responsibility of the foremen, and this responsibility is not lessened by the issuing of rules with penalties, which will be invoked only when an accident happens. Rules should be for the guidance and help of employees and be developed only by those who have the responsibility for, and full knowledge of the operations. While this statement may have general application it is especially pertinent to the chemical industry.

In a chemical plant the belts, gears, sprockets, dangerous moving parts and points of operation should be guarded and a big task of the Safety Department is the maintenance of the safeguards provided. Fumes, caustics and corrosives often make equipment unsafe and continued exposure without protection will ruin equipment. Guards must be painted, frequently renewed and in most cases acid resistant paint is necessary. Metal guards may be found impractical sometimes, but wood guards are not recommended for general use. Falls on wet and slippery walkways are common, so that constant attention to housekeeping is necessary. Provision should be made for the proper and immediate attention of chemical burns and a settling of the burn problem should be made to find proper equipment and safe guards to prevent same.

The safety department should review all proposed new installations of equipment and check the maintenance of all equipment in use, to make sure of the calculations covering the safe working pressure for tools, and the specifications for pressure control devices, relief valves and indicating and recording temperature and pressure instruments.

A consistent, systematic and efficient inspection service covering plant, housekeeping, relief valves, indicating and recording instruments, etc., should be inaugurated and maintained.

Earlier in this paper the question of cooperation between the safety department and the supervisory staff was covered. As a final point let us consider the cooperation between the safety department and the technical division. It would appear to be reasonable to assume that when the necessary research work

and tests are completed in connection with a new product that every reasonable step had been taken to manufacture the product in a safe and efficient manner. This is often not the case. During the development many dangerous conditions have to be met. Violent reactions may have to be controlled, dangerous sub-compounds or by-products made safe by the invention of new machinery, dangerous factors replaced by substitutes which work equally well, and process hands thoroughly trained to carry out the process. Let the technical division make known to the safety department and plant supervisors all the accident possibilities in connection with new processes employed so that no item of accident prevention can be possibly overlooked. All too often the safety inspector or safety director is a non-technical man and knows little of the manufacturing processes, and the technical men have little knowledge of safety or interest in it. Chemical plant safety inspectors have frequently remarked that they did not know the nature of the materials used and stored in certain departments and had little or no knowledge of the operations that were being conducted. A closer relationship must be developed, for little effort has been made by safety supervisors to make the technical men enthusiastic for safety. The technical division must educate thoroughly all who work with a new process to make the proper tests, handle the materials as they should be handled and keep careful watch for the possible but unexpected reactions. The close co-operation between the technical and safety departments is the high point of chemical plant accident prevention. That industry is a highly technical business, safe in the test tube; usually safe in the autoclave, but the steps between the test tube and the autoclave may produce anything new and interesting. Watch that they do not produce an accident.

Foremen Sold One Hundred Per cent on Safety

CHAIRMAN WHITING: We have a little time for discussion and I would like to have each one of you keep in mind the four forms of discussion we have on the program. I want to have you give your viewpoint as to how you utilize them in your own control of safety in your plant. I think Mr. I. V. Kepner can start on that line.

MR. KEPNER: Mr. Chairman and Gentlemen: I have been very, very interested in all these four problems. It so happens that the company I represent, the Pennsylvania Salt Manufacturing Company, has all of them, and we utilize all the various things which have been outlined here this morning. I still feel, however, that we have a long way to go and we have lots to learn. For instance, I am fortunate enough to have our plant management from the president all the way down thoroughly sold for safety, which helps to make my job much easier. The medical department in all our plants is well covered. We have a physical examination of all new employees and in certain departments we have an examination once each month.

I feel all our foremen are sold one hundred per cent on the idea of safety. We do not have any big safety rallies, but we just keep plugging at it all of the time and our accidents on the records show results, and a great part of that is due to the foremen and the manner in which they handle their men.

The insurance carrier—thank heaven we don't have much of him. We carry our own insurance but are inflicted with the state inspectors once in a while, but they are good fellows and I am always glad to have them visit our plant. It so happens that one is sitting in front of me now and I have to say something nice for him.

I would like to hear what some of the other plants are doing in those various subjects, particularly with their medical examination.

CHAIRMAN WHITING: Mr. Shaw, I wish you would very briefly give us your viewpoint on these four elements of safety.

MR. SHAW: Mr. Chairman, they have been very interesting to me. I feel as Mr. Kepner does that we have a whole lot to learn and a long distance to go. I was particularly interested in the statement that the workmen should be examined every day. Did I understand that correctly?

MR. JOHNSON: That statement covered only those process men who are possibly subject to the chemical reactions which cause serious occupational diseases—those that have serious chemical exposure.

MR. SHAW: Does that mean a fairly complete examination?

MR. JOHNSON: No. It means to keep them under observation and not let them drift away and allow them to get so far that they can't be cured easily.

MR. SHAW: We carry our own insurance with the exception of fire insurance in one or two of our plants, so we have a whole problem at home to take care of. We deal with the carrier. I don't know that I have any more points to bring up.

CHAIRMAN WHITING: Do you stress the foreman element in your safety work?

Accidents Are Really a Cost Item

MR. SHAW: Oh, yes. We are trying to give the foreman that freedom of expression which was spoken of by Mr. Streeter. I think that was an excellent paper in which he brought out the foreman's point of view.

I think the high spots in the management's point of view was that we have to put safety in its proper place, balancing it with all the manufacturing items. Safety has been harmed by some few who have been harping on safety alone and not balancing it. Safety is really a cost item. It is economically sound and it takes its proper place according to the proper analysis, but if we harp on safety alone we very often disgust the manager who knows the proper place in which safety should be and feels that we are too one-sided in trying to shove safety to the forefront.

CHAIRMAN WHITING: I see that the subject has come down to three points: management, foreman and medical department, and I know it is so with the Eastman Company. Mr. Armstrong, will you give us your views on those three phases?

MR. ARMSTRONG: Our safety work has developed into something new in our plant. It was started about two years ago and was an experiment. It may be in the experimental stage yet.

First of all, our management is very much behind the safety program. They are all very much behind it all the way down the line. What we have done was to establish a school. It is a room perhaps three-quarters the size of this one. In one end of it we have a laboratory and when we have new men to go to work in the chemical plant we take the men in and we show them what happens exactly under certain conditions. We also show them just how treatment must be given to men who are injured, how to protect themselves and what it means to them if they don't protect themselves with the proper method which we show.

As an example we show them that acid can be poured on the hand and washed off. We then pour the same acid on a piece of cloth and leave it there for a few minutes, and it is not necessary for me to say here what happens. You all know that the cloth will immediately burn by turning black and then smoking with some acids which burn very quickly.

We go with them into electric wiring, electric lights, static electricity, dust explosions, inflammable solvents, solvent vapors and so on. Although it was rather tough going at the start and rather hard to sell to the foreman, now we are unable to take care of the demands made on us by the different departmental superintendents who ask to have their men be allowed in. We have even gone so far as to take in our yardmen, the reason being that these men have to handle acids, and common labor of that type as you all know are rather hard to get to appreciate what will happen if they throw things around.

and be able to give those findings. While in my organization everything that touches a medical problem comes in to us, we haven't been able in common with many of the medical departments throughout the country to reach that condition where we could answer questions of that kind.

You want to know what percentage of accidents are due to eye conditions? A man holds up a statement that there are three percent less cases in the last year. We have only a general answer to make to your question: if 40 per cent or 50 per cent or as somebody insists 65 per cent of the people are in need of correction of their vision, and vision is such an important function in a man, it is very obvious poor vision must mean increased accidents and increased injury and of course lower efficiency. That would mean accidents and a lessening of safety.

CHAIRMAN WHITING: We will now come to the second subject of this morning, the Hazards of Spray Coating, a process you are all familiar with. Just as a preliminary to Dr. Winslow's presentation of the subject, I should like to get the background of this investigation from the chairman of the Steering Committee that worked out the preliminary details. Mr. Watson, will you give us some idea of that situation.

The Hazards of Spray Coating

A. L. WATSON (The Koppers Company, Pittsburgh, Pa.): Such a review must necessarily be very short because if I tried to cover the field thoroughly it would take the rest of the morning session, I fear. In general the Executive Committee of the National Safety Council determined to conduct an investigation into the hazards connected with the process of spray coating and made appropriations for that purpose. A Steering Committee was appointed by the Executive Committee to develop an investigating committee to carry on the investigation. That work was done largely through various sub-committees. I might mention that investigating committee was made up of representatives of national organizations that were most interested in the subject at hand.

The purpose of the investigation from the start was to determine in an open-minded, fair way just what the hazards were in connection with the process of spray coating and to find, if possible, ways and means by which those dangers could be guarded against. The work was completed a few months ago and a report was prepared and approved by a majority of the committee, which consisted of about twenty-seven or twenty-eight members. Upon the approving of that report a minority report was filed by two members of the committee. The main report, together with the substance of the minority report, were presented to the Executive Committee of the National Safety Council for determination as to what action should be taken on the minority report. The Executive Committee of the Council has referred the minority report back to the Steering Committee for action and that is the present status of the matter.

Spray Coating and Brush Painting Not to Be Compared

I might mention that in making this investigation, it was never the intention to make any sort of comparison of hazards as between the practice of spray coating and brush painting. It was not the intent to start anything that was going to cause legislative discussions, but it was simply to find the facts in as fair a manner as possible by perhaps the one body in the country that was in the best position to do that kind of work. So the present status of the investigation is that the report has been adopted by the main Investigating Committee, by the Steering Committee and in turn by the Executive Committee of the National Safety Council, and the minority report has been referred back to the Steering Committee for consideration.

CHAIRMAN WHITING: You all remember the Benzol Investigation made at the initiation of this Chemical Section, and the Rubber Section jointly, and how valuable that has been as a guidance in certain modern forms of industry. You all know without any introduction who the chairman of that committee was. He is also the chairman of the Spray Coating Committee, most appropriately. I take pleasure in introducing Dr. Winslow of Yale University.

Some High Points of the Investigation

PROFESSOR C. E. A. WINSLOW (Yale University, School of Medicine, New Haven, Conn.): Mr. Chairman and Members of the Safety Council: We had very much hoped that the final report of the Spray Coating Committee might be ready to place in your hands this morning. Unfortunately the large amount of tabular material has delayed the printing and I have here the galley proof alone. I will not read all of it to you, but I will present some of the high points.

This matter seemed to the Investigating Committee as it did to the Steering Committee, of very great importance and one on which it was desirable to reach a rather prompt and, if possible, convincing conclusion. The use of the spray coating process, as you know, has been very definitely increased since the war and the introduction or extension of any process is likely to bring in new hazards.

Attention has been forcibly called in some quarters to the hazards involved in coating surfaces with a spray gun and it had seemed at times that some very threatening and restrictive legislative action might be taken. It is the hope of the Safety Council and the committee that by an entirely unbiased study of the situation any precipitate or unreasonable action might be forestalled and a sound conclusion reached as to the ways in which the spray gun could be used with safety.

The committee organized for this purpose found at its disposal relatively little in the way of information in the shape of earlier studies. It found that a study of the principles involved in the subject had been made by the Industrial Commission of Wisconsin, and that a rather exhaustive field study had been made of the situation by the State Department of Labor and Industry of Pennsylvania. It was clear, however, that more direct information was needed as to the conditions existing in the plant with regard to the spray gun and the health of the man. There was only one way to attack a problem of this kind and that was to go into the industry and see how the particular process was used and the result.

Discussion Upon the Committee's Work

CHAIRMAN WHITING: Now we have ten or fifteen minutes for discussion.

W. J. PITT (National Paint, Oil and Varnish Association, Toledo, O.): Mr. Chairman, will we have an afternoon session to discuss this important subject?

CHAIRMAN WHITING: I think not. Our entire program closed with this morning's session and we will not meet again as a Chemical Section.

MR. PITT: Has this meeting the power to modify a report by motion?

CHAIRMAN WHITING: While I have some opinion on that matter I will refer the question to Mr. De Blois, who is a member of the Safety Council Executive Committee and a Past President. The question which Mr. Pitt asks is whether this meeting today has any power to modify the report of the Spray Coating Investigation Committee.

MR. DE BLOIS (National Bureau of Casualty and Surety Underwriters, New York City): If it is a modification at the suggestion of any member of the original committee or sub-committee I should say "No," because the report in its present form

has been adopted by the Main Investigating Committee and has been adopted by the Steering Committee and by the Executive Committee. The Executive Committee at the same time referred back to the Steering Committee for its consideration the minority report.

I should say there could be no further action by the Main Committee. Any possible recommendations for modification coming from within the Main Committee would not be in order because all members have already had their chance to make them and the committee as a whole had adopted the report.

Now, any recommendations for changes suggested by this meeting would naturally go to the Steering Committee and I don't know what could be done with them. It looks like a finished job to me.

MR. PITT: Do I correctly understand you to say that the Executive Committee read and approved this report.

MR. DE BLOIS: They did not read it in detail, but approved it as a whole.

CHAIRMAN WHITING: I might say that, so far as this meeting is concerned, we are open to any discussion on any of the papers presented.

MR. PITT: Mr. Chairman, I would like to ask Dr. Winslow if he would mind answering some questions for me? Did not the report of the sub-committee on respirators state that all these industrial respirators are efficient for at least a day or longer?

DR. WINSLOW: I have the data here which I could look up. My impression is that some of them were, and not all of them were. Of course they would naturally become more inefficient as time went on, because they would get clogged up. The only question is the relation between efficiency and what we may call wearability.

MR. PITT: It was my impression, Doctor, that the report of the committee was in straight contradiction to the conclusions made with regard to respirators. You mention 200 milligrams of lead contamination. Was there any plant examined by Dr. Smyth that showed anything nearly as high in lead contamination as that?

DR. WINSLOW: I will look that up.

Quotations Upon the Degree of Air Contamination

MR. PITT: Mr. Chairman, I would like to say these were the air contaminations which were abstracted from Dr. Smyth's summary which was sent in to the committee:

Plant 2 was 0.2; Plant 4 was 32.; Plant 5 was 164.; Plant 6 was 0.2; Plant 17 was 99; and that is all the report we have as to the air contaminations at these plants.

Did Doctor Smyth, to your knowledge, make any laboratory test as to the relation between air velocity and air contamination as to lead—I think you mentioned benzol? Has any such test been made in this investigation as to lead?

DR. WINSLOW: No. I can now answer your former question. The undercoat plant showed 164 milligrams lead per cubic meter of air. Was that the highest, Doctor Smyth?

DR. SMYTH: I should say so, offhand. I haven't seen the figures for some time.

MR. PITT: Doctor, you mention the fact that 65 spray painters, 17 of whom show lead in feces. Were any positive cases of lead poisoning discovered among any building or structural painters in this investigation?

DR. WINSLOW: There were cases, yes, among structural painters. They were those figures I quoted. Now I have that other point you asked about. In regard to the exhaust ventilation in the plant spraying lead, there was high atmospheric contamination in three undercoat plants. There was a suggestive evidence of plumbism at 130 feet and another at 123 feet. On the other hand, there were an under-

coat plant with an exhaustion of 160 feet and another 212 where no cases were found.

MR. PITT: I don't know whether you have had a chance to read this sub-committee report or not. The plant No. 2 is all auto or auto body plants. Plant No. 2 were an average air velocity of 75, lead content 10 and there were discovered five cases out of fourteen men examined. But plant No. 4 were 54 feet of air, 10 per cent of lead content, 32 of lead and no cases. Plant No. 5 were 52 feet of air, 11 per cent of lead content, 164 of lead per cubic meter of air and no cases. Plant No. 6 were 160 feet of air, 11 per cent of air, two-tenths milligrams and no cases. Plant No. 17 were 19 per cent of lead content, which was the highest of all, 99 milligrams of lead in the air and no cases. Now, you gave the range there as I understand it, the average range by plants, but is there anything in the report which shows what that would be by units, for instance, each booth?

DR. WINSLOW: No, I think not.

Technicalities Presented in the Minority Report

CHAIRMAN WHITING: I feel that so far as this meeting is concerned we are now getting into technicalities beyond our understanding without careful study, but if it is your pleasure to go on don't hesitate to tell me. The material that Mr. Pitt has just illustrated to us has been very thoroughly covered by him in his minority report, which is now in the hands of Mr. Watson's committee. From your standpoint of practical operating men, I wonder if you wish during the remaining quarter of an hour or so to discuss the respirator matter and some other practical phases of spray coating?

DR. WINSLOW: Mr. Chairman, I think Mr. Pitt should be given a reasonable time to present what he wants here.

CHAIRMAN WHITING: It is only a question of what the meeting desires. If there are many of you who desire technical discussion of the report to go on, will you make an indication to that effect?

MR. PITT: Mr. Chairman, I would like to correct one impression here. These are not technical details at all, they are very important factors in the question at issue. Doctor Winslow, you made a statement about some letters which you received. Did they come before the Spray Coating Committee?

DR. WINSLOW: I don't care to quote the individuals, but there came to me a number of letters from various officials of organizations in the United States urging immediate action and radical regulations. Mr. Cameron and I had quite a little trouble in urging these persons to wait until they had this report before taking drastic action. I do not care to quote the individuals who wrote these letters, but I can say they came from certain quarters with vigorous desires for administrative action and we have urged delay until completion of the study.

Copies of Minority Report Available

MR. PITT: Mr. Chairman, I would like to make an announcement with your permission. I understand that an Abstract Committee was appointed by the Executive Committee to fix up my minority report. I would like to announce that any gentleman present who would like a complete copy of this report will get one by writing to me, William J. Pitt, 300 Phelps Street, Toledo, Ohio. I should be glad to send a copy of the minority report to anyone. I had a summary of that report which covered a couple of pages, but owing to the pressure of time I don't feel like imposing upon the meeting by reading it.

CHAIRMAN WHITING: But I think the meeting would like to hear that summary.

MR. PITT: This is a summary of a minority report filed by the representative of the National Paint, Oil and Varnish Association.

Minority Report on Report of Spray Coating Committee

While we are in accord with many statements in the report of your Committee on Spray Coating, particularly as to the hazards in the use of benzol, there are other statements and conclusions expressed therein, of a fundamental nature, which we feel are not well founded and, in some cases, are diametrically opposed to the data placed before your committee. Our dissent from that report is explained in detail below, as follows:

First—The detailed facts of the Committee's study were not placed before the members until after discussion at the last meeting and just before voting on the adoption of the report. This data constituted such a mass of figures, there was no opportunity afforded the Committee to study such details, nor do we understand that such data was in shape for consideration. Only the summary of Dr. Smyth's investigation was in the hands of the members, and, at this shows the results by plants or groups of subjects and not by each individual, booth, person, or the material used separately, the inaccuracy of the conclusions derived from such information obviously is open to question.

We feel that the data made available to the committee, perhaps due to the combined manner of setting it forth, is inconsistent, inaccurate and fails to justify some of the conclusions expressed by the Committee on some very important phases of the subject.

Second—That your Spray Coating Committee's report, by its references to so-called historical literature, experiments with obsolete equipment, out of date investigations, meager and incomplete data on studies of antiquity, not demanded by literary style or a proper bibliographical treatise of such a subject, seriously impairs its effectiveness. We deem such statements are irrelevant to a study seeking to find existing hazards, if any, and to recommend reasonable correctives.

Preparation of the Report Is Criticised

Third—By improper construction of this summarized data, and not the basic detail facts of the study, and by the exclusion of late statistical data published by the Federal Government relating to lead poisoning cases or deaths in the United States, we feel this report, without warrant, seeks to unduly exaggerate the so-called hazards of the spray process, particularly as to the use of lead. In thus creating a phantom of fictional perils, not corroborated, we believe, by the limited facts available to the Committee, we believe it will tend to promote the disregard of its recommendations instead of furthering their acceptance as a wholesome medium for enhancing health protection among the industries of the country, who may, in some minor or greater degree employ such products in their finishing operations.

Fourth—By refusing to clearly differentiate building or structural painting (exterior and interior) from industrial or manufacturing finishing processes, involving vastly dissimilar facts, working conditions, type of equipment, and, in a measure, the materials used, we feel that its conclusions are misleading and fundamentally wrong. Such statements as "spray painters," "interior painting" and "indoor painting" unwarrantedly convey the impression that the conditions in the industrial finishing field are applicable to the building and structural

field. We think these classes should be segregated and treated separately and the report clarified.

Fifth—That its treatment of state regulatory conditions is incomplete and improper and omits pertinent and published facts, for instance the Massachusetts investigation and regulations, yet unduly stresses the Wisconsin regulations.

Sixth—That its conclusions and recommendations as to respirators are erroneous, unduly preferential to a certain type of respirators prejudices research and future development along this line, and are contrary to the facts and data embodied in the report of its Sub-committee on Tests of Painters' Respirators.

Seventh—That its conclusions and recommendations of frequent, periodical, medical examination and spray painters or finishers "employed within building, booths or *other indoor or enclosed spaces* in spray coating" are not supported by the facts of this study submitted to the committee in so far as building or structural spray painting is concerned.

The Matter of "Air Velocity"

Eighth—That its conclusions and recommendations calling for an air velocity of not less than "200 linear feet per minute" is wholly unwarranted by the facts submitted. The recognized standard of equipment manufacturers, based on extensive engineering experience, is 100 linear feet per minute. It is claimed that the study showed an average air velocity for all practical purposes to be 60 linear feet, and we recommend "an average *minimum* of 90 linear feet per minute or 50 per cent more than that found by the study and within 10 per cent of the standard of reputable equipment manufacturers. Considerable speculation is indulged in by this Committee throughout the report as to the proper air velocity requisite for reasonable protection and extreme or erroneous citations of the data submitted to the committee to support it. Stress is laid upon the tentative proposal of 125 linear feet in the pending Pennsylvania proceedings, but as the underlying data in that investigation has not been made public and a counter-proposal of a minimum of 90 linear feet per minute has been submitted, it is our belief that the conclusion of the Committee that not less than 200 linear feet per minute is absurd in the light of the facts of this study. No tests were made to determine the relation of air velocity to air contamination in the spraying of lead paints, as was done in the case of benzol lacquers and the conclusion of the committee as to air velocity with respect to lead paints seems only a guess.

The Michigan Department of Labor and Industry in their recent investigation of the spray process in the industrial plants of that state prescribed "*an average minimum air velocity of 90 linear feet per minute*" at the working face of the spray booth. No state authority that has investigated the matter has prescribed a definite air velocity. We feel your Committee has grievously erred in its conclusions and recommendations on this important phase, and that in the interest of all concerned this report should be modified by the National Safety Council to accord with the facts.

William J. Pitt
Wayne B. Thompson.

History of the Spray Coating Committee Outlined

MR. DE BLOIS: Mr. Pitt makes one statement of fact with which I wish to take issue. I think I had better begin by giving you a little more of the history than Mr. Watson did of what actually went on. There was a general non-technical main committee—the Spray Coating Committee. It had in it technical experts, Dr. Smyth, Dr. Greenberg and Dr. Winslow.

The field investigation resulted in a draft of a large report by the technical people. That report carried a summary of all the field data. The Main Committee held five meetings altogether, though I do not recall how many were devoted to preparing its own final report. There were also reports of the sub-committees to be considered and a separate report by the Bureau of Mines. The latter and Dr. Smyth's report of the field work will appear as appendices I and II.

The technical report was revised and more data was added to it. Then came strong objections from the minority members of the committee who raised the points that Mr. Pitt has mentioned today, although I do not think he has given them all here, by any means.

An Editing Committee was appointed to adjust, if possible, these differences. I was on that committee and so were Dr. Bricker of Pennsylvania and Dr. H. A. Gardner, who, I believe, represented the National Paint and Varnish Association or Institute.

Many Objections Were Incorporated in Final Report

The final action of the Editing Committee was to incorporate a large number of these objections, but not all of them. Its report was considered at a final meeting of the Main Committee at which every bit of the field data was presented. It was all there, but it could not be handed around because the data sheets and tabulations that Doctor Smyth and his staff made in the field were far too large. So I am really inclined to contest the point made by Mr. Pitt that the field data were never available to the committee.

Furthermore, the committee has gone farther. It realized after all that its conclusions are naturally open to question. At no little expense (because it will add considerably to the cost of printing the report) it is going to include every bit of the field data in the final report, so if you want to read it and reach your own conclusions you can do so.

This thing has been considered as thoroughly as any job I have ever seen done by a research committee. Mr. Pitt's and Mr. Thomson's objections were all considered by the main committee and their motions were lost in a perfectly open vote. The majority was heavily against them. The minority report has now been submitted by them, and, as seems perfectly proper, it was referred back to the Steering Committee for further consideration. I want to again make the point that all the data was placed before the committee members and will be placed before the public.

CHAIRMAN WHITING: Before Mr. Pitt speaks again I wonder if there is any respirator manufacturer who would want to say something.

The Question of Damage to An Industry

F. A. SMITH, JR. (Titanium Pigment Company, Inc., Cicero, Ill.): Isn't it possible that the publication of such a report might work irreparable harm to some particular industry? There seems to be considerable stress laid on the subject of masks and considerable stress laid on pigment lead, and it is generally accepted that there are adequate masks for lead and that there is no more danger in handling lead as a pigment than in handling a thousand of the other articles of daily commerce.

CHAIRMAN WHITING: My own feeling on damage to any industry from discussing its hazards is illustrated in the automobile industry, where we are harping on death cases by thousands, but I haven't seen any reduction at all in the growth of that industry. Again, coming closer to our present subject there were similar fears expressed of the Benzol Report when it came out doing great harm to certain

industries. That report has not abolished the use of benzol, because we are still getting occasional death cases in shoe shops, rubber goods plants and so on where the recommendations of the Benzol Committee were not followed.

Of course the Safety Council is endeavoring to diminish accidents and deaths. How is it going to be done if they do not call public attention to the hazards that technical investigations disclose? If they don't get the report before the public, how can any progress be made?

MR. SMITH: I am saying this just so the public don't get an erroneous impression. There are some things in that paper, which is a very able paper, that some people might misunderstand.

CHAIRMAN WHITING: That is probably true of any technical paper that was ever written. It can be misunderstood by those who are not able to understand it, and they may be the ones who are determining our legislation now. Aren't there any respirator manufacturers who want to have something to say with their masks off?

A Piece of Constructive Work Accomplished

MR. BLOOMSBURG (Davis Emergency Equipment Company, New York): I think we have received a great deal of interesting information this morning and it seems to me that a real piece of constructive work has been done. We are never going to know every last thing about a problem. We all have problems of one kind and another and we have got to keep on our jobs and continue to learn as much as we can. We never may have a final answer, but unless we make a start on getting some answers we never will make progress.

It seems to me that the report of this committee is a good start in getting knowledge on that thing in spite of the fact that there have been some doubts raised as to respirators and gas masks. I might take exception to some of them, but we can discuss the facts as we meet them in the field. I think the report is a real effort in constructive work.

One point I would like to make to prevent any misinterpretation is this: The National Safety Council is not a legislative body of any kind one way or the other. This report is being submitted to us for our information. We are not taking any definite and final action in saying that it is officially approved and finally adopted. It is merely something for us to use, and with the filing of the minority report, we will have the information on the other side of the question. Everybody interested will consider both sides of the question.

CHAIRMAN WHITING: Does any other manufacturer of safety devices involved in this hazard wish to say anything? I wonder whether Dr. Hamilton would care to discuss the matter.

DR. ALICE HAMILTON: No, I should only like to ask a question. I have been accustomed to go about and have watched spraying. I have noticed the pressure in the spray gun and I would like to know if the pressure were kept down to thirty pounds, would there be any danger in it.

CHAIRMAN WHITING: Are there any more who desire to add to the discussion before Mr. Pitt and Doctor Winslow close the discussion?

MR. PITT: Mr. Chairman, I only want to correct a statement that Mr. De Blois made. He spoke of Mr. Gardner's participation in this investigation. As I understand it, he has not voted for the adoption of this report. I am further informed—but I can't speak positively about this—that he did not attend the meeting of the Editing Committee.

MR. DE BLOIS: He attended the first meeting, but not the second.

MR. PITT: The second thing I would like to ask Professor Winslow or Mr. De Blois is if there was any contractor, painter or manufacturer of respirators or any practical industrial hygienist in touch with the problems of spray coating in the industry today who were members of this committee?

MR. DE BLOIS: I can answer part of the question by saying that there was not a manufacturer of respirators on the committee. I cannot tell you why unless they were overlooked by the Steering Committee. It might have been that they were guided by the fact that there is no national organization of respirator manufacturers. It is my personal opinion that if we do similar work again we should have them represented.

Adequate Technical Representatives on the Committee

As far as the people from industries with a practical knowledge is concerned, Dr. Bradshaw of the du Pont Company, who although he was not one of the first members, certainly knows a great deal about the practical and manufacturing side of it. He also was concerned with the Pennsylvania investigation. At the last meeting we had Mr. H. C. Mougey from General Motors Corporation, a research man. There may have been others whom I do not recall at this moment. On the matter of the practical hygienist, if you can find any more practical hygienists than Doctor Winslow and Doctor Smyth, I would like to know them.

CHAIRMAN WHITING: As to representation of respirator equipment, if you could find a more competent man than Doctor Sayers of the Bureau of Mines, I would like to have anyone answer. If there is no further discussion I would like to have Doctor Winslow sum up the various questions.

DR. WINSLOW: With regard to the velocity, we have the following data on three points: With benzol in the best booth we had practically 147 linear feet. Let me say to Dr. Hamilton that we did nothing much on the spray gun pressure. Of course that makes a difference, but there are also other things which may make a difference, such as the way the man stands, the size and shape of the work and of the booth. It was impossible to test out these numerous variations, to determine their comparative effects on the hazard.

Now, this linear feet is the linear feet of exhaust. Even in benzol we had 147 feet. For silicate, we had 130 feet in one case with marked symptoms which were suggestive of silicosis. That is the reason we did not feel we could put the velocity certainly below 130 feet. We got absence of any symptoms below two hundred. It may be that study will show that it can be brought to 150, 160 and 170 feet. We say that 200 feet have been shown.

In regard to structural painters, 37 were examined. They showed a very large number of subjective symptoms and three showed a complication indicative of plumbism. In other words, as far as our data goes the structural painter seems to stand below, as far as seriousness of hazards is concerned. I do think it ought to be made very clear about masks and respirators. As Dr. Smyth has said, it is perfectly possible to use a respirator of the filter type.

Finally, I want to make clear that there seems to be some difference between Mr. Pitt, De Blois and myself in regard to the extent to which material has been submitted to the committee. I think that is due to the definition of what you mean by material. In the first place, there are original data, the original records of analysis which were made in the plants; that is, the original sheets on which the files recorded each man and those have not been printed and not even distributed in mimeograph form to the committee. It would be impossible and absurd to do so, but every page was in the hands of the committee at the meeting and was available for consultation and the tables were made up of those. All the tables, summaries and collection of

that information was distributed twice in Doctor Smyth's appendix, and as I say, every scrap of paper was at the last meeting of the committee.

We have had five meetings, the last one lasting from ten o'clock in the morning until five-thirty o'clock in the afternoon continually, with luncheon on the table while we were continuing our proceedings. I think as Mr. De Blois said he did. I feel rather strongly on this, that it is an apparent reflection of the faithfulness of the committee in its performance to its duty. Every single point of criticism was brought up and I think about ninety per cent of the time of the last two meetings were devoted to points raised by Mr. Pitt. All those points were given great care and were met with the facts on hand.

I think the committee on the whole is in a position to be entirely responsible for the conclusions reached and for the study made of all the available material.

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Construction Section

New Section Officers

- Chairman*, E. C. HARDING, The Ferro Concrete Construction Company, Cincinnati, Ohio.
Vice-Chairman in Charge of Publicity, C. H. ALMSTEAD, The Patent Scaffolding Company, New York City.
Vice-Chairman in Charge of Stereopticons and Slides, J. F. CONNER, The U. G. I. Contracting Company, Philadelphia, Pa.
Vice-Chairman in Charge of Program, J. W. DALZELL, The Ferro Concrete Construction Company, Cincinnati, Ohio.
Vice-Chairman and News-Letter Editor, GEORGE WIDUA, Woods Brothers Construction Company, Lincoln, Nebr.
Secretary, J. WILSON ROBINSON, Everett Winters Company, Detroit, Mich.
Membership Committee Chairman, J. F. CONNER, The U. G. I. Contracting Company, Philadelphia, Pa.
Post Committee Chairman, CHARLES H. BLACK, Stone and Webster, Inc., Boston, Mass.
Engineering Representative, F. A. DAVIDSON, Chesebro, Whitman Company, Inc., Long Island City, N. Y.
Statistics Committee Chairman, J. WILSON ROBINSON, Everett Winters Company, Detroit, Mich.
Executive Committee, THE OFFICERS AND—
COL. D. H. SAWYER, The Associated General Contractors of America, Inc., Washington, D. C.
W. F. AUSTIN, W. E. Wood Company, Detroit, Mich.
F. L. HURLBUTT, The Patent Scaffolding Company, Chicago, Ill.
W. G. WHEELER, Exec. Secy., Acci. Prev. Com., Building Trades Employers Assn., New York City.

Retiring Officers

Chairman, E. C. HARDING, Ferro Concrete Construction Co., Cincinnati, Ohio;
First Vice-Chairman, C. H. ALMSTEAD, Patent Scaffolding Co., New York City;
Second Vice-Chairman, J. F. CONNER, The U. G. I. Contracting Co., Philadelphia, Pa.; *Third Vice-Chairman*, J. W. DALZELL, Ferro Concrete Construction Co., Cincinnati, Ohio; *Secretary*, J. WILSON ROBINSON, Everett Winters Co., Detroit, Mich.
Committee Chairman: Poster, WM. F. TUBESING, Wm. F. Tubesing Co., Milwaukee, Wis.; *Program*, J. W. DALZELL, Ferro Concrete Construction Co., Cincinnati, Ohio;
Statistical, J. WILSON ROBINSON, Everett Winters Co., Detroit, Mich.; *Membership*, J. F. CONNER, The U. G. I. Contracting Co., Philadelphia, Pa.; *Engineering Representative*, F. A. DAVIDSON, American Safety Device Co., New York City; *Executive*

Committee. The OFFICERS and COL. D. H. SAWYER, Associated General Contractors of America, Inc., Washington, D. C.; W. F. AUSTIN, W. E. Wood Co., Detroit, Mich.; F. L. HURLBUTT, The Patent Scaffolding Co., Detroit, Mich.

Tuesday, September 27, 1927

E. C. HARDING, Chairman

General Superintendent, Ferro Concrete Construction Company, Cincinnati, Ohio

The first session of the Construction Section of the National Safety Council was called to order at nine-forty o'clock by the chairman, E. C. Harding, general superintendent, Ferro Concrete Construction Company, Cincinnati, Ohio.

CHAIRMAN HARDING: Gentlemen, let us open the Sixteenth Safety Congress, the first session of the Construction Section:

We will begin the program with an address of welcome, presented by Mr. O. W. Rosenthal, president of the Builders' Association of Chicago, and the Chicago Chapter of the A. G. C.

MR. ROSENTHAL: Mr. Chairman, Gentlemen of the Construction Section of the National Safety Council: The address that I am delivering this morning is not mine. It is the address of welcome of Mr. Sumner Sollitt, the president of the Associated General Contractors of America, who was unable to be here this morning; but any welcome that I would offer you would be none the less warm, would be none the less encouraging, and I hope to say just a few words with reference to how I personally feel regarding your presence here.

However, this particular thing that I am reading to you is a summation of thought of Mr. Sollitt, and I wish you to treat it as such.

Address of Welcome

**Sumner Sollitt, President, Associated General Contractors of America,
Chicago, Ill.**

It is a great pleasure to welcome you to this Council. It has a serious problem to discuss and no section can recognize the seriousness of this problem to a greater extent than the Construction Industry. If it is possible, through any section we may take here, to save one life, to prevent one serious injury, even to the extent of a single man, our time will not have been wasted.

No firm, corporation, or individual can do its full duty to the industry, no matter how careful they may be, no matter how great has their progress been in safety methods, if they do not divulge to others the full results of the good they have obtained for themselves; if they do not impress upon their competitors or others in the industry the necessity of striving after these good results to the full extent that opportunity may permit. That opportunity is before you now, and the success of this conference depends wholly upon the use that is made of this opportunity for a free and frank discussion by all present of the problems that are sure to present themselves.

I note that the subject I am to present is an address of welcome. I take it that this does not mean only an expression of the pride that Chicago takes in having you here: the hope that you may make use of the opportunities that are freely presented to you for such pleasures as it is in the power of the City to give; the welcome that will be extended to any and all of you to visit the head-

quarters of the construction industry in Chicago, at our new building at the corner of La Salle Street and Wacker Drive; the invitation to such use as you may make of our automobiles and our guides in seeing the vast public improvements that are already made and going on, the vast industries that make their homes here; and the pleasure we shall all take in making your acquaintance; but that it does also mean a welcome to the discussion of the subject of safety in relation to our great industry.

I am not one of those willing to admit that accidents in construction work are entirely due to avoidable carelessness, neither am I one of those who are willing to admit that the majority of this carelessness is due to the employers—the employees must bear their equal share of blame. It is not without careful concern, however, that I glance over the statistical information that makes the construction industry responsible for what appears to be a very dominant place in the list of accidents. In the first place, we must remember that construction and the preparation and transportation of materials for construction are practically equal to all other industries combined, when the hazards of that occupation are taken into consideration. In building, we are concerned and compelled by law to make safe places for practically all other industries except agriculture to operate in. We must construct safe structures and in so doing are often compelled to hazard an accident to ourselves so as to make the proper protection for those who must come afterwards. It is true that often hazards may also be taken for reasons of economy. Such a reason is indefensible from any moral, financial or legal standpoint.

Vitally Concerned With Accident Statistics

We are vitally concerned with the statistics which show such a predominant percentage of accidents attributable to construction. I will not go into figures which at best would be only copies of what is so ably put down in the printed tabulations of accident reports in various states. Due to compensation laws, taking into consideration our industry more especially than other industries, probably a larger percentage of our accidents are reported and scheduled than is true of business in general. However, their showing cannot help but be a matter of special concern to us.

I regret that I shall not have the pleasure of personally addressing you, it being necessary on account of an engagement long since made for me to be absent from this city on this date. My intimate and close friend, Mr. Rosenthal, has kindly offered to substitute for me, much to your advantage. What he cannot say, however, in terms any more impressive than mine, is that—"Chicago welcomes you"—and the building industry of Chicago is proud of being able to entertain you.

MR. ROSENTHAL: I think that Mr. Sollitt has expressed about as well as it could be expressed the thought that is fundamental in safety. But to me the appeal of this great Congress is not upon the economic side, nor is it alone upon the human side of an effort to safeguard life to put industry on a sound constructive basis. It is the combination of all these factors: it is the thought that men are becoming kindlier, the thought that men are becoming more considerate. Although the economic phase in it should be sufficient to justify every action that could possibly be taken toward safety, just the economic side alone is not justification. Industry has approached this question of safety from a standpoint different from the economic, there is something kindlier, something more spiritual, something just a little bit friendlier. Chicago, my friends, is proud that this great movement has selected it as the place in which to hold this great meeting with its fine, spiritual side;

and I, as president of the Builders' Association of Chicago, wish to say that we are happy, we are proud that you have selected our city. Chicago is not big enough to feel that your visit here is just a casual thing; we feel that you have done us a distinct honor, and we feel that you have set Chicago apart and aside from other great communities by holding this great meeting here. Anything that the Builders' Association can do, anything that the movements that I am connected with in the building industry in Chicago can do, to add to your comfort and happiness, rest assured that will be done; and please feel that there is nothing that you could ask of us that would be too much.

CHAIRMAN HARDING: Thank you, Mr. Rosenthal. While we miss having Mr. Sollitt with us, I am sure we are very fortunate in having Mr. Rosenthal present his paper.

Next on the program are the reports of the officers and committees. Mr. Almstead, first vice-chairman, have you anything to report?

C. H. ALMSTEAD (Patent Scaffolding Company, New York, N. Y.): Nothing at this time. I don't happen to be the chairman of the Membership Committee. I am reporting on the progress of the committee with which I was connected. There are three, four or five contractors that I personally solicited, and I fortunately landed one of them in the Section. I sent in approximately 250 names of contractors in New York State, and I think the National Safety Council has followed them up with a three-letter drive, the result of which I do not know.

JAMES F. CONNER (The U. G. I. Contracting Company, Philadelphia, Pa.): I have no report to make other than to say that in the Philadelphia District I have been after the contractors there trying to get them interested in membership in this Section. I think we will eventually get a pretty good showing in that Section.

CHAIRMAN HARDING: Mr. Dalzell being Chairman of the Program Committee, it will speak for itself.

SECRETARY ROBINSON (Everett Winters Company, Detroit, Mich.): Inasmuch as I am also Chairman of the Statistical Committee, playing a double roll, I have combined the reports in this one report.

Annual Report of the Secretary

J. Wilson Robinson, Everett Winters Company, Detroit, Mich.

Your Executive Committee composed of

E. C. Harding, The Ferro Concrete Construction Company

C. H. Almstead, The Patent Scaffolding Company

J. F. Conner, The U. G. I. Contracting Company

J. W. Dalzell, The Ferro Concrete Construction Company

J. Wilson Robinson, Everett Winters Company

Wm. F. Tubesing, Wm. F. Tubesing Company

F. A. Davidson, American Safety Device Company

Col. D. H. Sawyer, The Associated General Contractors of America

W. F. Austin, W. E. Wood Company

F. L. Hurlbutt, The Patent Scaffolding Company

held one meeting this year, namely on February 25th at Chicago. Of the ten members of this committee, seven attended this meeting.

Besides the various committee reports the three principal topics discussed were: 1. Statistics, 2. Membership, and 3. Codes.

With reference to statistics there was considerable discussion regarding the movement on foot to upset the present basis on which statistics for this section are made up. The suggestion having been made to change the loss rates from 6,000 days for a death to 1,000 days and so on down the line, the contention

being that a loss of 1,000 days for a death was more nearly correct than 6,000 days. For various reasons your committee felt that for the present at least no change should be made in the present method and in accordance with instructions from the committee your secretary went on record to the National Safety Council opposing such a change.

There are equally good arguments for and against this change though the trend is in favor of the change, the Paper and Pulp Section being the first I believe to adopt the new method.

Only recently the Accident Prevention Committee of the Detroit General Builders Association adopted a new set-up based upon the Michigan Compensation Law. At the Annual Safety Meeting this year the Association voted to award a plaque to the firm having the best record for a three year average. When the Committee on Awards checked into the records they felt that an injustice would be done to award the plaque on the basis of the method now used to compute losses. For instance member "A" has a death loss and there are no dependents, so that the accident actually cost the association's loss experience report in dollars and cents, two hundred dollars. According to the arbitrary list, he is charged up with 60,000 hours. His neighbor, member "B", has no death loss but he has pretty close to 60,000 hours of actually compensable cases. Sixty thousand hours are 1,000 weeks at \$14 per week, making \$14,000 of compensation payment and approximately \$10,000 of medical expense. Our old method would give member "B" the prize over the member whose losses had cost but \$200.

Membership Must Be Increased in the Section

On the subject of membership your committee came to the same conclusion they had eighteen months previous at the committee meeting held in Detroit, namely that until such time as a paid secretary was provided for this Section that all we could expect to be able to accomplish would be the holding together of the organization as it is now constituted and mark time until such time as someone would step in and give his full time to the work. Your chairman, Mr. Harding, pointed out that up to then there had been but six new members added to our section and four cancellations since the Detroit Congress in October, 1926. In other words, the section was just about holding its own. We had been advised some time previous by the Council that the necessary funds had been provided for a full time secretary. Mr. Austin then asked Mr. Cameron of the Council to explain to the other members of the committee why a secretary had not been provided since same had been promised us for over a year. Mr. Cameron stated that the Council up to that time had not been able to find the right man for this position: It was pointed out, however, that shortly after the A. G. C., through the efforts of the Detroit General Builders Association, had made accident prevention one of their major activities, they had a man on the road visiting the various chapters. Major Richards was appointed to this work.

Though we have not had a full time secretary considerably more progress has been made this year in adding new members than in previous years, because I believe the safety conscience of our industry has been awakened. This I believe has been mainly brought about by the numerous articles that appeared in the Press and Building Journals in the year 1926 through the efforts of certain members of this section. As I pointed out in my report last year, never in the history of the country has so much space been devoted to the subject of safety in the building industry, and I believe that this nation-wide publicity has in no small measure been responsible in awakening the safety conscience of our industry and which in turn has increased our membership.

At the last Congress we had a membership of 86. During the year 1926, 17 new members were added and 9 memberships cancelled leaving a net increase for the year of 8.

We have at the present time a membership of 121. During the year 44 new members were added to our roster and 9 memberships were cancelled, giving us a net gain of 35 members this year. While the number of cancellations this year were the same as last year, our membership net increase was 35 against 8 the year previous. Of these 35 new members the Associated Pennsylvania Constructors have a membership of 136 firms, the Associated Building Employers of Detroit has a membership of approximately 200 firms and the Michigan Municipal Contractors Association has a membership of 20 firms, so that in reality we have an increase in membership by firms over last last year of 391.

No small share of this increase is due to the efforts of the A. G. C. under the guidance of Major Richards in the big work he is doing.

Improvement in the Statistical Records

Likewise there has been considerable improvement in the statistical records of this section since 1922. The following is the record to date:

Year	Man Hrs. Worked	Man Hrs. Lost	Hrs. Lost per 1000 Hrs. Worked
1922	17,527,467	1,049,820	59.9
1923	22,642,745	1,083,190	47.8
1924	20,531,761	952,640	46.4
1925	25,451,441	1,927,010	46.4
1926	43,709,696	2,422,420	55.4
Total	129,863,110	7,435,080	255.9
5 Yr. Average.....	25,972,622	1,487,016	57.2

The above figures do not include all of the members of the Construction Section, but they do provide a typical cross section of the experience of our industry.

Statistics alone will not prevent accidents, but the study and analysis of statistics are essential in determining what to do. In order to reach a maximum of success, statistics must be kept for study and future reference; they are what the compass is to a ship crossing the Atlantic—without them we would not know where we are going.

Statistics have proven that accidents can be reduced through organized and well directed effort. I therefore appeal to all members not to overlook this very important phase of this work and I know that a real concentrated effort on our part during the year 1927 to reduce accidents will bring us the desired results. The seed we have already sown is being cultivated in all parts of the country.

SECRETARY ROBINSON: There is just another phase I should like to call your attention to in our statistics here, that problems today are altogether different than they were in 1922. With the equipment and machinery that the modern contractor is using today, his problems have changed considerably from what they were in 1922, and it has now reached the point where we have not only to consider it from the standpoint of the detailed problems on the job but also from the manufacturing standpoint and go to the manufacturers, as we have been doing in Detroit. We have so far been able to get some satisfactory results. But therein I think lies a good share of our success in getting the equipment manufacturers lined up with us, so as to make their equipment safe for our men.

CHAIRMAN HARDING: To comment for just a moment on Mr. Robinson's report and requests for accident statistics. I think that is very important. He brought out the vital need for having statistics, as one year's statistics mean very little to us, but after a compilation of several years and going into them, we can then know where to put our finger on the thing that is doing the dirty work in the construction industry. It has always been urged at the Safety Congresses that the members send in their statistics and I again urge the various firms to do so. They are published under a key letter and the identity of the firm is known only to itself so there is no undue publicity which can come from it.

With your permission, and that of the speakers also, we are going to switch the fourth speaker next, inasmuch as he would like very much to attend one of the other sessions this morning. Dr. Carl A. Wilzbach, of the Ferro Concrete Construction Company, Cincinnati, Ohio, will address us.

Health and the Construction Industry

Carl A. Wilzbach, M. D., Ferro Concrete Construction Company, Cincinnati, O.

Health in the construction industry may not be different from other fields of endeavor and yet there are certain factors that favor and others that disfavor the health of the construction worker. The worker is usually a rather healthy individual to begin with, made so by the natural processes of elimination. Only those who are able to withstand the physical effort, as well as the effects of the out-of-doors with its varying weather conditions can remain long at this work. It is not a task for weaklings or soft-muscled individuals as can be testified by any who have watched the progress of a construction job.

On the other hand, there are many who start young in years and in good health who become expert, efficient workmen, valuable to the company, who over the years acquire all the usual ailments which result in ill health and poor production. At this period the need for medical examination and advice on hygiene is evident and valuable to the men as well as to the company.

We are told by reliable men who have gathered statistics that 3.5 per cent of the 38 million people gainfully employed in the United States are constantly ill and disabled, and of this number half remain on the job. This means that over 1,300,000 workers are ill at any given time. It is further estimated that at least half of this illness is preventable.

Those workers who are ill and still remain on the job furnish us a real problem and an opportunity for it is generally recognized today that there are degrees of health. It is not just absence from disease. It is not present when one is just able to do his daily work. Health expresses itself in satisfying work, in the ability to enjoy play and recreative activity, in the desire to cooperate with those about one in a common cause.

On the contrary, the worker who is in a low degree of health does not react normally and is apt to be surly. His attitude on questions to be decided is not what might be expected of one in a happy state of health and there is many times an unwillingness to cooperate. Altogether, this individual is not fit and efficient physically and therefore not a good workman.

The average health span or period of physical freedom and full vigor after maturity is between the ages of 18 and 31. That is to say, there is only 13 years after maturity on the average that the worker is free from disease. The work span, or period when men can compete in industry on a fair basis of equality is from 20 to 40 years. This fact is demonstrated by the great falling off in the number of men in industry about the age of 40, at which age their years of productive usefulness seem to be over.

I am sure that all will agree that these periods are far too short, especially when one remembers that the life span at the present time is about 58 years. The rapid accumulation of physical defects, the rapid lowering of physical resistance and working capacity with advancing years, reflect conditions and processes that should be controlled by the application of intelligent care of the body and rational adjustment to work.

What are some factors that influence health? We will admit the influence of heredity and pass on to those causes that can be changed and helped during the life of the individual. It is a generally accepted view today that the body does not simply wear out; it is infected out, poisoned out, starved out, or deficient out. A condition is produced in the body which changes it chemically. In disease there is a tendency toward acidity and death is said to result from acidosis. The factors that produce the above conditions have been combated successfully in dealing with lower forms of life and much can be done to help man in his fight for a longer, healthier existence.

Infections, acute and chronic, lead the list as the most potent cause of disease, the epidemic infections being chiefly responsible in the early years of life; but chronic infections later appearing as a tremendous pathological influence, this type of infection working insidiously and radiating from foci in the teeth, tonsils, middle ear, nasal sinuses, prostatic urethra, gall bladder and appendix.

This condition is evidenced by the man on the job who reports to the physician with a sore throat. On examination he is found to have an acute tonsillitis. This condition is followed by vague pains in the joints some weeks later and then still later by dizzy spells, headache and dyspnoea, resulting from a definite cardiac involvement, all caused by infected tonsils. High blood pressure, nephritis, even gastric ulcers, may be promptly relieved after the removal of an abscessed tooth. Careful attention to the nasal sinuses will frequently clear up a chronic upper respiratory affection which may have long been suspected of being a tubercular condition. It pays to search long and earnestly for some foci of infection especially in individuals who do not respond normally to the accepted treatment.

Food Deficiency a Big Factor in Health

Food deficiency is still a big factor in the health of men in the construction industry. While the standard meal of the worker, consisting of meat, bread and potatoes is still being seen as one goes among the men, there is also seen green vegetables, fruits and milk. We have seen the great value of the accessory food elements (vitamines) in feeding children, but there is also need for educating the worker to the great need of a mixed diet, including the mineral, vitamine, amino-acid and regulating foods. The effects of diet on certain diseases has been known for a long time but the newer knowledge of nutrition indicates that many other diseases are also caused by a lack of certain food elements. It is urged by these experts on the study of foods that there be included for adults daily a mixed diet that contains at least a quart of milk, leafy vegetables and a certain amount of raw vegetable food. If these principles are adhered to the remainder of the balanced ration can be derived from milled cereal products, tubers, root vegetables, sugar and meats.

Poisons are a factor in the health of the worker. The physician has educated the average individual to the need of avoiding constipation but it is surprising the number of men who are taking daily some form of purgative. The various drugs used as cathartics plus all sorts of proprietary preparations are being used. It is questionable what effects some of these drugs generally used will occasionally have upon the body when taken daily and over a long period of years.

Headache tablets are also quite generally used and it is no uncommon sight to see the worker on the job with his box of aspirin tablets which he takes as regularly as he does his meals.

Tea, coffee and tobacco also come under the heading of substances which may poison the individual. Alcohol is increasingly being found to be a factor in producing poisoning. Aside from the chemical impurities contained in the poorly made moonshine there has lately been found copper in quantities large enough to produce metallic poisoning and over a long period of time cirrhosis of the liver.

There is also a need for the man in construction industry to have an opportunity to relax after his day's work. The speeding up of the worker has increased the strain both physically and mentally and this often results in an over-fatigued individual who is not fit for the job. Recreation and hobbies that lead to different channels of thought and action are needed by men in industry just as much as they are needed by men in other walks of life. While there are exceptions, the average construction workers need exercise as does the clerk or business man. A man who merely stands is not exercising and if he does not stand or walk properly the slight amount of exercise he gets moving about the job makes insufficient call upon the heavier muscles. This fact can be demonstrated by a physical examination which shows how woefully deficient the muscular development is and how high the percentage of physical defects is in the average construction worker.

Insomnia Increasing Among the Workers

In this same relationship comes the question of sleep. There seems to be an increasing number of cases of insomnia among the workers. There is at first just an occasional sleepless night. These gradually increase in number, and before long the strain of work plus the loss of sleep becomes too great. All sorts of malconditions result, chief of which is stomach symptoms with indigestion and loss of weight. There can be no doubt that the push of modern construction plus the worry of paying for the car and the newly purchased home are some of the major causes of these conditions. Fear, grief and emotional excesses are most destructive to the health of many workers.

There should be special effort made to stress the need of at least eight hours rest for all workers and more if one is below par physically.

Lastly, there is the problem of mal-function of the endocrine secretions. A complete statement of the effects of the various hormones in health is beyond the scope of this paper. It is generally recognized that these substances do stabilize the body tissue and help maintain a normal state of health.

In closing it seems evident that progress is being made. The average worker is better paid, has more of the luxuries of life, is more intelligent, enjoys a better health state and lives longer than at any other period in American history.

But we must advance. There is no reason why the present health conditions can not be improved. "Health, vigor and working capacity are not functions of time, but physical states influenced by what happens in the course of time. Neither the life span nor work span of mankind is fixed by any law. It is within the power of man's intelligence profoundly to influence the length of these spans. To this end we must work with full vigor and driving force.

J. W. DALZELL (Ferro Concrete Construction Company, Cincinnati, Ohio): As to the effects of overtime, Doctor, what is the relation of excessive overtime and continuous overtime and accidents? Is there any relation?

DR. WILZBACH: I am quite sure that the man who is overly fatigued is not able

to respond normally to the activities that he would be called upon to perform in cases of accident, and I am sure that overtime and accident are bound to have a relationship, although I have no facts, no statistics to prove that. But it seems reasonable to suppose that the nervous mechanism of the body functions best when the body is in the normal state, when it is properly nourished, properly rested and working; so I should say, in my opinion, there would be a direct relationship between excessive overtime and accidents.

CHAIRMAN HARDING: Is there any further discussion? This paper is somewhat out of the ordinary for the Construction Section, in that it does not deal with accidents directly; nevertheless the subjects of accidents and health go hand in hand. I am sure this is an opportunity for asking any questions that might be in your minds on this subject.

The chairman has committed a serious breach of etiquette in the reports of the officers; we neglected the Poster Committee, our good friend Mr. Tubesing, of Milwaukee.

WILLIAM F. TUBESING (William F. Tubesing Company, Milwaukee, Wis.): The only reason I called our chairman's attention to it is that a lot of you men don't realize what work the National Safety Council does as regards posters. Now, the National Safety Council not only takes care of our Congress here, but throughout the year, if you are a member of the National Safety Council, you get monthly some of those posters. Every year we have a new set of those posters and they are distributed at certain periods throughout the year. So if you are a member of our National Safety Council you get these posters regularly, and if they appeal to you the National Safety Council will send you as many as you desire at a certain price.

Besides that, the NATIONAL SAFETY NEWS comes to you monthly, which also carries miniature reproductions of posters that are available, so that you can choose from them.

I am quite sure that the committee would welcome any suggestion for future posters, or any criticisms of the posters we picked out, because that is the only way we can give you what you want.

CHAIRMAN HARDING: What Mr. Tubesing says about the posters is very well put. I can recall a few years ago being chairman of that committee myself, and what a task it is to get material for the posters! To make up a poster is not an easy task, particularly after you have covered the field at hand, and I am sure the Poster Committee will appreciate ideas very much. If any of the members have a particularly well guarded hazard that they think would make a good poster, send a photograph of it to the Poster Committee. I understand also that the National Safety Council has a staff photographer. If any of the members have a series of particularly interesting subjects for posters it would be possible to send the staff photographer to this particular job.

We have next on the program a paper by Mr. D. D. McLean, Construction Engineer, Travelers Insurance Company, Hartford, Connecticut.

Why Safety in Construction Work?

D. D. McLean, Supervising Engineer, The Travelers Insurance Company,
Hartford, Conn.

This question, which is the subject of my talk, is put forward in the true spirit of inquiry and is a mark of that fine attitude of open-mindedness which the contractors and construction engineers of our country have ever maintained on every phase of the problems and activities of their noble and all-important industry.

It is not my purpose to discuss this question so much from the point of view of

the designer and architect, who work out their conceptions upon the drawing board and make their calculations with studious care within the quiet precincts of the drafting office. That phase of safety in construction work as it relates to the security of the structures which man erects to the glory of his Maker in the cathedrals of divine worship; or the palaces of commerce which he rears heavenward in awful and majestic splendor; or the mansions of the great; or the more frugal dwellings of the people; or the ornate and rugged theaters and stadiums which he raises for the purpose of his entertainment and sport; or the railroads, bridges, tunnels, and viaducts which he builds for the facility of his travelings back and forth upon the earth; that aspect of safety, I repeat, which relates to the inherent security of these wonders of man's industry and energy, is so well understood and its need so definitely recognized by the artist-engineer, and is so hedged about by public opinion and legal imposition that it may be said to overwhelmingly outweigh all other considerations combined. Despite the beauty he may have captured in the lines of his structure, the architect or engineer has made a failure of his building or utility is not conducive to health or does not admit of the maximum of usefulness with the minimum of hazard to its users. No one knows this better than they; hence, safety in all its aspects is the first and foremost consideration of all their calculations and is indeed their first duty to society.

Humane Motives and Noble Ideals

The purpose in raising this question is the same which for sixteen consecutive years has drawn together these hundreds of public-spirited leaders of industry, and has caused them at vast expense to send forth their best executives and workers alike to the National Safety Congress. That purpose is to confirm their faith in organized safety and personal-accident-prevention work as it relates to the men and women who daily toil in the ranks of industry; and to gather fresh inspiration and knowledge to go forward with the noble work of human conservation.

Humane motives and noble ideals are the rock and foundation of this convention, and it is because the contractor or industrial leader recognizes his responsibility and duties to his employee and realizes that his workers are entitled to the fullest protection against the hazards of their various callings, that he has gathered here today in such numbers.

And in this we see the first answer to our question "Why safety in construction work?" Why?—because the leader is responsible for his men. Is there a man killed on your job? You cannot escape some feeling of remorse unless you have done everything you could to prevent it. Is there a worker injured on your contract? What have you ever done to safeguard him? Has some unwary toiler fallen through an unprotected floor opening? Where lies the responsibility?

There is no escaping it. Reason and rationalize upon it as we will, the first responsibility morally lies upon the leader, the employer. That fact stands out in bold relief. Let us not fear to own it. Has Heaven blessed you with a frugality and enterprise that have raised you above your fellowman? Have the circumstances of life projected you into a position of mastership over some quota of human beings? Has the heritage of the past placed you in a posture of command?

Well, then, the higher you have risen and the more extensive your influence, so proportionately is your responsibility. Believe it or not; acknowledge it or deny it; be conscious of it or otherwise; you are answerable. No man can escape his destiny; and though he may stifle the promptings of his own conscience and avert the consequences of an earthly reckoning, there is a tribunal before which all must finally stand to receive the just rewards of their stewardship.

This, I aver, is the deep-rooted motive prompting this Congress, and the first and highest reason why the contractors and construction engineers and all other industrial leaders in this country seek more light on the business of organized safety and

accident-prevention work in their various lines of industry. It is a duty to humanity, it is a work that is in harmony with the divine order of things. We do not lack *strength* to make it a success—all we need is the *will*.

But it is well and truly said, "He profits most who serves best"; and again, "It is expected that every man shall have an enlightened understanding of his own best interests." It is universally true that you cannot improve the lot of another without enhancing your own fortune, and even if we should be unmindful of humanitarian motives, the promotion of accident prevention in our industrial enterprises is a profitable and dividend-paying business for its own sake and from a purely worldly point of view.

Hence, we have the second answer to the question: "Why safety in construction work?" Put bluntly that answer simply is: "It pays." And that, let me say in all modesty, is a perfectly laudable and legitimate reason why every contractor and construction engineer, as well as every other employer of industrial workers, should take a direct and personal interest in accident prevention. The reduction of accidents has a direct and elevating influence on the profits of every contract job and every other industrial enterprise.

Production Depends on Human Hands and Brains

These statements, I know, are general and broad and they require elucidation. The inquirer at once demands an explanation. He wants to know "How does it pay?" And the answer to that is "By increased and uninterrupted production," and "By getting the job done on time." "Old stuff" you say. "Yes indeed, but true, emphatically true, old stuff."

All production depends on human hands and human brains and on absolutely nothing else. Human workers comprise the only possible source and means of production in industry. Without them nothing in the shape of material wealth can be brought forth. You have a marvelous plant, you have magnificent equipment, you have powerful engines, colossal reserves of fuel, and an assemblage of every means, device, and raw material for the construction of your building or utility or for the fabricating of your product, whatever it may be—all in the first place, mark you, produced by human hands and human brains. But with it all, it is as nothing; and it will lie and rot and no edifice will ever be built until the human worker, marshalled by his leaders, bring his and her hands and brains to work on it.

This is a fundamental truth as old as the world; and if this is true in the larger sense it is equally true in every detail of your organization, for if but one worker is hurt production, so far as he is concerned, stops right there. It stops, and as his value and relationship to the job is calculated every hour of his absence or (in the event of a minor injury) while his reduced effectiveness prevails, the profits of that enterprise are reduced. No worker is ever injured, however, without affecting the production of another or, it may be, many others. Some will stop out of curiosity—one of the strongest human emotions—or out of sympathy and to assist the injured man, and for many other reasons, among which may be pointed out that the progress of one man's work often depends on the advancement of another's, so that it is an entire cycle of stoppages, all affecting the whole job, that often occurs. Indeed, it is not at all an uncommon thing on a construction job, to see a whole gang of workers quit for the day when one of their fellows is seriously hurt.

In the meantime, and while the reduced effectiveness and production of the workers are prevalent, the foreman, supervisor, or other executive on the job must necessarily have his attention distracted from the affairs of production; he must assist or arrange for the assistance of the injured man; he must investigate the accident; arrange for the replacing of the injured worker by another employee;

select, train and break in the new man; prepare state accident reports, and sometimes attend hearings before the Industrial Commissioner.

Further, where the frequency of accidents is such as to require it, a First Aid Hospital or department must be maintained with a staff (or at least a regular attendant) in charge, and where the cost of this is not compensated for by insurance it becomes a direct cost to the job.

Again, personal accidents often involve damage to machinery, tools and other property, and the spoilage of materials.

And also, on construction jobs in particular, all these delaying influences oftentimes bring on failure to fill orders or complete jobs on time, occasioning the loss of bonuses, the paying of forfeits, and other similar losses.

Where an employee welfare and benefit system is operated the cost to the employer is directly proportionate to the cost of the system. Upon the return of an injured worker who has not fully recovered either from the physical or nervous shock of an accident, there is a loss in the continuing of wages in full while his effectiveness or production may actually be worth but 50 per cent of their normal value. This further involves the loss of profit on that injured employee's productivity or effectiveness and on idle equipment.

Many, if not all, of these factors enter into the loss cost that must necessarily be paid by an employer out of the profits of the job. Nor are these all of the items that could be mentioned and that might well receive attention. But these are the more obvious factors that every employer may very well understand.

Still Additional Cost Items

In all of this no reference has been made to Workmen's Compensation and Liability Claims; or Statutory Medical and Hospital Cost; or Insurance Premiums; or to the cost of lost time when actually paid by the employer. The first three of these at least are measurable and directly proportionable to the calculated cost of any job, and these are the only costs that loom large in the mind of the employer, as a rule.

But most employers have been more or less conscious in a vague sort of way that something of the kind, such as I have outlined, also happens to their output and profit when an accident occurs. What it is or what it amounted to was never very definitely studied, so far as we know, until about a year ago, when the engineering and inspection division of The Travelers Insurance Company undertook an organized and scientific research of the problem by a review of some five thousand specific accident cases taken at random from its files.

The purpose of that research was to establish a gauge or measure of the actual "incidental" cost whereby the employer can determine under existing cost-accounting methods, and by means of factors known to him, the cost of accidents in his own industry; and it was discovered that this "incidental" accident-cost, paid by the employer directly, is four times the total cost represented by compensation and liability claims and medical treatment.

This "incidental" cost has never hitherto been brought down to a specific, concrete, or tangible basis—something that the trained business-executive's mind might readily grasp. We need no longer deal in generalities therefore with regard to the desirability of preventing accidents. We need no longer refer merely to national "economic waste." We can now point to a *measurable monetary loss* to the employer which cannot be compensated by insurance, and which demands a remedy. Granted that the analysis of another 5,000 cases might show a higher or lower ratio, and granted also that in the acid-test of application to industrial plants a variation in ratio will surely occur, yet the truth persists that a tangible incidental cost actually exists; that it must be paid directly by the employer; and

that it is sufficient in amount to justify the inclusion in plant routine of means to reduce it through systematic accident-prevention work.

We therefore freely admit the probability of a variation from the figures thus quoted in the "incidental" cost of accidents, when the facts come to be computed on a national basis, yet enough has been done already to establish the facts approximately.

Every contractor to whom we have thus far presented the thought of measurable incidental accident-cost has demanded, and has obtained to his satisfaction, proof and details as to the method of measurement.

A specific illustration taken from actual practice on a contract job is typical.

Total cost of compensation and medical aid.....\$ 25.00

Total additional incidental cost, paid directly by the employer.....\$169.50

While sinking a shaft on a large contract job in one of our big cities, the engineer on the hoist dropped the battleship bucket into the hole. Almost miraculously nobody was killed, but three of the men in the shaft were injured, and one was knocked unconscious by a blow on the head from a part of the bucket. None, however, was seriously hurt, although the unconscious man was rushed to the hospital and had the cut on his head dressed, while the others received first aid, and the whole job was at once stopped.

An Example of Incidental Cost

The incidental cost was computed as follows:

\$10 time spent by foreman away from the job, 5 hours for supervising the arrest of the engineer, laying charges against him, and having him jailed without bail.

\$12.50 time spent by superintendent investigating damage to the bucket, the bridle of which was broken, and arranging to get it repaired.

\$ 6 lost time of several employees who were required to assist the injured man.

\$ 6 time spent by several employees untangling the wreckage and getting bucket up out of hole.

\$15 cost of replacing the broken bridle and repairing the bucket.

\$60 time spent by twelve other employees working in and about the shaft, trimming, but otherwise unprofitably employed awaiting the repair and return of the bucket while the job was at a stand.

\$60 cost of three motor trucks at \$20 per day, their work being brought to a halt because of no dirt to haul.

This case is actual and typical and I am sure that every contractor and construction engineer can recall a great many similar cases in his own experience, equally representative of the losses that are contingent upon accidents in his own industry.

I might easily cite other cases, but I am purposely withholding a recitation of them because it is a phase of the safety problem that is so important, interesting, and in this manner of treatment, so new, that it has been assigned a special place in the program of the A. B. C. Session of this Congress, when Mr. H. W. Heinrich, assistant superintendent, Engineering and Inspection Division, The Travelers Insurance Company, will talk on "The Cost of Accidents." To all of you who are interested to learn more about the finance of accidents I most certainly recommend that you attend that session.

My purpose here is to reason the "Why" of safety in construction, and I have endeavored to show by the emphasizing of humanitarian motives and self interest, that common-sense demands that we adopt it as a regular and routine part of all construction work.

It is a duty to humanity, for the lives and limbs of the men and women who

It is a duty to our Country, for industry is the most important factor in our daily toil in the ranks of industry depend on it.

national life—our national prosperity is won in our mines and mills and factories.

And finally it is to our own best self interest morally, physically and financially.

CHAIRMAN HARDING: Is there any discussion on Mr. McLean's talk to us on the "Why" in construction work? I hope any of you will feel at liberty to bring any question up for discussion. A little later in the morning we will have a free-for-all on any particular point that may come to your minds.

The last topic on our program is rather a misnomer. The Program Committee was a little disappointed in the symposium that was to be presented and it slipped in on the regular program, and since it is here we are going to make use of it. Last year a very comprehensive symposium was presented along the same line and the committee felt it might be well to do the same this year. It is divided up into four parts, the state reports, A. G. C., publicity and new members; and I am going to call upon Mr. McMurchy of the Industrial Commission of Ohio, to tell us something of the state reports.

Methods in Ohio for Gathering Statistics

D. F. McMURCHY (Industrial Commission of Ohio, Cincinnati, Ohio): Mr. Chairman and Members of the Construction Section: I must admit that this is quite unexpected, as I was to be only a spectator and not a participant when I came up here. But last year in Ohio, we did several things in the matter of gaining statistics about accidents that previously had never been done. The division of Safety and Hygiene, a part of the Industrial Commission, through its statistical laboratory was able to get a pretty good cross section of the accident situation. An estimate of the number of construction firms in Ohio was gotten from the Bureau of Labor statistics, and the number is something in excess of 9,000. The 1925 reports show 8,407 firms submitted their employment schedules, and these estimate that they are getting reports from about 90 per cent of the firms doing construction work in Ohio, those firms which employ three or more operators regularly because they come under the compulsory compensation law in that state.

A summary of the accidents runs something like this: about 23,000 accidents in building and construction work, which includes construction other than building and erection; 189 fatalities are included in that; four permanent total disabilities and 98 permanent partial disabilities. I made some studies of the employment situation to find out something of my exposure. The Bureau of Labor Statistics receives from these contributing firms a schedule giving the number of employees on the fifteenth, or the nearest representative date to the fifteenth, of every month. Over a year's period they turn in the amount of wages paid to the various classes of employees, the wage earners, the bookkeepers, stenographers, and the salesmen. Since these accidents occurred to the wage earners—the men on the job, or the bulk of them—I was only concerned in the number of wage earners employed, and I used this method in arriving at this figure; I divided the average number of wage earners employed on the fifteenth of every month into the total wage payment for the year 1925 ('26 figures are not available yet), arriving at an average wage per year. This average wage I divided into the total pay roll exposure submitted to the actuary of the Industrial Commission. That pay roll exposure will cover in excess of 99 per cent of all of the accidents submitted to the Industrial Commission. The results of that division gave me a figure of 92,166 men continually employed in the construction industry last year, wage earners.

Now, the exposure and the number of hours per day, or number of hours per year which those men worked, were more or less matters of conjecture. We had to arrive at an arbitrary figure for that, which was arbitrarily set at 2,000 hours per year. I may be high or I may be low, but I want to get the idea across that it is an arbitrary exposure. On that basis, 92,000 men and 2,000 hours is a year's work,

our frequency work per million man hours worked figures 61.72 accidents. On the same basis our severity rate is 8.0 days lost per thousand man hours worked.

That is a computation of the frequency and severity of lost time accidents only, the number of lost time accidents being 11,788 out of 23,000 injuries. The balance of them were medical only, involving no lost time. These involve the loss of one shift, and I think that that is the same basis that the Council uses in computing its frequency and severity. It is not a very accurate record, I admit, but at least it gives us the first authentic picture of our accidents and how the construction industry in Ohio can be compared with the other industries in Ohio. It at least gives us a mark to shoot at this year and the years to come. It may be of interest to you to know that the Ohio State Federation of Labor passed a resolution at their convention held in Middletown wherein at every meeting of their various local bodies there would be a certain time in that meeting devoted to the discussion of accident prevention. They were to have in every local organization a Safety Committee. It signifies to us that they are getting behind this proposition. It is also a challenge to the employers that those fellows are going ahead regardless of what may be done by the employer or what may not be done.

I want to present one more proposition to you gentlemen. I am probably taking a lot more time than is allotted me. I was talking to Mr. Keefer about this same proposition last night. You gentlemen are here by virtue of the fact that you are interested in accident prevention. To attempt to sell you safety would be superfluous, because you are sold now, but we have before us in Ohio (and I guess it is pretty general all over the country), a number of contractors who are not as interested as you are in the accident prevention business. I speak now of the small operators which I estimate in Ohio amount to about 30 per cent of the construction work, those fellows who are not inclined to affiliate with any sort of a building organization. They don't know each other, they don't care to know each other. You have as much chance of selling them safety as you have getting them to build a skyscraper because they don't know what it is all about. Don't you think that it is a part of the larger operator's responsibility to get the rudiments of safety across to these smaller fellows? By example; yes, by more than example; by encouragement, not by fraternalism; but recognize them as potential builders, if not now, eventually, and give them the benefit of your experience in accident prevention. We can't do it by individual calls only and with our limited force we can't attempt to visit every two-story house under construction; but where you are located in any one locality I think that your companies by action of your organizations and your general relations among each other on the work, could foster a better spirit or a better feeling among these little fellows, and only in that way are we going to be able to reach that little fellow and cut out that 30 per cent of our accidents.

Need to Broaden the Influence of the Section

CHAIRMAN HARDING: I am now going to call on my good friend, Colonel D. H. Sawyer, Secretary of the A. G. C., for a few remarks.

COLONEL D. H. SAWYER: Mr. Chairman, I am not on the program. I am not prepared for any talk at all and I was sitting here having a good time. The thing that does run through my mind is the metamorphosis of the Construction Section. Three or four or five years ago when I attended this meeting, I think we met in somebody's bedroom, and today we have the walls kind of bulging out, and I think we are reaching the consciousness of the contractors. It is stimulating to me, and I know it is to all of you, that the contractors are feeling the necessity of doing something along accident prevention lines. Mr. McMurchy put his finger on a thing that we can't overlook; and that is, regardless of how faithful we people here in the

Associated General Contractors may be in spreading the gospel of accident prevention, we are occupying a limited field. All of the contractors of the country do not belong to organizations, they are not appreciative of their responsibility to their employees as others, and it is those people we have got to reach.

I think the answer to that is that if in our own circles we can develop thorough going accident prevention methods little by little, that gospel with the pressure of increased rates by the carriers will bring home to the people the contingent responsibility and little by little they will come along with us.

Speaking for the Associated General Contractors, I have to say that Mr. Richards is on the program, I believe, and he will give you a rather complete picture of what we are doing. The National Safety Council enjoyed a lot of hard work in trying to get our organization in step with the safety movement. I daresay they were very much discouraged for several years, as we of the staff and the officers were. It seemed almost impossible for us to convey the idea of mass necessity to our membership. Time and again at every board meeting and every convention we stressed accidents; and when I say stressed, I mean it, because we did it to the point that we really created resistance in our ranks to the safety movement. You can go so far that you can overstep yourself to the extent that fellows get tired and say: "What is the use?"

Entering the Activity Wholeheartedly

We finally brought our people around to the point where they saw the necessity for it. They not only saw the necessity for it and the dividends that it would pay, but they saw the contingent thing there, that if they didn't pick up this movement others were going to force them into accident prevention work; and so the two worked hand in hand. Some pressure from other sources, plus educational processes from within, have finally induced our people to go into this activity wholeheartedly.

We told you, I think, a year ago, that it was on our program to employ a high grade man whose major duty, if not his sole duty, was to inject accident prevention measures into our ranks. We made good on that promise. Mr. Richards here came with the staff last January, and since that inception we have gotten out a manual which has probably been in the possession of a good many of you which has no other purpose than to stimulate interest in accident prevention and tell our members how to proceed. Beyond that we have gotten out three standard accident prevention signs which have met with a very ready sale; and little by little as you go around the country and see an A. G. C. job, I think in a prominent place you will see one or more of those signs to inculcate accident prevention in the minds of the superintendents, foremen and employees.

Beyond that, we have three of our members, including Mr. Tubesing, who have given cups in order to stimulate chapter and individual contests in the reduction of accidents in their groups and in their individual companies. I don't want to say that that idea has met with as ready response as I wish it had, but I am quite sure if next year we have other prizes for contests, the results will be rather startling. Since I came to town a number of contractors have told me of the financial benefit they have received from accident prevention activities, reduction in rates and the reduction of hidden losses that they sustain when accidents occur on one of their jobs. Beyond that, all around the country we have had our officers and Mr. Richards meeting with the chapters for the sole purpose of having them as a group go into accident prevention measures, so I think I can report that so far as our organization is concerned, while you people may not be entirely satisfied today with what we are doing, we can see tomorrow we are thoroughly in step, thoroughly in accord with the National Safety Council, and that you will be highly

pleased not only with what we do but with our contingent efforts among the other contractors of the country.

CHAIRMAN HARDING: I am going to call next on one of the old war horses in the Construction Section, also interested in organization work amongst the trade associations. Mr. R. A. MacMullan, Secretary of the Builders' Association of Detroit. He needs no introduction.

R. A. MACMULLAN: I just told Colonel Sawyer that Major Richards would have to stay up all night now to think up a new speech, but I don't think I had better say anything.

I have been, of course, connected with both the A. G. C. and the Construction Section of the National Safety Council for quite a number of years, and I remember the famous meeting of the Construction Section in Buffalo four years ago next week. That same week the A. G. C. had its meeting down at St. Louis and I attended both of them, and I remember particularly the lack of interest when we talked safety at that meeting. During the past year or two we have had visitors in Detroit from the four corners of the country. We have had men from Texas up here, three of them at one time. We had a delegation from Buffalo. We had visitors from Denver, from Louisville and from Oregon, to talk about accident prevention. We have had letters at the rate of two or three a week from all over the country and it has been extremely interesting to us to see the wave that has been going over the country, the wave of enthusiasm for accident prevention work in the respective industries.

Influence of the Association Important

There is one thing that sticks in my mind. It is that the A. G. C., or the Highway Contractors' Association, whatever the national association may be called, has an opportunity to bring into the Construction Section here, a tremendous amount of additional interest. We have found that we have friends there in Detroit, sewer contractors, who have practically no statistics on accidents in sewer work. The Detroit City Gas had a serious accident on a trenching machine, and they couldn't find any record of any such accident over the country although these trenching machines have been used considerably. In other words, the public works contractor is considerably behind the building contractor today. Two or three years ago I was over at the Highway Association meeting and they had the Commissioner of Roads as a speaker, who said they had a \$100,000,000 bond issue being spent on roads. In Michigan, I suppose, we have spent \$100,000,000. The western states are going to spend tens of hundreds of millions, particularly through the middle section where the roads are so bad when they get a little rain on the gumbo. That will all have to be handled through some division or section on accident prevention, and it means a tremendous field for this Section, it seems to me, in the years to come.

Another matter should be stressed and stressed with a word of caution, because we fully realize that only a small portion of accidents are preventable by mechanical means; but still those that are preventable by mechanical means may be followed a little more closely, we think, by the plan of taking up with the manufacturer of equipment any inherent weakness in that equipment. As a specific example, we had a foreman, a very intelligent man, killed by the sinking down of a dipper on a steam shovel. We found that that break was a friction break and that there is no way of being sure that that dipper is going to stay up when you are moving your shovel without moving the dipper in without steam in the pistons. We are pressing that particular manufacturer now because that is something that can't be controlled on the job.

In regard to concrete mixers, we had an accident on a hoist engine we were working on, and we have taken it up with the manufacturers. They have studied

it now for a year or two and have given us blue prints of a suggested method of operation to control it.

If you men would bring in your problems that way, it would have a tremendous effect on the manufacturers. We haven't had a case of a manufacturer refusing to give any cooperation because naturally he has to sell his product.

I am now going to call on some of our new members. They may not be new, in so far as accident prevention work is concerned, but I understand they are new with the Construction Section. It has been brought to my attention that Mr. Charles H. Black, of the Insurance Department of the Stone and Webster Company of Boston, is here. We would like to call on Mr. Black.

MR. BLACK: This is the first Congress I have attended and the first Congress that Stone and Webster has ever sent a representative to, particularly to the Construction Section. Stone and Webster are sold on safety, but they are beginning to awake to the point now where they must assist the National Safety Council by giving it their ideas and experience and by helping others. They have on their jobs a large number of sub-contractors and they think that in this mutual field, much can be gained by swapping experiences. That is why I am here to see what you do in the Construction Section. I have no special program laid out; it is just more curiosity at this first meeting.

Good Results Secured in Safety Work

CHAIRMAN HARDING: Thank you, Mr. Black. I am sure you can get a world of discussion out of some of the members if you button-hole them and have a little talk with them.

We also have a man who, I believe, is new in the Construction Section upon whom I am going to call, Mr. George Widua, Superintendent of the Safety Department of Woods Brothers Construction Company, Lincoln, Nebraska.

MR. WIDUA: Woods Brothers became members of the National Safety Council when I accepted a position with them in May, 1926. Up to that time they were general contractors, especially in river embankments and protection. Our work deals mostly with sea walls, pile driving, making up retards, and we have just recently completed a sea wall. Our experience of past records shows that it was necessary to put on a safety man to go into this safety work on account of our excessive insurance rates. I didn't bring any statistics along. I didn't think I was going to be called on to speak, but I will say that in the past two years, in which I have been with them, they have done wonderful work in that safety line. The firm appreciates what has been done and we are in this heart and soul. We employ around 2,500 to 2,800 men all over the country, and with the assistance of the National Safety Council in providing bulletins and other safety devices and ideas, we are getting very good results. We have cut our accidents considerably, that is our lost time accidents, and we hope to be able to do better. It is a hard job of course to sell our superintendent's, who have been with the company for years and years, the idea of safety. Safety must be sold to the superintendents and executives. Superintendents must sell it to the foremen and the foremen must deliver it to the employees.

CHAIRMAN HARDING: Among the other new members (and I think this is the first Safety Congress he has attended), I am going to call on Mr. William H. Miller of William H. Miller & Sons Company, of Cincinnati.

MR. MILLER: Mr. Chairman, I am thankful to you for proposing my membership. I will say it has benefited our concern tremendously. We receive the posters and the men are taking notice. I think that is one of the principal things we want to do, educate the men, and see that we have their well being at heart. I am certainly glad to be a delegate to this Congress.

CHAIRMAN HARDING: We still have a few more minutes before the hour of closing, and I am going to call next on Mr. P. E. Wright of the Associated Builders Employers of Detroit.

MR. WRIGHT: Mr. Chairman, I thank you for calling on me. I don't see where I can lend anything to a Safety Congress or a safety meeting of this nature. Up until a few weeks ago I knew nothing about safety and cared less. I happened to go down to see Frank Austin one day, who was former chairman of this Section, who converted my Mohammedanism into Christianity. He converted me into safety, and I immediately got to trying to do something for the safety meeting.

I will say that to approximately 200 members who do not belong to the General Builders' Association of Detroit (and those members have been interested in safety), I sent out a questionnaire asking them to appoint a safety contact man. In one week's time I had sixty replies, with a safety contact man appointed in each organization. That takes in organizations employing from twenty-five men up. There is some interest in the safety movement there. We are going to try to do all we can to increase that interest and perhaps after we get to be war horses like MacMullan and a few other of the fellows who have been coming here, we will have a better report to give you.

Activities in the Engineering Section

F. A. DAVIDSON (American Safety Device Co., New York, N. Y.): About all your engineering representative can say this year is that he is glad to get a chance to look at everybody.

During the past year the Engineering Section has had no particular problems relating to the construction industry. We have devoted ourselves in the Engineering Section (as is quite regularly the case) to problems that are more directly concerned with the Industrial Sections. That is primarily the fault of our own Construction Section. We haven't been quite as keen as some of the other sections in deciding quite definitely on two or three problems in safety accident prevention that are specifically engineering problems, and it seems to me that that is something we must do—definitely pick out one or two specific problems that are obviously specific engineering problems and put them before the General Engineering Section and have them devote some attention to them during the year, not only at their periodic meetings, but also have them assign a committee to work on them. Of course the engineers who would make up the committee wouldn't be primarily construction men, and they wouldn't have the general construction viewpoint. Nevertheless, they would have an engineering viewpoint that would be very helpful in solving, or helping to work out, a particular engineering problem in our section.

If the matter of specific engineering problems is something that can be divorced from construction or iron and steel, or what not, there are some problems that are quite common to all that you may remember. They were brought out in a session of the Engineering Section of Milwaukee on the subject of hazards in circular saws. I am sure that that meeting developed some engineering principles as related to accident prevention in connection with the use of circular saws that proved a revelation to men in all the different industrial sections. I think that the chairman should, out of this meeting, or as a result of it, finally settle down and specifically define a particular problem that we have; and if that is put to me I will see to it that it is put quite definitely to the Engineering Section, so that we can have a year's consideration, and I hope next year that my report will be more specific than this.

CHAIRMAN HARDING: Along the lines that our engineering representative was just talking, it has been brought to the attention of the Section, rather as a suggestion offered, that next year each industrial section should complete three

safe practice pamphlets on semi-technical subjects, which are of specific interest to the industry represented by that section.

I understand we have in the Construction Section quite a few safe practice pamphlets. The field is by no means covered, but I am sure the incoming Executive Committee would like suggestions from the members as to the preparation of a safe practice pamphlet. Perhaps you have some particular hazard or some problem that is confronting you on which you want to get the benefit of the experience of a group, and in the preparation of these safe practice pamphlets these points no doubt will be answered. There are a few subjects that have been suggested. They are, by the way, the subjects of papers presented at the Congresses, the Construction Section meetings, in the past. One subject, "Safe Construction of Scaffolds and False Work," is quite a field for a safe practice pamphlet. "Safety in Steel Erection" has been suggested. Another is "Standardization of Accident Statistics and Their Value in Construction Work." Perhaps the safe practice pamphlet is a misnomer in that. I think we will hear more about the accident statistics before the session is over. Another subject is "Safety Work in the Ship Building Industry." I don't know how many of our members are interested in ship building, but there are no doubt some representatives who have some problems. Another subject has to deal with statistical work and also the keeping of records of accidents according to causes; and that, to my mind, is one of the big problems in this Section. If we can designate in the order of their importance the causes of our accidents, it is going to give us a very fertile field to work in. I don't know whether it can be stated now that this particular hazard takes precedence in frequency and severity over another hazard, but the necessity of this has been continually brought before the Construction Section.

Another subject has been suggested on "Safety work in the erection and demolition of the steel frame work of high buildings." Another one is suggested, "Analyzing the relation between accidents and the volume of construction"; another one, "Safety and efficiency in dam and other construction." I am sure the incoming Executive Committee will be only too glad to hear from the individual members, and what is true of one must certainly affect the majority in this case. So they will be very glad to have any suggestions that might be offered.

In closing the first session of the Construction Section, I want to call on a man who has been interested in construction work for years. I heard him speak quite a few years ago when he was interested in association work and I want at this time to present Mr. J. H. Ellison, past president of the A. G. C. and president of the Winston Dear Company of Minneapolis, Minnesota.

MR. ELLISON: Mr. Chairman and Gentlemen of the Construction Section: I don't know of any more important activity of construction than safety. I think that perhaps, like Mr. Wright, I have become more or less Christianized by my contact with Frank Austin and the gospel which he preached to me, and by my friendship with Mr. MacMullan and other people who have interested themselves in this matter. As a past president of the A. G. C., I put first in the agenda of our association, accident prevention as the most important thing we had to do for several reasons. First, because of its humanitarian appeal; second because it was our own job, because we don't have to ask somebody else to do something for it; and third, because it paid in dollars and cents.

The element of the spiritual, the righteousness in our business cannot be ignored or overlooked; unless our construction, of whatever nature it may be, is founded on righteousness, it cannot endure.

I want to say this word, that none of us are too small, or too insignificant, to get in and do our part in the carrying out of this safety work.

ADJOURNMENT

Wednesday, September 28, 1927

The second session was called to order at nine forty-five o'clock by the chairman, E. C. Harding.

CHAIRMAN HARDING: Gentlemen, the first order of business is the election of officers. The chairman of the Nominating Committee is Mr. Fred Hurlbutt. Has the Nominating Committee a report?

J. W. DALZELL (Ferro Concrete Construction Company, Cincinnati, Ohio): The Nominating Committee, as has been its custom in the past, has submitted only one slate, but that does not by any means do away with the probability or possibility of nominations from the floor.

Report of the Nominating Committee

Chairman, E. C. Harding, The Ferro Concrete Construction Company, Cincinnati, Ohio.

Vice-Chairman In Charge of Publicity, C. H. Almstead, The Patent Scaffolding Company, New York City.

Vice-Chairman In Charge of Stereopticons and Slides, J. F. Conner, The U. G. I. Contracting Company, Philadelphia, Pa.

Vice-Chairman In Charge of Program, J. W. Dalzell, The Ferro Concrete Construction Company, Cincinnati, Ohio.

Vice-Chairman and News-Letter Editor, George Widua, Woods Brothers Construction Company, Lincoln, Nebr.

Secretary, J. Wilson Robinson, Everett Winters Company, Detroit, Mich.

Membership Committee Chairman, J. F. Conner, The U. G. I. Contracting Company, Philadelphia, Pa.

Poster Committee Chairman, Charles H. Black, Stone and Webster, Inc., Boston, Mass.

Engineering Committee Chairman, F. A. Davidson, Chesebro, Whitman Company, Inc., Long Island City, N. Y.

Statistics Committee Chairman, J. Wilson Robinson, Everett Winters Company, Detroit, Mich.

Executive Committee, The Officers and—

Col. D. H. Sawyer, The Associated General Contractors of America, Inc.,

Washington, D. C.; W. F. Austin, W. E. Wood Company, Detroit, Mich.;

F. L. Hurlbutt, The Patent Scaffolding Company, Chicago, Ill.; W. G.

Wheeler, Exec. Secretary, Accident Prevention Committee, Building Trades

Employers Assn., New York City.

CHAIRMAN HARDING: Gentlemen, as the Nominating Committee reported, we are now open for nominations from the floor. There being none, what is your pleasure with the report of the Nominating Committee?

D. F. McMURCHY (Industrial Commission of Ohio, Cincinnati, Ohio): I move the report be closed.

WILLIAM F. TUBESING (William F. Tubesing Company, Milwaukee, Wis.): I second the motion.

CHAIRMAN HARDING: Are there any remarks?

(The motion was carried.)

CHAIRMAN HARDING: It will probably be in order to entertain a motion that the secretary cast one vote for the election.

MR. TUBESING: I move that the secretary cast one ballot.

MR. DALZELL: I second the motion.

CHAIRMAN HARDING: Are there any remarks?

(The motion was carried.)

CHAIRMAN HARDING: It is so ordered. Mr. Secretary, you will cast the ballot in your records and it will be complete.

With the election out of the way, we will now proceed with the second number on our program, by Mr. Frank Morris, Assistant Chief Engineer, Liberty Mutual Insurance Company, Boston, Massachusetts.

Keeping Out of the Rut in Safety Work

Frank Morris, Assistant Chief Engineer, Liberty Mutual Insurance Company,
Boston, Mass.

Twenty years ago I was on a construction job not more than 30 miles from Chicago. Safety in construction work was unknown at that time. We were setting roof trusses with a 50-foot span from an 80 foot gin pole and it was customary then for the men to ride the load. This gin pole rested on a 16-inch block and one morning I said to the rigger foreman, "Jim, your pole isn't anchored and supposing she slips off that block, you'll kill three or four men." The rigger foreman looked at me scornfully, gave the signal to hoist away and said, "To hell with them; we can get lots of men."

The Construction Section of the National Safety Council indicates (1) that today we hold different values, and (2) that accidents in construction work don't need to happen. While standing on the coping of the Multnomah Hotel one rainy day in Portland, Oregon, I saw a carpenter's axe fly from his hand—strike the ledge and bound far outward. I watched that axe, fully expecting it to cleave some innocent pedestrian in the street far below, but it landed harmlessly immediately behind a man who was hurrying along.

It was a few days after that incident that I stepped on a nail—that was in August. A doctor probed around and cleansed the wound immediately afterward but the foot bothered me continually. X-rays showed nothing. I hobbled around all winter and twice had the foot lanced. It was not until the following May that a piece of leather worked itself near enough to the surface so that I could dig it out myself and—the foot immediately got well.

I recite these personal incidents because they illustrate two common causes of accidents in the construction industry—falling material and stepping on nails. Fortunately most of the material that falls hurts no one, and only about one nail in 5,000 makes a puncture wound, and most of the nail punctures result in no lost time.

A bulletin issued by the New York Department of Labor last month called attention to the fact that five years ago only 10 out of 58 accidents reported were construction accidents and that last year the construction accidents were 22 out of each 100 reported. This increase might be due to several causes; fewer machine accidents, more building, better reporting, etc.; not necessarily indicating that we are slipping in our work; but these figures do show the growing importance of our job of preventing accidents in the construction industry.

This is a tough proposition compared to the average safety man's job. Obviously the grade of the average employee on a construction job—outside of the skilled trades—is inferior to the employee in a manufacturing plant. Many of them probably are "rejects" whose physical disabilities are not checked up before putting them on a construction job. The moral incentives such as

pride in workmanship, expectancy of promotion, or hope for steady employment are lacking among the non-skilled employees and under these conditions we may expect to find a sort of "dont-give-a-dam" attitude among the men. If we were to erect a mill type building, say two stories high and 100 x 1800 feet area, our problem to prevent serious accidents on that job would be rather simple, but if we were to turn this job on end and erect a building with 100 foot front, 18 stories high, our job becomes at once one that calls forth all of our ingenuity. This is largely because the law of gravity insists on pulling down to earth anything or anybody that is loose. The school teacher said, "Now children, it is the law of gravity that keeps us on this earth." A voice pops up, "But teacher, what held people on earth before the law was passed?" The careless way in which some men ramble around up aloft indicates that they don't know the law has been passed. There was a time when I considered a three inch stringer 50 or 75 feet in the air just as safe as a sidewalk, but lucky for me when my turn came to fall—and every careless man has his turn—I fell but 25 or 30 feet; since then I have preferred the sidewalk.

Fatalities on a Job in Boston

On one job—a 14-story building in Boston (that isn't a big building for New York or Chicago, but it's one of the big ones in Boston) we killed seven men, in spite of the fact that four men were delegated to put up guard rails, cover up holes, etc. The average non-skilled labor was 600, and the job ran a year and a half. One man was knocked off a building being demolished—fell 70 feet. One was crushed by a lump of falling earth. The third was struck in head by a board that fell from sling. The fourth fell 105 feet through a shaftway. The fifth stepped from one scaffold to another at different level and fell six stories. The sixth fell into a hole that he was about to cover up; and the seventh—you've been expecting this one—stuck his head in hoistway and lost it. These are typical accidents on a construction job and after they happened of course we could see how they might have been prevented. Closer supervision might have saved at least four of those seven men.

In a manufacturing plant with a constant supervising force and a constant body of employees, it is not much of a job to hold a safety rally or carry on other safety activities. One department can be pitted against another in a contest; the foreman is generally available to talk to and to talk with about accidents that may happen; the physical makeup of the workers' surroundings do not vary from day to day; once a guard is put on a machine in a shop it generally stays on. All of this is changed on a construction job. Who ever heard of a safety rally on company time on a construction job? When you want to talk to a gang boss about safety or anything else you find that he has just gone to another part of the job—like the Irishman's flea, you step on it and it isn't there. Moreover the non-skilled worker finds his surroundings change from day to day. True, one floor is much like another but they are at different levels, floor openings vary, and the progress of the job from floor to floor presents varying hazards.

Therefore, the safety engineer on a construction job must be more keenly alert than the average safety man and if he himself has ever swung a pick or pushed a concrete buggy so much the better for he can then be more human—more sympathetic with these take-a-chance fellows who after all are on the job to earn a livelihood in the best way they know how—just as you and I. Safety posters or bulletins, instead of being in a regular place, must be located strategically and just follow the job up. Slogans on payroll envelopes, stamped

on with rubber stamp costing a dollar or so, can be used very effectively because they can be made to refer to that particular job and they can be brought right down to the minute. A rainy day is the time for the safety man to get busy visiting the shacks or shelters where the men are congregated and if the safety man knows his job he will enter into their conversation and swing into a good talk on accident prevention. All of these tricks of the trade you are familiar with. The construction safety engineer cannot be a Sisyphus.

Sisyphus was the chap that was always falling down at the moment of supreme success. He could never get over the top. He pushed a huge stone to the top of a mountain and just as it was about to reach the summit a weakness overcame him and the stone rolled back into the valley. After pausing to get his breath, Sisyphus again started the stone upward, steaming and sweating, and this time he was sure he could and would give the rock the final push. But his foot slipped again and the rock rolled back. It is not recorded how many times Sisyphus tried and failed, but it was a large number of times for the Gods had sent him to Hades to do a great thing—and to always miss doing it.

The days of mythology are gone, but now and then we run across a Sisyphus in the safety engineering field. The original Sisyphus was handicapped—for the power of the Gods was greater than his own. But the modern Sisyphus on construction accident prevention work is not hoodooed that way, on the contrary the Gods are for us and if we but be of strong heart to persist to the end we are bound to attain success and Old Man Carelessness and all of his cohorts can't keep us from winning the victory.

Check Up on the Sub-Contractor

We hear a lot about sub-contractors removing guard rails and not replacing them. Every problem is simple after it is solved. Getting guard rails replaced is no problem. After the general contractor has instructed the sub-contractor that guard rails must be replaced if he finds this rule is not being obeyed it is a simple thing for him to delegate a laborer or carpenter to follow these subs and replace the guards, charging the sub-contractors for the carpenter's time, this of course is made a part of the contract with the subcontractor. This idea is so simple and it works so well that we wonder why this practice isn't generally followed. Most bulletins are 8½x11 inches in size. For guard rails they should be four inches wide so that they will fit a 2x4 and they should be of heavy paper well tacked on and they should be put on both sides of the rail so that the warning will be there on either side.

In manufacturing industries we have concluded that accident prevention is largely a matter of proper supervision and safety engineers are giving more and more attention to the attitude of the foreman. Why aren't the supervisors on a contracting job just as responsible for accidents? They should be—but construction foremen are likely to feel a divided responsibility because probably several causes contribute to an accident and several men might be responsible. There is a noticeable lack of contractors in meetings of this sort. This has been demonstrated by Mr. Leo Woedtke who more than once in safety congresses has asked the contractors or representatives of contractors present to stand up, and not a man in the audience arose. It is very obvious that safety in construction work is in the rear of the procession but, thank God, we are in the parade, we have made a start.

Sometimes I think that the company carrying the insurance on a construc-

tion job doesn't try hard enough to sell the big man on the possibilities of preventing accidents. What we want from him is his support—his backing. When he goes out on the job to give it the once over we want him to remind the super that he is holding the super responsible for the safety of the workers. And if a man is off on account of injury we want the big boss to inquire from the gang boss how the man is getting along—when can he come back to work and so on—in other words advertise his interest in accident prevention.

Necessary Details on the Progress Report

It would be a good idea for the general contractor to have on his progress reports not only number of men employed, percentage of completion of work, etc., but also a record of lost time accidents occurring. With only a minimum of effort the big boss can look over copies of the accident reports and he can check up to see that preventive measures are taken. His attitude will soon be reflected all down the line.

The general contractor is beginning to understand how his cost of insurance is affected by his accidents, he is coming to realize that accidents are not a necessary by-product in the erection of a store or a dam or a power house, and he feels at times that if he could personally supervise each operation he could reduce accidents to a minimum. Therefore, he is gradually passing this responsibility on to the super and to the gang bosses. The rigger foreman I referred to at the beginning who said, "We can get lots of men," couldn't get a job today with a first class contractor.

Organized safety drives in the construction business don't seem to have the proper punch to carry through—at least not in the east. An effort to have last May as a safety month didn't seem to get anywhere. The first news that my company had of this so-called drive (and we have a large volume of construction coverage) was some newspaper publicity about May 1. We tried to tie in and help the program along but we couldn't find the program anywhere. If a drive is contemplated for the month of May it should be worked out in January and all interested parties should be drawn into it. We understand that the A. G. A. doesn't do safety business that way and we hope that their influence for accident prevention may soon reach even to Boston. You may be sure that the trades unions will cooperate in any such movement.

Reasons Why Homes for Orphans Are Depopulated

Many differences of opinion may arise between the general contractor and the unions but there can be no argument between them about accident prevention. On one large job in Boston the union officials pulled the men off the job because unsafe working conditions were not remedied. The resultant loss, from low production, cost considerably more than adequate guarding would have cost in the first place. The trades unions are now backing a bill in our legislature to increase the number of building inspectors so they can get safer conditions. This is a sad reflection on safety progress in the construction industry. In the October number of the Century, Silas Bent says that there are three reasons why homes for orphans are becoming depopulated: (1) smaller families; (2) the successful war against communicable diseases; and (3) the decreasing death rate from industrial accidents. While we have made some improvement the construction industry cannot claim a very large share of credit for this third condition.

We are all working to beat hell—for an accident on a construction job sure is hell, but are our efforts availing?

In the statistics reported for 1926 to the National Safety Council by the various member companies, by sections, we find that "Public Utilities" and "Quarrying" are about on a par with construction work—from a hazard standpoint—and that only "Mining" is more hazardous. This may be a bit discouraging to those of us who are trying to prevent accidents in construction industry. It may seem that our efforts are futile—that we are getting nowhere.

Let us tell you a story which illustrates the power of your constant hammering away at this stupendous job. This test was made in a munition factory during the days of the war:

Parable of the Cork and the Steel Bar

A great bar of steel, 8 feet in length and weighing 800 pounds, was suspended by a chain. Nearby, a small cork, a bottle cork, was hung by a silk thread. The purpose of the test was to see if the action of the cork, lightly swung against the great steel bar, would have any effect upon it. Again and again the cork was swung against the bar and produced no apparent effect whatever. At the end of ten minutes, after hundreds of gentle taps, a tremor or sort of nervous chill, seemed to run through the bar. Another brief space, more tappings, and a distinct vibration was seen. At the end of 20 minutes the great bar was swinging like the pendulum of a clock.

That surely is an instructive parable for construction safety engineers for none of us is conscious of inadequacy comparable to the disproportion between a cork and an 800-pound bar of steel. If at the end of 20 years—not 20 minutes—we are able by our constant hammering away to move this tremendous problem we will have our reward for our faith, our hopes and our perspiration.

The Construction Section is not 20 years old, but less than 10 years old. The same figures I referred to above (the National Safety Council report) show that both frequency and severity in accidents reported by members of this section took a decided drop (7.57 to 5.44 and 69.54 to 57.70) from 1925 to 1926. So the little corks, you, me, and the other fellow, hammering away, are showing results. When I look at those figures I feel like saying with Florian Slappey, of "Bummingham"—"Hot dam, Boys, we's sure a gettin' somewhere."

CHAIRMAN HARDING: I am sure we all enjoyed this paper presented by Mr. Morris and we will allot a few minutes to the discussion of it.

C. H. ALMSTEAD (Patent Scaffolding Company, New York, N. Y.): Does your company in all its coverings show just how the construction industry stands, whether with its fatalities it is back of mining, or just how we stand with the other industries? Are we ahead or losing?

Relative Standing of the Construction Industry

MR. MORRIS: What Chris Almstead is asking me I guess is whether my company is making any money on construction business. We don't write mines, but our construction experience has been good; in the first place, because we don't take the contractor that won't play along with us on this proposition. Any contractor that isn't interested in accident prevention is bound to have bad experiences. There is absolutely no question about that. Unless the big man is interested and will work along with you, you won't get anywhere. It is absolutely futile to put in any effort at all on a job where the big boss won't back you up. We have no trouble with the gang bosses or the superintendent, or anybody else. They know

somebody is behind them and pushing them on the proposition. That is absolutely essential in contractor work, and more so than in a shop or factory. You can do something there with the foremen, even if the big boss isn't very much interested in accident prevention; but you absolutely cannot get anywhere on a construction job.

CHAIRMAN HARDING: Has somebody else some further discussion or questions?

R. A. MACMULLAN (General Builders' Association, Detroit, Mich.): I just want to ask one question, Mr. Morris. Have you any idea as to whether the tall building or the low building produces the greatest loss?

MR. MORRIS: The tall building is certainly the more hazardous, and we have the most accidents on the tall building.

That is because the safety men and the men on the job only kid themselves and think it isn't dangerous. Of course you are going to have accidents in both cases if you don't give attention to accident prevention. You have to use the same energy and the same efforts in either case but the hazard in the low building isn't comparable to that of the tall building.

Accident Prevention Month Is to Be Continued

R. E. PARI: (General Builders' Association, Detroit, Mich.): Isn't good housekeeping on a job necessary to the reduction of accidents?

MR. MORRIS: I didn't mention good housekeeping because we all recognize that that is absolutely essential to accident prevention.

WILLIAM F. TUBESING (William F. Tubesing Company, Milwaukee, Wis.): Mr. Morris asked whether there would be another safety month next year of the National Builders' Exchanges. I wish to state that there will be as long as the National Builders' Exchange is in existence, and it is kind of funny to me that you didn't get the bunch of posters that were sent out last year by the Exchange. Didn't you receive one with a little girl with her head in her hands wondering where her daddy was, what happened to him?

MR. MORRIS: I would have been perfectly willing to receive the little girl.

MR. TUBESING: It was sent out. It might not have been sent to insurance companies, but it was sent to all national exchanges for distribution.

MR. MORRIS: I don't mean to criticize any particular organization that has undertaken safety work, but I do think, as I said, that if you will only have in mind that the insurance company covering that job has a very vital interest in it, and they have a broad experience behind them in accident prevention work in that particular line or else they wouldn't be writing that line, and if that interest is only tied into your program, you will get lots of help and we will get lots of help because we are right there and right on the job. We are a long way from Milwaukee and if your stuff had only filtered through to us, your program there would have been effected.

MR. TUBESING: This came out of the Washington office of the Builders' Exchange.

MR. MORRIS: Let's all pull together, and we will get somewhere.

CHAIRMAN HARDING: There was one thing that impressed me, Mr. Morris. It was the statement in one of your answers to the discussion to the effect that you will not take a risk unless the contractor will play ball with you. I think your association should go along that line. The little fellow is bound to be pinched sooner or later, and it is one wedge that we can drive into some of the fellows who refuse to believe what it is all about.

If there is no further discussion on Mr. Morris' paper we will proceed to the next one, to be presented by Major W. R. Richards, Field Secretary, Associated General Contractors of America, Inc., Washington, D. C.

Accident Prevention Activities of the Associated General Contractors

**By W. R. Richards, Field Secretary, Associated General Contractors,
Washington, D. C.**

You are accustomed to hearing that the greater number of accidents occur in the construction industry and that safety work in this field presents greater difficulties than in any other. But I am here today to tell you what contractors, and particularly the Associated General Contractors, are doing to overcome the obstacles in the way of accident prevention.

As our second largest industry, surpassed by agriculture alone in the number of men employed, construction has held an important place in civilization from earliest times. Man has solved construction problems; he has conquered heights with towering skyscrapers, he has annihilated distance with tunnels, he has mastered the rivers with bridges and he has solved traffic congestion with subways, but there still remains the problem of carelessness and thoughtlessness resulting in injury and death.

Every year in this country we face the appalling fact that more than 85,000 deaths result from accidents of all kinds; while casualties, other than death, number over seven million. Of the total of industrial accidents, construction contributes a large percentage—from 15 to 20 per cent in Pennsylvania and New York, and a similarly large proportion in other states.

As a result, in too many cases the skyscraper, highway, railroad or other project, which is commonly looked upon as a monument to the architect's, engineer's and the builder's ability, is really a headstone for the men who were killed during the construction period.

I doubt if there is any industry that is confronted with more hazard, from the beginning of operation to its completion, than is construction. Accident prevention has not yet reached the average contractor. He thinks of it as a remote proposition, an unattainable ideal. He considers prevention of accidents as something beyond his control. His work, as he sees it, is to secure the contract and make all possible speed for completion of the project.

In promoting this safety program we find the most common objection made by contractors is that they believe the construction business has too large a labor turnover for accident prevention to be effective. They do not want to spend money on safety work when they know some men will be careless; they prefer to trust to "luck." They remind me of the Scotchman who paid his railroad fare from station to station, leaving the train at each stop to buy a new ticket rather than to purchase a ticket that would take him to his destination, because his physician had told him he was suffering from heart disease that might prove fatal at any moment. Just as with this old gentleman, the contractor's imagined thrift results in a waste of both energy and money.

No matter if the labor on construction jobs is a shifting group, education along accident prevention lines on one project will make the worker a safer employee on his next job. We are all travelers from post of birth to post of death, wanderers between the two eternities. Therefore, if we all cooperate on accident prevention it matters not where the workman is employed.

It is estimated that every year the construction industry in the United States is loaded with a charge of \$250,000,000 in personal and property damage. Faced by this problem and the mounting cost of both insurance and so-called "hidden losses," the Associated General Contractors of America at their annual convention in January, 1927, at Asheville, N. C., determined to begin an active campaign to turn these losses into profit for both the employer and the employee. A full-time safety engineer was

added to the headquarters staff of the organization, and work was begun at once.

To finance the undertaking the W. E. Wood Memorial Fund was inaugurated by W. F. Austin, president of the W. E. Wood Company, Detroit. This fund has now reached approximately \$15,000 and we are confident it will continue to grow as the results of accident prevention work convince other members of our organization of the value of the work.

Competition between local chapters and contractors is being encouraged by the offer of three cups to be awarded for the best records in accident prevention. An individual membership cup is being offered by William F. Tubesing, president of the William F. Tubesing Co., Milwaukee, Wis.; a chapter cup will be awarded by Robert L. Reisinger, also of Milwaukee, while Sumner Sollitt, of Chicago, is donor of a third cup.

Probably the biggest accomplishment of the Associated General Contractors up to the present time has been the publication of the "Manual of Accident Prevention in Construction," prepared by contractors for the use of members of the association and others in this industry. This 51-page book links up the new safety program of the organization with the fundamental ideals of the association in these words: "As construction is our business, and accident prevention our obligation, may we not show our *skill*, prove our *integrity* and meet our *responsibility* in this important matter of accident prevention in construction?"

Selling Safety to the Executive Is Important

In its introduction the manual points out that "maximum results can be obtained only by voluntary action on the employer's part. Technical, mandatory safety requirements formulated by others will not accomplish the desired objective." Practical suggestions for safety work are offered, but not until an argument has been advanced for cooperation—cooperation of the contractor with his local Associated General Contractors chapter and with such agencies as the local branch of the National Safety Council, cooperation with the subcontractors and cooperation with the workmen. Because we believe the only means of securing accident prevention is dependent primarily upon "selling the executive," we have begun the book with a plea to that executive. Then, because we likewise believe that seven out of ten accidents in construction are preventable by educational means, we have devoted considerable space to a discussion of the best method of undertaking such education.

The manual carries our message of information to the contractors of this country. It was published not to convey an atmosphere of compulsion or autocratic mandates, but in the interest of service and cooperation; and contrary to the accepted fate of men and matter so garbed, it has a place. It has gone to the far corners of the United States and is filling a need that nothing else has met. That it is breeding good will, friendship and mutual confidence, we are confident. The manual is not perfect—it was prepared by men for men—but if it fills the gap in information wanted by our general contractors it is serving its purpose.

At their spring board meeting the Associated General Contractors adopted a series of three accident prevention job signs, and a good number of contractors immediately ordered the signs. Our plan is to have these placed on every job on which one of our members has men working. Each sign measures 18x24 inches and bears the A.G.C. seal in red and black, with a safety slogan in the same colors. It is our belief that the Associated General Contractors' insignia, standing for cooperation and recognized as representing skill, integrity and responsibility, will impress the public with our interest in promoting safety in construction. At the same time, we feel that these signs placed on every job, whether building, highway, railroad or public works construction, will prove a continued warning and a constant reminder to our workmen of the dangers of being careless.

Before undertaking our safety program we found that with too many contractors

accident prevention was something to be talked of but not acted upon. It was in the same category with most folks' religion, which the old darky said "is lak dey Sunday suit. Dey ain' nevuh weah it frequent 'nough to shape it to deyse'f."

Construction accident statistics as compared with those of manufacturing plants are anything but encouraging from the standpoint of the contractor, and insurance rates are correspondingly high. Yet contractors, with few exceptions, have refused to follow the example set in other industries where accident prevention has been found successful. They have neglected to take a part in the movement which has placed safety work in the United States 25 years ahead of that in other countries.

The Associated General Contractors are attempting to make accident prevention an everyday objective, not only because of its economic benefits but also because of the humanitarian angle of the problem. Fewer accidents mean lower insurance rates, increased efficiency and greater production.

Insurance Rates Based on the Record of the Firm

Because the insurance companies have recognized the value of accident prevention work, they have adopted the policy of basing their rates on the past record of the firm. Contractors who have been able to take advantage of a lower compensation rating find themselves at a great advantage in competitive bidding. If one contractor has a 20 per cent credit on his rating while another must pay a penalty of 20 per cent, the spread between the two rates will be sufficient to win or lose the job. The man with the penalty cannot leave this charge off his bid any more easily than he can leave the bricks out of the building he is erecting or the sand and stone out of his concrete.

Insurance, however, amounts to only a small percentage of the total cost of accidents. In fact, statistics collected by casualty companies indicate the so-called "hidden losses" from accidents amount to approximately five times the charge for compensation. At least 85 per cent of all accidents are said to be caused by carelessness, while only 15 per cent are practically unavoidable. If this 85 per cent can be cut down through introduction of a safety campaign, the employer will benefit very materially.

At first thought these "hidden losses" do not appear so vital, but their true importance is seen when one considers the losses in equipment, time, efficiency, morale, labor turnover and men-power. Conservation of all these items is important in any industry, but in construction the shortage of trained workers makes the loss of even one man an especially serious problem.

On the other hand, it is the humanitarian angle of the safety campaign that appeals most to the employees. It creates a common bond between the employer and his men which is absolutely essential for the successful operation of accident prevention work. Considered from this viewpoint, fewer accidents mean a saving of lives: prevention of unemployment, illness and poverty; and raised morale among the workmen. The two ideas of economy and moral obligation, however, are so interrelated as to be inseparable. Whatever helps the employer also benefits the employee, and vice versa.

You will be interested, I believe, in a review of the actual savings realized by a number of contractors through accident prevention. Two branches of the Associated General Contractors have already applied accident prevention very effectively. These are the Texas Branch and the Detroit Chapter, which furnished the rules of safe practices prescribed in our manual as well as other material for that publication. This chapter has reduced accident insurance rates for its members 50 per cent. Several individual members, likewise, have earned a handsome merit rating through safety work. For instance, James Stewart & Co. have secured a credit of 60 per cent on their insurance rates, while Fred T. Ley & Co. have reduced their accident rate

54 per cent. In 1926 J. W. Cowper, of Buffalo, completed a job of \$400,000 payroll with a total cost for medical aid and compensation of \$1,614.04, while on other jobs this charge has been as low as 89 cents per \$100. Equally encouraging is the report of an insurance company which points out that a number of contractors, large and small, have been successful in having their rates reduced 20 to 30 per cent by accident prevention methods.

Another incident that I want to cite is that of a large subway contractor in New York who was about to have his insurance canceled. The premium which he had paid amounted to \$50,000, while the cost to the insurance company in 11 months for his 384 accidents during that time was \$39,000. Instead of canceling his insurance, he was induced to give *accident prevention* a trial. In the first month he reduced his accidents to 29, lost time days to 122, and medical cost and compensation to \$533. The second month showed 32 accidents, 230 lost time days, and \$696 costs. In the third month, accidents were again lowered, numbering only 21, with 217 lost time days and a cost of \$1,178. His records for the succeeding months varied but little from these figures, showing conclusively that accident prevention pays when given the proper attention.

Safety is like time—it is a valuable commodity, and should be recognized in terms of dollars and cents. The more effort and enthusiasm we put into accident prevention work, the greater results we will realize from our investment.

If seven out of every ten accidents are preventable, it is our duty to find out the means of prevention. Voluntary efforts in this direction will be more far-reaching and satisfactory than legislation, yet if construction does not take steps to clean up its house, the state legislatures will send in the statutory scrubbing brush and soap to do it for us. We must accept the challenge and not sit idly by, bemoaning the facts, like the dog who sat on his tail and howled all day because he was too lazy to get up.

Careful Organization Will Eliminate Accidents

It is important, too, that contractors differentiate between well-managed accident prevention methods and the careless, slipshod, don't-care procedure that has proved unsuccessful whenever tried, leaving an undeserved black mark against the safety campaign. Accident prevention, undertaken as part of the contractor's organization, will eliminate the majority of his accidents and make his employees more efficient.

Skill, integrity and responsibility are required of all members of the Associated General Contractors, and we are now interpreting this responsibility to include accident prevention. The public expects the employer to protect both the workman and the interested onlooker or the passerby whose life is often endangered by accidents on our work. If we are to live up to our motto we will accept this task as part of our responsibility.

The methods of applying accident prevention are practically the same in all cases and should be carried out along standard lines instead of being put on a plane of mystery. They must be made a part and parcel of the contractor's business and worked out in a practical way. In fact, the best plan is to use good commonsense methods. Properly applied, these are flexible—they fit any job and are adaptable to any kind of construction. Some one has said that it is the "horse sense of the driver that will save accidents, not the horse power of the car," and that statement is applicable here.

The first essential of accident prevention is the sincere interest of the employer in the project. Safety must begin at the top. The success of the program will depend largely on the confidence the "big boss" has in the activity and on his ability to inspire that confidence in each and every member of his organization. If the employer will stop for a moment to consider how he would feel and act were he in his workmen's shoes, he will be eager for the success of accident prevention, and will not postpone taking up the campaign.

Safe equipment, kept in good condition, represents the second important factor in any accident prevention program. It may cost more to provide a covered scaffold instead of a narrow plank for a bricklayer, but his increased efficiency will more than pay for the expenditure, aside from any consideration of safety. Likewise, a stairway is superior to a step-ladder because of the greater speed as well as lessened danger made possible by its use. No matter how many safety devices are put up, however, constant supervision and continued house-cleaning is necessary to keep them in place. Careless workmen will sometimes destroy them, or a subcontractor may remove guard rails and neglect to replace them. So, we urge contractors to clean their jobs internally and externally. The physical condition of any job shows the attitude of the employer to the work on the job. If the job is kept clean, the facilities for handling material are increased and the hazards are overcome to a great extent.

Proper supervision by superintendents and foremen and the instruction of workmen in safe methods are of practically equal importance. A little later I will tell how Associated General Contractors are carrying out this part of the program.

We have found two methods successful in conducting safety work in construction: First, that of safety organization within the company, and, second, the system depending on the assistance and stimulation of the local chapter of the Associated General Contractors.

The Plan Worked Out in Detroit

The latter plan, as worked out by the Detroit Chapter, consists first of all in appointment of a general safety committee of the association, composed of one representative—a responsible executive—from each company. This committee formulates safety policies and supervises all safety work. Decisions of the safety committee are carried out by the secretary of the association, assisted by an able insurance engineer who makes safety inspections of the larger jobs of the member companies.

Under direction of the safety committee and the secretary the following activities are carried on: Accident reports are sent to the secretary and comparative records are compiled and distributed monthly to the various member companies. All serious accidents are investigated at the accident location by a board of inquiry consisting of the secretary, insurance counsel, insurance engineer, and the safety committee member representing the employer. Testimony and recommendations of all eye witnesses are taken, "findings" are reached, and reports are distributed to all members. A set of regulations covering safe practices and equipment for various branches of construction work has been compiled by the committee and furnished to all superintendents and foremen. To encourage study of these rules a prize contest is held several times each year. Evening meetings for superintendents and foremen are held, for the purpose of instructing them in safe practices and in first-aid treatment for injuries. And finally, every week safety bulletins or posters are sent by the secretary to each job.

Naturally the most common means of carrying on safety work is that of safety organization within the individual company. The contractor who wants to inaugurate accident prevention on his jobs must organize. In this work, as in every other worth-while undertaking, organization and a definite program are absolutely essential.

First of all, it is advisable to have the services of a first-class safety man, either on an individual plan or through insurance connections. If possible, there should be someone in the general office of the company having supervision of all the safety activities on jobs and being held directly responsible to the employer for carrying on the campaign.

On large jobs running a considerable length of time, a safety committee is effective. This committee ought to consist of the superintendent, as chairman, the time-keeper, as secretary, and three or more foremen. Regular meetings should be held

and minutes kept for record. The committee should also make inspections of the job, at least weekly, investigate all serious accidents, report findings to the general office, and assist the superintendent in giving safety instructions.

If the job is not sufficiently large to warrant appointment of a safety committee, some reliable workman may be named as safety inspector to devote a small part of his time to inspecting the entire job at regular intervals and reporting to the foreman or superintendent all unsafe conditions and practices. The duties of such an inspector should include maintaining first-aid facilities satisfactorily, investigating accidents, reporting findings to the general office, at least on all serious cases, and assisting in safety instruction.

Careful selection of the men for these tasks is most important, yet in employing every man the contractor must exercise care if he wishes to be successful in his safety campaign. The experienced worker is much less liable to be clumsy than the new laborer; likewise, the healthy individual is a much safer man than one who is sickly or physically handicapped. Especially important, it seems to me, is the attitude of the superintendent. When hiring a new man for this position I think every employer should inquire what his opinion is of accidents on the job. Let him understand that one of your requirements of a superintendent is that he promote accident prevention. Only if he shows an interest and indicates a willingness to cooperate along these lines should he be placed in this position.

"Accident Disease" Not to Be Tolerated

The well-organized accident prevention program includes a careful record of all accidents to both employers and property. This will end continued employment of men who have what might be called "accident disease," and who are a menace to their fellow employees as well as a source of loss to their employer because of their repeated carelessness. It will also point out many other methods of correcting dangers. Such a report shows the nature and cause of accidents, their cost and the resulting lost days from each.

Accidents are caused; they do not just happen. So it is our task to discover how and why they occur, and then correct the causes. Safeguards cannot eliminate the 85 per cent of accidents which are due to the human element and result from carelessness, thoughtlessness and ignorance. Such accidents can be prevented only by teaching the workman safe methods and habits. Above all, the employee must be taught to use good judgment. Last year in a Michigan industrial plant there occurred 171 accidents. Investigation shows that in 170 cases the injured party had explained the accident by saying: "I did not think." This resulted in lost wages amounting to \$10,610 and cost the company \$17,000 in loss of production, all because those men failed to "think."

To prevent accidents one must go back to the circumstances leading up to the occurrence. If accidents result in no injury to persons they still should be listed and studied in order to avoid repetition. Besides, in accidents of this sort there is a hidden loss and a possibility of injury to persons. For many years there has been talk of the cost of accidents in addition to the expenditure for compensation. The principal factor entering here is the cost to the contractor of replacing a man, which amounts to from \$25 to \$100. When a new piece of equipment is placed on a job, orders are immediately given to exercise care in its operation because the machine has cost so many thousand dollars, but no mention is made of the employee who is to operate the valuable piece of equipment. Yet, like a machine, if he is not well cared for, he will soon be broken and unfit for use.

A thorough study of accidents reveals many causes. Perhaps you have heard of the little girl who was almost run down by an automobile, but was rescued by a heroic bystander who inquired why the child had not clung to her mother's skirts. "I did try to hold on," she explained, "but I couldn't reach them."

Accidents in construction result from a multitude of causes, but most of them can be traced to carelessness of some form. Although these are not always reported, the majority of accidents are scratches of some description which may easily be kept from proving serious if given immediate attention instead of being considered as "nothing to worry about." This is where an ounce of prevention is worth a pound of cure. Someone has said that accident prevention is that pound of cure for excessive compensation rates.

Of the so-called major accidents, the predominating causes are falls of various sorts—falls from scaffolds and ladders; falls from buildings; falls from runways, floors and stairs; falls from other elevations; falls into floor openings; falls into excavations; falls into quarries or pits and even falls on the level. Many very serious injuries result from men being struck by falling objects, while others are brought about by workmen stepping upon or striking against various objects.

To overcome these difficulties the safety engineer should work with the operating executives in formulating and applying a set of company standards or rules covering both safety of equipment and safe practices. He should also keep in touch with the safety men of other construction companies in order to pick up all available information regarding new and improved methods.

Education of the Employees Most Important

Because not more than 15 or 20 per cent of accidents can be prevented by mechanical means, the most important item in the program is the education of the employees. Different companies have worked out this plan in varying completeness, but practically everywhere such details are included as distribution of safe practice pamphlets and safety bulletin boards. The National Safety Council publishes 5,000 different safety bulletins yearly, many of which are applicable to the construction industry, while the Associated General Contractors' job posters are particularly intended for our members. Safety contests and prize awards encourage the men to take a personal interest in the movement, yet I believe nothing is more effective than the enthusiasm of the employer himself. While a contest is being held, or even after the awards have been made, many contractors have found it a good plan to use score boards to mark the progress of accident prevention work. These boards are provided with 31 spaces, one for each day of the month, and when an accident occurs a red plate is inserted.

Safety meetings, combining entertainment with instruction, have been found very satisfactory means of creating an interest in the project. Sometimes first-aid demonstrations are included in the program at these meetings. The more minute directions in first aid, however, are given only to the foremen and superintendents. If possible, the services of a physician should be secured for the latter purpose in order that the information given out may be dependable. Such instruction, followed by care in equipping and maintaining adequate first-aid medical kits on every job, has been found to be one of the most effective means of reducing the number of lost time accidents.

But we are diverging into the field of curing instead of sticking closely to prevention. Important as is first-aid, I believe it is even more essential to train the workman in the proper use of his machinery than to treat him for injuries received through ignorance of its operation. A man may be furnished goggles to wear for certain work, but he probably will neglect to do so unless he finds his fellow employees wearing them and unless he is thoroughly impressed with the advantage of protecting himself from possible injury. This statement, of course, is an admission that constant vigilance must be combined with education. But when we are careful to see that neither supervision nor training is lacking, we find increased efficiency going hand in hand with accident prevention.

Group liability and compensation insurance make accident prevention more easily

possible and profitable, yet it is not necessary that safety work be predicated on any insurance arrangements. It should rather be based on the desirability and advantage of accident prevention. However, energy spent on groups usually obtains better results, and where insurance is connected with the operation a still greater result is obtained.

No matter whether it be an individual company or a chapter of the Associated General Contractors that is undertaking accident prevention, cooperation is a great help in promoting the plan. First of all we urge our members to join their local branch of the National Safety Council. For best results it is necessary to cooperate with the insurance agencies, the manufacturers, the sub-contractors, labor, building departments and the architects and engineers.

Safety Is Not An Unattainable Ideal

Pessimists will tell you that accident prevention is simply an ideal, an unattainable dream, but remember that while the "calamity howlers" are complaining, progress is marching on. Shortly before the Civil War a writer in the Atlantic Monthly said of our capital city, "Washington has a monument that will never be finished and a capitol that lacks a dome." But the fact that such dreary predictions ever were made never occurs to the throngs of tourists who daily ascend the monument and visit the capitol. Nor will the doubts of the present hinder the ultimate success of our safety program.

You yourself can do more and better work if you take sane, practical care of your health. Then why not protect and care for your employees so that you will benefit from their better work?

Accident prevention is our obligation. Let us show the employees, the public and everybody that we are going to operate a humane industry, wholeheartedly attempting to live up to the slogan of skill, integrity and responsibility.

CHAIRMAN HARDING: To start discussion on Major Richards' paper, I want to call on Mr. M. S. Dearborn.

M. S. DEARBORN (Federal Mutual Liability Insurance Company, Boston, Mass.): It has been my pleasure to meet the Major on numerous occasions and this is one of the pleasantest, and I have been very interested in his discussion of how the A. G. C. has organized to carry on its safety work. He has covered the ground very thoroughly and has emphasized the fact that the only way to carry on this intensive safety program is to organize and cooperate in a definite program. I am somewhat at a loss to know just what to say. The Chairman rather took me by surprise. I think, though, we have all been enlightened by the wonderful paper presented by the Major.

CHAIRMAN HARDING: Is there some further discussion?

MAJOR RICHARDS: I say this, that quite a number of the chapters have joined the National Safety Council, or the local branches in their various localities.

R. E. PARIS (General Builders' Association, Detroit, Mich.): The Major talks about accident prevention about like Bobby Jones does about golf. Bobby said there are a great many different methods of learning how to putt, but he has found the best way to putt is just to knock the ball into the hole and cut out all the preliminaries; and that is about the place where it seems to me we are landing in this Construction Section now. I don't believe that accident prevention is in its selling stage any more. The size of these meetings as compared with the meetings we have had in earlier years in this Section rather proves that; and I think perhaps, maybe it is natural modesty on the part of the Major, that he wouldn't tell us the strides that the A. G. C. has made in accident prevention this last year, is because he has made it his business to get out around the country and talk accident prevention to contractors. He has taken the gospel to them by personal appeal rather than by circulars and pamphlets and magazines and that

sort of thing: and I am glad to hear that the Construction Section has been promised for more than a year now. By the Executive Committee of the National Safety Council, a field secretary for this Section, and we haven't got any field secretary.

Now we could do in the Section what the Major has done if we had as good a man as the Major for a field secretary. Maybe that isn't possible, but at least we could have a field secretary, and the A. G. C. can't do it all. Their membership is not representative over all the United States yet, and there are more contractors that are outside the A. G. C. than are inside and why not have our field secretary? Why not represent the attitude of this Section to the Executive Committee of the National Safety Council, if we really believe we ought to have a field secretary to carry this gospel to the contractors? I should like to read the resolution over to that effect.

CHAIRMAN HARDING: The Chair will be very glad to entertain a resolution to that effect, Mr. Paris. The question of the field secretary has come up before the past two Congresses.

Resolution Regarding a Field Secretary

MR. PARIS: To get the matter before you, I will read this:

"Whereas, Heretofore the great need of a field secretary to promote accident prevention in the construction industry was definitely determined, and

"Whereas, On representations of the Construction Section to the Executive Committee of the National Safety Council the employment of a field secretary was authorized but has not been carried out, therefore be it

"RESOLVED, That it is the sense of this meeting that the officers of the Construction Section shall bring emphatically before the Executive Committee of the National Safety Council the increasing need of the services of a field secretary and the great benefits to employers, employees and the public to be derived from the campaign of accident prevention in construction and the consequent loss from further delay in this important matter."

I move the adoption of that or an improvement of it.

MAJOR RICHARDS: I second that motion.

MR. ALMSTEAD: Mr. Chairman, I believe the Council has, in the past year, had various men under consideration for a paid secretary, but it seems at the critical moment this man either slipped away or got a better position and wouldn't take it. I think the whole Section should make effort (that is, if they have a man in view), to make recommendations to get him. They have been trying real hard for the past year to get a man. I know for an absolute fact, because I had one lined up myself for them.

CHAIRMAN HARDING: I am sure the managing director of the National Safety Council would appreciate any suggestions as to the man to fill this position, if you have any to offer.

S. LANGNER (United States Fidelity & Guaranty Company, Chicago, Ill.): I have always felt in these meetings, at lectures and moving pictures and so forth, the right men have not been present to get the benefit of this safety propaganda; and I have had occasion to meet a contractor in Chicago here who says the executives have not themselves realized the importance of the accidents on their jobs. I have in mind one particular man whom I talked to about accident prevention who didn't have any conception of the record of his accidents. When I brought to mind the number of cases of men stepping on nails, he decided to get out on his jobs with me, and when he saw the condition of the jobs he discarded the concrete forms lying all around the place and immediately instructed all his superintendents to remove the nails from the boards as soon as they took them down and burn up all the scrap material. That is an indication of the fact that when these men are

reminded, or when it is brought to their attention, that their jobs are hazardous, when they see the importance of this work, they will take it upon themselves to do something about it.

CHAIRMAN HARDING: We have a motion that hasn't been voted on. As soon as we dispose of it we will entertain your motion.

(The motion to adopt the resolution in regard to field secretary, was carried.)

C. H. ALMSTEAD (Patent Scaffolding Company, New York, N. Y.): I move that Mr. Paris be appointed a committee, and, if he finds it necessary to appoint his own committee to take it up with Council Headquarters, to see that we get a proper man, he may do so. While it is true that a man can be trained for the position, we would like to get a construction man into it.

JAMES F. CONNER (The U. G. I. Contracting Company, Philadelphia, Pa.): I second the motion.

An Eye Inspection Campaign in Detroit

MR. PARIS: I appreciate the compliment of it, but I think I will have to rise to a point of order, because it seems to me that is a natural function of the Executive Committee of this Section to take up the matter with the Executive Committee of the Council. I think that is the proper form in which it should be done.

MR. ALMSTEAD: I withdraw my motion and leave it that way, Mr. Chairman.

CHAIRMAN HARDING: The Executive Committee will present the resolution to the Executive Committee of the National Safety Council. We hope for luck this time.

In line with Major Richard's paper, I understand that Detroit is running an eye inspection campaign amongst all the workers and I think a few remarks along that line might be well at this time. I understand Mr. Buck is chairman of this committee. Mr. Buck, can you tell us something of this committee's work?

CHARLES BUCK (Bryant & Detwiler, Detroit, Mich.): The Industrial Commission is a new acquisition by the Detroit Safety Council. It was adopted at a meeting of our subcommittee and referred to the General Building Association for passage, to have an Industrial Commission, or Industrial Eye Company, which is formed in the locality of Detroit for the purpose of investigating the eyes of all employees in construction in all kinds of industry. It has become quite a proposition in Detroit so far as the manufacturers are concerned. About 50 per cent of them, up to the present time, have adopted that means of procedure; to have all their employees, not from a mandatory or compulsory standpoint, but from an advisory standpoint, examined as to their eyesight.

We started out on our job (the Bryant & Detwiler Construction Company of Detroit), one job of 400 men. They put a doctor right out on the job, a head doctor, with two assistants. We furnished them a room for their investigations. They brought all the equipment out on the job and those 400 men were given a cursory examination in about two days and a half.

They make a final report, with a card index on the condition of every man. They classify them as to whether laborer, cement finisher, form builder, form builder's helper, bricklayer, and so forth. They keep a record at their office and they furnish you a card index record of the same. They also give you recapitulation of the men who are affected with close vision and far vision afflictions. Practically 35 per cent of the laborers on the job needed glasses, but none of the bricklayers. The bricklayers on the job at that particular time were about seven or eight. Their eyes were in pretty good condition, although the jobs before they were finished had 60 or 70 bricklayers. They furnish a blank card to the man, telling him the condition of his eyes and he can, at his own option, either go to this eye sight bureau and get glasses from them to suit his vision at a nominal price of \$9; or if his eyesight

demands stronger glasses, they will furnish them for \$11. They are the best possible glasses obtainable with the best possible frames. You can pick your own frames or nose piece or anything you care to; and with that they will also furnish examination and glasses for any one of your immediate family.

The cursory examination costs General Builders' Association of Detroit nothing; the general examination costs the General Builders' Association nothing. The cursory examination of the man costs the man nothing. The general examination costs the man nothing. And it is optional with him whether he cares to buy the glasses from the Industrial Bureau or elsewhere. He is given a thorough examination and a thorough report so he can get the glasses from them or go to some other doctor and get them.

We can't give you any comprehensive report on it, as we have just started this, but from the experience the industrial plants have had which have been through this thing in the last six or eight months, the claim is that it has reduced accidents; and it has a general tendency to correct the morale of the man from the standpoint that his employer is interested in his own personal gain and is looking after him every moment for his entire safeguard.

CHAIRMAN HARDING: Is there a minute or so discussion on his little presentation? JAMES F. CONNER (The U. G. I. Contracting Company, Philadelphia, Pa.): I would state as a matter of information that on all large operations we have for the past several years had every man examined, not only as to the eyes, but thorough physical examination to see that the man was suited for the job. We have had occasions where, to all appearances, a man was gifted with good eyesight, yet on an examination of the eyes his vision was found deficient practically down to 20 per cent. We have had records. That shows the importance of the eye investigation, especially on construction work, where a man is exposed to the hazards of fall from heights; and in addition to that we go thoroughly into the question as to whether man is subject to any attacks of vertigo. We have had several accidents resulting from that, severe falls.

CHAIRMAN HARDING: We will proceed with the program, which has been termed the new members session.

Safety Campaigns and Stunts

Clifford Penland, Director, Safety Division, Memphis Chamber of Commerce, Memphis, Tennessee.

When I was asked to discuss this subject, I think the idea in mind of the committee was to tell you what is going on in other fields of accident prevention work in a community. I imagine you stick pretty close to your one subject in the deliberations here in the Construction Section. Those of us who are carrying on community programs in a more or less broad way, have to broaden out a good deal and get in the various phases of safety work. For instance, a community organized like Memphis is and like a good many other cities, many of which are represented here, that have local Safety Councils, does carry on an industrial safety work of all sorts. That is, educational programs, home safety, child safety, traffic control or public safety work and various other kinds of accident prevention activities that are designed to reduce and control your community accident problem.

For instance, I will just touch on a few of these things because it may be of interest to you. Consider for a minute the child safety work. It is an important activity, at least we consider it important, because we are teaching the young mind. That is the impressionable time, in the grammar and grade schools, to teach the simple rules of safeguarding his or her life when operating on their own hook. When children are under the supervision of their parents

or teachers in school there is not very much apt to happen to them. But when they are out on their own, by themselves, and they violate certain safe practices or safety rules, immediately our problem becomes an important one, because the child fatality rate is very high in a great many communities. So our programs in schools are designed to impress the young mind with certain safety rules of conduct so that when he is out on his own he acts in a safe way.

For instance, just a simple little rule—look first to the left and then to the right, when you cross the street. That is worked up in little rhymed verses to make it attractive. We feel that if the child, before he crosses the curb, looks first to the left and then goes to the center of the street and looks to the right, he will be in better shape to get across the street safely.

In connection with that activity we think it is important to organize it, and we let the children organize it, in what are known as Junior Safety Councils; and we teach them little stunts, teach them safety songs and have little playlets. The chief idea is to imbue that child with the safety idea. When he grows up we feel we are going to reap the reward in years to come, because when he grows to manhood or womanhood he will be a safe individual.

Teaching the Householder Simple Safety Rules

In connection with our fire prevention work we believe that one of the most important fields of educational work is in teaching the average householder or home owner certain simple rules of eliminating fire hazards from his home. We approach it through the schools. We ask twice a year that the child take home a little leaflet on which there are six questions relating to the safety condition of his home. We offer prizes to the schools that return most of those blanks filled out and signed by the parents. Those six questions that we ask are based on an analysis of our community fire records, causes of our fire loss. We find from a study of our problem in Memphis that rubbish and flammable material in attics and cellars is one of the principal causes of fire. We find also that defective chimneys and flues are another cause; heating equipment that may have to be taken care of, is another cause. Another thing is putting hot ashes into wooden containers and wooden barrels. We know there are six or seven things that cause the trouble and we believe through an educational campaign we can bring about a reduction in the fire loss.

This might give you some idea of how effective this campaign is. We started this two years ago and have conducted three campaigns. It was about a year ago that we actually got into it. We have conducted two campaigns and have had upwards of 20,000 homes in which the children go home and catch daddy by the hand and say, "Daddy, we have to inspect our home for six years." This year we had 400 less firm alarms and 254 less home fires, which indicates to me without question that a simple little campaign like that is effective in a community. You take the average home fire loss and you will see that it runs into real money immediately. If you can, through the child, approach the father and mother with certain simple things, it will be effective over a period of years.

The trend, I think, throughout the local council is away from campaign, safety week and safety months, the chief reason being that more effective work can be done over a period of time. Sometimes you can fan enthusiasm up to a high point in doing a certain job over a limited period, and then you suffer a bad reaction when the week or month is up and things are let down. If you haven't done a good job, haven't made an impression during the one week, you say, "What is the value of these things?"

In Memphis we don't run a week or a month's campaign, we run 52 weeks' campaign. We plan our program on the basis of a year's time. At the end of

the year we start another, with the fire prevention campaign. We observe National Fire Prevention Week because it is a national proposition with the proclamation of President Coolidge. Governors of the states and our Mayor: and we come along with a program of publicity in which we say, "This is the opening of the fire prevention campaign which will be in force 52 weeks in Memphis." We have posters on street boards, publicity in the press, moving pictures, home inspection contests in the schools, and we do a lot of things that sort of focus or put the spotlight on what we are trying to do over a period of a year. That is the value of a week's campaign or a month's campaign. It sort of waves the flag or rings the bell and tells the public what we are trying to accomplish in the community. We want your moral support if we don't get your active support. That, it seems to me, is the value of this work.

In connection with stunts, there are a good many things that can be done and have been done by local councils. I guess you are familiar with a lot of them. We believe that you can go along and do constructive work and dig pretty deep looking toward the roots or causes of your accidents or your fire problem, but you go along and the community won't know what you are doing. So we believe it is a good thing occasionally, as I said a minute ago, to sort of wave the flag and ring the bell and know that the community knows that you are actually interested in this problem and are trying to solve it, or at least control it.

Profitable Stunts in Memphis

We have conducted a few stunts in Memphis to keep the public's mind thinking along lines we want them to, and one or two of them I will mention because they may be rather interesting.

About a year ago we heard of a man named Art Hitchcox, who is an old speedway driver. He is in the field conducting safety campaigns. He will come into a community and stay during a week and will do certain definite things to awaken public interest in the public accident problem. He is only interested in public accident work. Because of the background of his being a racing driver, he immediately appeals to the children, so he drives around in his car which is decorated, "Art Hitchcox," all over it in colors. He has a broadcasting apparatus on the front of his radiator and he put an apparatus on his face and drives up to a playground and talks to the children through a megaphone and gives a safety talk or goes into the luncheon clubs and does the same thing. He is an attention getter, first of all, and second he puts over the safety message. Children like him, and he told them this, which is a sort of key of this talk:

"I have driven as fast as any human ever has driven. I risked my life every day for months and years on the track, and I came to the conclusion it was not worth it. I got out of it, and today I am driving a car and I never exceed a certain speed limit, and I am going to safeguard my life. And you children ought to feel the same way about it."

There is one thing he did which was very interesting. He wanted to stage an accident right down in the business section of town, so he dressed up as an old man. We got the permission of the Public Commissioner of Safety. He put on a wig with whiskers and an old coat and hat and my assistant said he would drive a car and hit him. Just at the busiest time of day he stepped off the curb on a pre-arranged schedule, and this car appeared and he hit it with his can to make a noise and the car was under control. Immediately the woman riding with my assistant screamed and the crowd came. The police

knew what it was about, and we had an ambulance spotted around the corner. The ambulance came up with a clanging of bells to make it as dramatic as possible. Here was Art Hitchcox, kicking and quivering, the last gasp, and here came the crowd, a tremendous crowd, I guess 500 people, in two minutes, and they were jammed as close to him as they could get.

The ambulance came and he was put into it. They started to put him on the shelf and when they did, he said, "Hey, wait a minute here." He pulled off his mask and said, "You are curious, aren't you? You are curious. The only time you think of an accident is when it happens." And he hopped off and gave as fine a safety talk as you ever listened to. It was dramatic. Newspapers played up the whole thing, as it was designed for just one thing and that was to focus the spotlight on accident prevention work in the community.

Another stunt that you may be interested in knowing a little about is one Harry Rogers conducts. He is with the Western Actuarial Bureau. He believes in working with kids, and he got up this little stunt of his, and he calls himself "Smoky, the Fire Clown." He dresses up in a clown's costume and goes to school or any place where he can get a group of kids and puts on this little stunt. He has them count seven about 15 times, and then he says that *seven* out of ten fires are caused by carelessness. When they are out yelling he gives them the safety talk. Very good psychology with kids, because if you talk to kids, they get restless. Harry has a lot of apparatus he sets up and he tries to point out by exact occurrences how these things happen, how fires start. He will take five or six causes of fires and do the wrong thing, make a lot of monkey-shines. The kids yell at him, "Don't do that, that is wrong."

They go home and tell about "Smoky, the Fire Clown."

Marvelous Work Among the Children

Harry Rogers is doing a marvelous work with children all over the country. He traced back one case where a little boy's clothes caught fire and he did the proper thing at the proper time. He rolled over on the ground as fast as he could, all by himself, and his life was saved because his clothes were burned very badly. Harry happened to be in that town and he thought, "I guess I will see who taught the kid to roll on the ground." Without the child knowing who he was, he asked the child some questions and the boy told him, "I learned that from Smoky. Smoky, the Fire Clown, came to our school a few years ago." So Rogers felt very good about it. He knew whether they were getting it, whether they were actually practicing the thing he wanted them to, with the result that he felt encouraged and he continued it; and I think it is a splendid work.

There is one thing I want to tell you about in connection with a stunt and then I am through. This is in connection with child work. I wish the boy that I have referred to was still in the audience. He was sitting there. If you will all attend the banquet tonight you will hear him. Safety Sam from Safety Town and Ready Eddie and Handy Andy. It is a broadcasting stunt that Gerard started in St. Louis. He extended it to the four limits of the country, the idea being that he wants to broadcast little safety stories to children, as a radio program once or twice a week. If you will write in and say that you listened to Safety Sam's story, we will send you a pledge card and a button and you can see it. He has grown to such proportions that he now has 390,000 members.

Handy Andy and Ready Eddie are the two boys that help get this safety work over to the children. I don't think there is any doubt that here is a corking stunt, to keep continually before the minds of children the hazards that are to be found on our streets and at play.

I don't know whether I have fitted in with your program or not. When I was asked to do this, I think it was with the idea of giving you a little cross section, or a little picture, of what a community can do and is doing in a good many of the local council cities to try to impress the public and the people with the importance of industrial safety, home safety, fire prevention, public safety and child safety—all those things we know control and have a very definite bearing on the community accident rate. We want to have our communities safety-conscious. We believe that you can strike specifically at some of these groups. If we can get the whole community thinking in terms of its accident problem and what to do to correct or solve it, or at least control it, why we will have a community which will have a very favorable accident rate and will be a happier place in which to live.

I want to say to the Construction Section that we have had the finest sort of cooperation on the part of the Section of the A. G. A. in Memphis. We were very happy to participate or cooperate in a meeting which they conducted last fall. We believe that through meetings like that a great deal of good can be accomplished, and I think you will find the Safety Councils willing and eager to co-operate and participate in your accident prevention programs. That is what we are there for. We want to help, and we believe that by working together we can accomplish a good deal.

CHAIRMAN HARDING: I am sure Mr. Penland has brought out at least two points for the Construction Section. As construction men we are very often apt to form the habit of our business and our business only. He has brought out one thing, that every effort should not be confined solely to our business, but our duty and our obligation belong to the community as well as to our business.

Another point that struck me was the appeal through the children; what a field that must offer for getting over the safety idea to the men! In some way the construction men can be keyed up through the little children at home. There is no question but what it will be conducive of very big results.

Gentlemen, the time is growing short. I am going to proceed to the next number on the program, "Protecting the Public," by Mr. Siegfried Langner, of the United States Fidelity & Guarantee Company, Chicago, Illinois.

Protecting the Public

Siegfried Langner, Industrial Engineer, United States Fidelity and Guaranty Co.,
Chicago, Ill.

By protecting the public the contractor protects himself. The value of good-will cannot be overestimated and progressive business people are realizing more and more the advantages derived from catering to public opinion and considering the public welfare.

Lawsuits are expensive. Insurance rates are based on experience for which the individuals carrying insurance are responsible. Investigating accidents takes valuable time of foremen and superintendents. An injured person must usually have immediate medical attention. The time of the superintendents and foremen who are present is just as valuable as the doctor's time. The insurance company pays the doctors and lawyers, but contractors pay the superintendents and foremen. The contractor contributes largely to the expense of gathering legal evidence. We wonder why we have such large overhead costs. Accident costs not covered by the insurance policy are not usually given their due importance. It is safe to say that in the long run these costs amount to more than the losses covered by the insurance policy. There are many accidents and near accidents which result in no

cost to the insurance company, but which interrupt the production schedule and take a great deal of time from the contractor's employees. Safety measures are certain to eliminate a large majority of these accidents.

There is an advantage gained from protecting the public which should not be overlooked. The employees are simultaneously protected. It is assumed that every executive appreciates the material advantages gained by the protection of his employees. I have found that large contractors readily see the wisdom of this work and it is the small contractor who is more likely to be lax.

Competition is a wonderful stimulant to trade and there should be competition in order to keep things moving in the direction of progress, but in order to afford public protection we must have *some* competition. Today we are in an era of speculative building and there is a tendency to shop prices, which develops into cut-throat business which leads to disregard for the safety to which the public is entitled. For example, there is an instance where a large city contractor submitted his bid for a job and later discovered he had omitted his profit, his confirmed price being the bare cost of labor and material. He felt sure of obtaining the contract and was greatly surprised to learn upon interviewing the owner that his competitor had taken the job for 10 per cent less than his cost. This was done without refiguring or changing, just for the sake of getting the job. The contractor who takes a job under these conditions cannot afford the safety measures that are required and always tries to follow other methods, which have proved disastrous in the end. When the owner realizes that cheap competition does not pay, we will have gone far in a start toward protecting the public.

Isolation of the Big Construction Job Desirable

Of course, the most complete protection would materialize from isolating the public completely from the range of construction activities. Streets should be closed whenever practicable. In some parts of the country it is the practice on large jobs in heavy business districts to carry on hazardous operations such as hoisting heavy material and blasting at night or in the early morning. It is reported that this was done in constructing the Paramount Theater Building in New York City. The light pedestrian or vehicular traffic existing at these times facilitates such operations. Since it is not practical in the majority of cases to follow this procedure, it is necessary to analyze hazards and eliminate them whenever possible. Some people think that accidents just happen, but in reality every accident is caused. You can analyze any accident and find that the responsibility rests on a person who didn't think or who took a chance. Is it ever impossible to eliminate a hazard which comes to our attention? It is the duty of every executive who thinks that a particular hazard is inherent to his business and cannot be eliminated to ask for advice. Unfortunately too many contractors do not appreciate this; they think that because they cannot see a remedy there is none. The day of the jack-of-all-trades is gone. Today we are accomplishing things never dreamed of twenty and thirty years ago. This is due to specialization. In order to be successful today we must specialize in this new idea of safety and its promotion.

Children are the greatest sufferers and contribute the largest portion of public liability cases. In the child's mind a construction job is an ideal playground. We have a case of children playing in a sandpile located near an open manhole. One of the children sliding down the pile head first fell into the manhole and fractured his skull. In another instance some small boys were walking the edge of a mortar box which was left unprotected. One of the boys lost his balance and fell into the box, receiving third-degree burns on his body and limbs. One of the burns developing to such an extent that the tissues were eaten away from the knee to the bone. The ultimate results was a 50 per cent loss of one of his legs. On one of our risks,

children were allowed to play in the vicinity of the work during the working hours. One child was walking under the concrete mixer as the hopper was lowered. This resulted in a fractured skull. Children are continually being hurt while playing in piles of stone, brick and other material. If they are allowed to take wood away from the premises, this should be put in a place for them where they would not be exposed to hazards of the operations. These problems can best be met by isolating the job as far as possible by fences and railings and by educating the employees to the extent of discouraging their friendly relations with children around the premises.

Probably the most common cause of serious accidents to the public resulting from construction operations is that of falling articles such as planks, tiles, bricks, tools, hot rivets, etc. We have a case where a heavy windstorm blew a plank from the top of a building which was so near completion that the canopy over the sidewalk had been removed. The plank fell, hit the sidewalk, and on the rebound struck a woman breaking her hip. Tools and material should never be left in a position where vibration or wind would cause them to fall. Hot rivets should always be thrown toward the center of the building. Extreme care should be taken in constructing staging, hoists, etc. Trash chutes should be located so that the openings will be isolated as far as possible. Mechanical equipment on a job should be given frequent rigid inspections. Derricks, engines, cables, etc., should not be used to the point where they fail mechanically.

Fundamental Knowledge of the Strength of Materials

Every man connected with the design of hoistways, stagings, landings, runways, canopies, etc., should have a fundamental knowledge of the strength of material. The man on the job who designates work for the different apparatus should be familiar with the safety limits of the apparatus. Superintendents and foremen should be equipped with charts and tables showing the safe loads of the different mechanical equipment on the job. They should be told how to determine when ropes, cables and other equipment have depreciated to the extent that they are unsafe. Employees should be educated to watch for any conditions which might result in an injury to one of the public.

There are a great many causes contributing to the large number of cases of persons falling. Walkways should be kept in repair and there should be no holes or loose boards. Leaky waterlines in the winter time result in ice-coated walkways. These conditions invite groundless as well as justified cases of public liability. All protruding obstructions should be well marked, no loose material, tools or equipment should ever be left in the temporary sidewalks or walkways used during construction operations. Wherever railings are used they should be strong and substantially constructed to serve for something more than just a guide.

On one occasion we had a claim resulting from a woman who while attempting to board a street car fell into an excavation made for a sewer line. The street had been closed to traffic and the ditch was guarded by means of planks laid across small piles of brick about two feet wide spaced at intervals of approximately eight feet. Since these planks were simply resting on the bricks they were easily pushed away. While attempting to board the street car in company with a crowd of other people the injured woman was pushed against one of the loose planks and fell accompanied by the plank into the ditch. The plank contributed to her injuries. A lawsuit developed which resulted in her collecting for damages to herself and clothing. There are many hazardous conditions around a job which can be remedied by the night watchman. He could repair holes, loose planks in the walkways and straighten out protruding objects. It is important that a responsible person be employed as a night watchman, one who can see the wisdom of this work and will take it upon

himself to look for and eliminate as many hazardous conditions as possible during his working period.

Construction operations invite trespassing. There is no reason why there should not be a "No Trespassing" sign on every construction job. Superintendents and foremen should know when there is a stranger on the job, and instead of ignoring him should try to ascertain as soon as possible his business, and if he has none send him away.

In general, we have a great many accidents occurring from blasting, premature explosions, overloading canopies, cavings, nails and glass, hoisting heavy material, etc. I think the case of protruding nails should be emphasized. This is a common hazard which often results in a very serious condition, such as infection, which may cause amputation or even death. It is a simple matter to eliminate these nuisances if given attention. The contractor is seldom held responsible for motor vehicle collisions caused by blind corners, created by storing construction equipment and material in the street. However, he is morally responsible unless he puts up proper signs, warning drivers of the condition. Material which is protruding into the street should be marked and well lighted at night.

Three Principal Groups to Be Influenced

In a broad sense, education is the fundamental solution of these problems. When research and experience has proved a certain theory, any reasonable person will have faith in that theory if it is presented in the right manner. There are three principal groups, each of which must be educated in a different way, and each must be given a good reason why it should adopt safety measures. The first group is made up of architects, engineers, contractors and those officials responsible for the methods used in building. The contractor must be made to realize his responsibility to the public and his duty to himself. He can be reached through his trade journal, through his association with other contractors, and through sad experiences which are bound to come to him and others if they do not heed the call of safety.

The second group is the public. It is far more difficult to bring before the public the importance of avoiding construction operations. Complications of civilization have created innumerable hazards with which the public is unfamiliar and it will be a big job to thoroughly acquaint them with these hazards. The best plan is to keep people away from construction operations as far as possible. This can best be accomplished by teaching them that construction operations are hazardous. Education is a slow process and takes considerable patience. We are trying to sell an idea. We must take advantage of those selling conveyances which are at our disposal. We must advertise. We must give safety publicity at every opportunity. We should have safety organizations in every community. All news items dealing with accidents should be brought out with emphasis and contain safety comments. Safety should be advertised with the purpose of having it voluntarily adopted and not with the idea of inflicting it against the individual will.

The third group, the employees, must be made to realize that an important part of their job consists in regard for the public, regard for their fellow-employees and regard for their own safety. The most advantageous time to impress these men is when they are applying for work. If on being questioned as to their attitude toward safety they indicate favorable reactions, they will have no complaint when criticized for their carelessness when on the job, and it will be easier to organize them for safety meetings. It should be emphasized that a careless employee is a liability rather than an asset.

This problem should be dealt with from two angles. First from the humanitarian standpoint, and secondly from the standpoint of economy. Every individual can be convinced on these two points. Every employee should be made to prove

that he is a safe worker and the unsafe worker made to learn that he is not wanted until he has learned that safety is part of his job. To make a job safe it is necessary to have men who realize the importance of safety. When the employees are all on their toes and pulling for safety the most practical provision has been made toward the solution of our problem, protecting the public.

CHAIRMAN HARDING: Is there a minute or so for discussion on Mr. Langner's paper?

SECRETARY ROBINSON: There is one member of our Section who is not with us at this Congress, due to illness in his family. I am referring to Mr. Austin of the W. E. Wood Company, who was chairman of this Section for two years, and I don't know of any one who has accident prevention closer to his heart. I don't know of anyone who has done more in promoting accident prevention work in the Construction Section than Mr. Austin. I think it would be very appropriate that this Section send him a telegram letting him know that we have missed him at this Congress. I think this is the first Congress he has missed for some time.

WILLIAM F. TUBESING (William F. Tubesing Company, Milwaukee, Wis.): I second the motion.

CHAIRMAN HARDING: Mr. Austin has been a very faithful worker on the Construction Section and I am glad you made that suggestion. He spent a good deal of time and effort in the Construction Section. Will the secretary telegraph Mr. Austin? I understand he was not able to be here on account of an accident in his family. I think the Section would do well to go on record by sending a telegram to Mr. Austin.

Commendation for the Work of Mr. Austin

F. A. DAVIDSON (American Safety Device Company, New York, N. Y.): It is not often we have an opportunity to say what could well be said about Mr. Frank Austin in connection with safety. It has been mentioned in this motion that he has been a faithful officer of the Section, and so forth. He has done far more than that. I am sorry occasionally that I can't speak what I have in my mind with well chosen words because Mr. Frank Austin a most exceptional individual. The work he has done for safety is far more than any routine work or work as an officer in connection with our Section here. Mr. Austin's work, in my mind, can well be described as the work of a great man. There is no individual in the whole construction industry who has done so much for accident prevention. Mr. Austin is the president, and has long been one of the chief operating officials of his company, a large company in Detroit. Year after year, when numerous important individuals in the construction industry were sending down young men, assistants and so forth to pick up ideas and contribute to the Construction Section meetings, Mr. Austin, at a cost which I have realized more and more, has come down to these meetings in person.

He did more than any other single individual to promote accident prevention when the Construction Section was a pretty rugged, thin, red line (as Kipling said), a thin red line of chaps around here (and even today we are just getting started), and Mr. Austin, more than any other man, deserves the credit for the progress in accident prevention made in the construction industry of America.

CHAIRMAN HARDING: Now we come to the close of the Construction Section, the Tenth Meeting. I want to take this opportunity to thank Chicago for the welcome they have given us here. I want to thank the speakers who have contributed to these two sessions. I want also to thank the members of the Executive Committee who have served during the past year. I am sure any progress or any accomplishments that have been made in the Construction Section are due to the members of the Construction Section aside from the chairman.

In closing I want to bring before you the need, and more than the need, the necessity, for the cooperation of you members of the Construction Section of the National Safety Council. The success of the Construction Section depends not only upon the individual and collective efforts of the Executive Committee, but the burden also rests on your shoulders. The National Safety Council was organized some sixteen or seventeen years ago, at a meeting of some forty individuals representing perhaps forty different industrial activities, who got together in the face of some legislation and talked accident prevention. They didn't know whether it was going to cost them a million dollars or make a million dollars for them, but they got together. After talking this thing over they realized they must appoint one man whose duty it would be to search out, answer questions and ask questions on what these forty individual concerns were doing toward accident prevention work. They determined upon a man who was to devote his full time to it. One of the forty men would say, "Here is my problem." In turn the other thirty-nine would get this question. Maybe he got two responses and maybe he got thirty-nine responses. Those in turn were sent back to the original man who asked the question.

Those became quite interesting. Some of the industrial concerns put them on their bulletin boards or other boards in their plants so that the men might see them. The men took an interest in them, would read them, would read the first one with a great deal of interest and enthusiasm. They would read the second. Perhaps at the third or fourth they would glance at it and turn over a few pages and say, "Well, that is too long," and then they would pass on. Complaint was sent back, "That information is too long, condense it a little."

That was done. Suggestion was also made that they illustrate the point that was to be brought out. That was done. That was the inception of the poster as we know it today. These questions that were put before the paid man became numerous, the answers became quite lengthy as various problems were brought up. After a while they were bound up and sent out to the members. That was the start of the NATIONAL SAFETY NEWS.

The reason I have brought this up, gentlemen, is this: You have a problem and I have a problem and this man over here has a different problem. This man has been up against the same problem and has solved it. This man over here has done the same thing. If you will bring your problems to headquarters they will be analyzed, your questions will be answered. You will get the benefit of the National Safety Council's research. You will get the benefit of the individual members who have gone through the same thing. The National Safety Council, after all, is nothing more or less than the hub of a wheel in collecting and dispensing accident prevention work, and we as a Construction Section have our own problems. Our individual members have their own problems. Bring them before us. If we can't answer them we will admit it, but we won't drop the subject there. We will try to devise ways and means for answering.

And with this parting thought we will close this session. The strength, the growth and importance, of the Construction Section rests upon the members of the Executive Committee. We will try to do our part. Will you?

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Electric Railway Section

New Section Officers

- Chairman*, A. W. KOEHLER, The Milwaukee Electric Railway and Light Co., Milwaukee, Wis.
Vice-Chairman, H. K. BENNETT, United Electric Railways Company, Providence, R. I.
Vice-Chairman, E. K. EASTHAM, The United Railways of St. Louis, St. Louis, Mo.
Vice-Chairman, MELVIN W. BRIDGES, Chicago Rapid Transit Company, Chicago, Ill.
Secretary, J. E. STOTT, Georgia Power Company, Atlanta, Ga.
Poster and Slide Committee Chairman, L. R. BROWN, New York State Railways, Rochester, N. Y.
Membership Committee Chairman, W. H. BOYCE, Pittsburgh Railways Company, Pittsburgh, Pa.
Publicity Committee Chairman and News Letter Editor, BUELL W. NUTT, The Safety Equipment Service Company, Cleveland, Ohio.
Program Committee Chairman, GLENN H. SHAW, Northern Ohio Power & Light Co., Akron, O.
Engineering Committee Chairman, W. F. HANNA, United Railways and Electric Company, Baltimore, Md.
Executive Committee, THE OFFICERS AND—
R. W. EMERSON, The Cleveland Railway Company, Cleveland, Ohio.
G. T. HELLMUTH, Chicago North Shore and Milwaukee Railroad Company, Chicago, Ill.

Retiring Officers

Chairman, R. W. EMERSON, The Cleveland Railway Co., Cleveland, Ohio; *Vice-Chairman (Motor Bus Operation)*, A. W. KOEHLER, The Milwaukee Electric Railway & Light Co., Milwaukee, Wis.; *Vice-chairman (Interurban Transportation)*, H. K. BENNETT, United Electric Railways Co., Providence, R. I.; *Vice-Chairman (Urban Transportation)*, E. K. EASTHAM, United Railways of St. Louis, St. Louis, Mo.; *Secretary*, J. J. CONNORS, The Tennessee Electric Power Co., Chattanooga, Tenn. *Committee Chairmen: Program*, SAMUEL H. REID, Bureau of Safety, Chicago; *Poster*, J. E. SCOTT, Georgia Power Co., Atlanta, Ga.; *Membership*, W. H. BOYCE, Pittsburgh Railways Co., Pittsburgh, Pa.; *Publicity*, BUELL W. NUTT, The Safety Equipment Service Co., Cleveland, Ohio; *Recommendations*, A. L. HODGES, The Brooklyn City Railroad Co., Brooklyn, N. Y.; *Cooperating with Claims Assn.* A. E. R. A., G. T. HELLMUTH, Chicago North Shore & Milwaukee Railroad Co., Chicago, Ill.; *Engineering Representative*, CLINTON D. SMITH, Beaver Valley Traction Co., New Brighton, Pa.

Tuesday, September 27, 1927

RALPH W. EMERSON, Chairman
Vice-President and General Manager, The Cleveland Railway Company,
Cleveland, Ohio

The first session of the Electric Railway Section, National Safety Council, was called to order at nine-fifty o'clock by the chairman, Ralph W. Emerson, vice-president and general manager, Cleveland Railway Company, Cleveland, Ohio.

CHAIRMAN EMERSON: It is gratifying to see such a large attendance at this Sixteenth Safety Congress. At a convention held in Boston some eight years ago, the Electric Railway Section was represented by less than ten persons. In the years which have intervened, there has been a steady and very rapid growth in our membership. Such a phenomenal growth must have had a reason. I think the principal reason is the fact that the railways of the country are coming to realize the necessity of systematic accident prevention work as a very vital part of their operation. They are devoting as much time and attention, probably, to this new activity as they do to any other function of railway operation.

It is true that many railway properties have been slow to recognize the vital necessity for combating, in a systematized way, the conditions existing on our streets and highways; a condition which has been brought about through no activity or fault of our own, but which is the outgrowth of the tremendous increase in the use of gas propelled vehicles and the necessity for speeding up operation with safety.

The fact that our membership has grown in such a degree is evidenced by the fact that today we have over two hundred properties represented, drawn from all over the United States and Canada. The fact of this membership indicates that they recognize in the National Safety Council a medium which is most helpful to them in carrying on their individual activities.

I trust that you gentlemen will find the program which has been prepared for you of great helpfulness. Like modern dresses, we have tried to make it long enough to cover the subject and short enough to be interesting. We want the meeting to be snappy. We have allowed ample time for discussion, and I hope that anyone here who has a question in his mind about any paper will not hesitate to ask that question, and I hope that he will find the answer.

We are going to discuss a great variety of subjects. Our time is more or less limited, and in order to hold ourselves down to the limitation, I may have to call on this device here on the table which you all recognize. It may be necessary for me at times to turn on the red light. This is a safety meeting, and I want it to be absolutely safe for the audience.

We will now proceed with the presentation of new members. I would like to ask the representatives of the various delegations here to please rise and present the men they have brought with them.

(The Pittsburgh delegation arose.)

CHAIRMAN EMERSON: Are there any other delegations here?

(The delegates from St. Louis arose.)

(The Milwaukee delegation arose.)

CHAIRMAN EMERSON: We have a representative here from Canada. I have a letter from the Canadian Electric Railway Association stating that Mr. Arthur Gaboury is representing the Canadian Safety Section. Will you please rise, Mr. Gaboury?

Are there any other delegations that are newcomers?

(The Chicago, South Shore and South Bend Railway delegation arose.)

CHAIRMAN EMERSON: I understand that your property will be represented at each session of the Section with a different body of men.

Are there any others, individuals or groups that are newcomers?

(P. J. McGrath of the Amalgamated Association of Street & Electric Railway Employees of America presented himself.)

(M. Pasche of the Chicago Surface Lines, Chicago, Ill., presented himself.)

H. A. BRIGGS (San Antonio Public Service Co., San Antonio, Texas): I am from the San Antonio Public Service Company. I am equally divided between electric railway and public utility.

(G. L. Robertson of the Alabama Power Co., Montgomery, Ala., presented himself.)

(W. L. Fagan of the Illinois Traction System, Springfield, Ill., presented himself.)

(T. H. Kendrigan of the Public Service Company of New Hampshire, Manchester, N. H., presented himself.)

(W. J. Harvie of the United Traction Company, Albany, N. Y., presented himself.)

(F. W. Flannigan of the Chicago, Aurora & Elgin Railroad Company, Wheaton, Ill., presented himself.)

Reports of the Section Committees

EDWARD McMORROW (Amalgamated Association of Street and Electric Railway Employees of America, Detroit, Mich.): I claim a double representation. I am a member of the Pittsburgh delegation as well as being the representative of the American Association of Street & Electric Railway Employees of America.

A. J. VAN BRUNT (Public Service Corp. of N. J., Newark, N. J.): I want to say that the Public Service Corporation of New Jersey is very ably represented here.

CHAIRMAN EMERSON: We will now proceed with the reports of committees. I will call on Mr. Reid who has something to say to us about the Program Committee.

SAMUEL H. REID (Bureau of Safety, Chicago, Ill.): Arrangements have been made for the members of this Section as well as the Public Utilities Section to visit certain points of interest on Thursday afternoon. One trip is to the new Crawford Avenue Station of the Commonwealth Edison Company, which is, I think, the largest in the world. The other is the Chicago By-Products Company, which is about the last word in gas station construction and operation. Another trip is one or two of the shops of the Chicago Surface Lines, and part of the new shop of the Rapid Transit Company at Niles Center. We have arranged for free transportation to these points of interest.

CHAIRMAN EMERSON: Mr. Stott, will you give us your report of the Poster Committee, please?

J. E. STOTT (Georgia Power Company, Atlanta, Ga.): During the past year, two electric railway posters were issued each month. Very few suggestions for electric railway posters were submitted to the Poster Committee or to the National Headquarters. To those who did offer suggestions, the committee want to give thanks. Those who did not supply any ideas are urged to cooperate with the new Poster Committee and give them some material on which to work.

Posters play a part in accident prevention, the same part that advertisements play in selling the product. It is the silent salesman selling safety. The more and better posters we have, the more interest in accident prevention work we will create. Ideas are needed.

The new Posters Committee can usually think of new subjects, and can manage to get out a few each month. They may or may not, however, be the kind needed by the member companies. When every member of this Section takes advantage of

the opportunity to offer suggestions, the Poster Committee can publish more and better posters.

CHAIRMAN EMERSON: Mr. Boyce, we would like to hear from you in regard to your report on the Membership Committee.

W. H. BOYCE (Pittsburgh Railway Company, Pittsburgh, Pa.): I am very sorry, but I didn't know you had me scheduled to make a report.

I know this: That we lost ten old members and took in eleven new members. Fortunately for us, the majority of these that were lost were comparatively small companies, while we took in such companies as Winnipeg, Canada, Toronto, Canada, Brazil and Australia.

Thanks to Mr. Emerson and a number of the District Chairmen who agreed to assist me in this work, we have been able to make the record that Mr. Ernst will tell you about. I dictated one letter, and Mr. Ernst did the rest.

F. W. ERNST (Pittsburgh Railway Co., Pittsburgh, Pa.): The New York State Railways is new. The Department of Street Railway in Detroit is new; and that, by the way, is just one section. The Chicago, South Shore and South Bend is new. The Melbourne and Metropolitan of Australia is new. The Anglo-Argentine of Buenos Aires is new. The Toronto Transportation Commission of Canada is new. The Central Power and Light Company of San Antonio, Texas, is new. The Pere Marquette Railway of Detroit is new. The Cleveland, Southwestern Railway and Light Company is new. The Lake Shore Electric Railway Company of Cleveland is new.

Fifty-Seven New Railway Property Affiliations

CHAIRMAN EMERSON: I would like to ask Mr. Boyce about the railway properties that are affiliated with public utilities. I understand there are quite a number.

MR. BOYCE: There are 57 new affiliations, I believe.

MR. ERNST: As a result of our writing to various roads, we found there were quite a number that already belong. We also found a number who were already members of some utility corporation; 60 of them, I believe.

MR. BOYCE: I want to say this. That the most surprising thing to me is to find a small company, which would naturally mean a comparatively small membership fee, that says they cannot afford to belong to the National Safety Council. That is their excuse. One reason they give is, the receipts are too low. Another reason is, expenses too high. Probably a third excuse is, the company is in the hands of receivers. I ask you gentlemen here, boosters for safety, how do they expect to keep their expenses down and out of receivership if they don't belong to the National Safety Council and keep their accident expenses down through every avenue that is open to them?

CHAIRMAN EMERSON: Mr. Nutt, will you please give us your report on the Publicity Committee?

B. W. NUTT (Safety Equipment Service Co., Cleveland, Ohio): I assure you it has been a great pleasure to get some publicity for this Section. I think you are more or less familiar with what has been done. The getting up of the News-Letter was the one important thing we did this year. The changing from the mimeographed letter to the regular printed pamphlet was a big improvement.

We have also been very successful in getting into the various trade journals articles on safety. Probably a great many of you men have read them. We were also successful in getting the NATIONAL SAFETY NEWS to publish, I think, three major articles. Usually it is difficult to get more than one. We were successful in getting about three. I think all told we had something like 14 articles devoted entirely to safety in other magazines.

Our efforts have been helped along very much by the members of the Section. I don't know very much about railway operation. I had some fine cooperation

from the men who are capable of discussing the problems in this Section. I wish to thank those who did contribute for their time in getting these articles up.

I think a considerable amount of good can be done by furthering safety not only in the trade papers, but in other journals generally throughout the country. Newspaper articles could be very well worked up, inasmuch as you are in such close contact with the public. If you will make an effort to see that some of these articles are put in the local newspapers, it will be very helpful. I think that is a thing that can be done by the membership generally better than by a Publicity Committee. If you will help do this, you will get in your own Section some very favorable reactions.

The articles that have appeared have covered quite a range of subjects in safety, and I hope that next year you will help your Publicity Chairman, whoever he may be, by contributing more of these articles. I have received a number of comments, showing that they are really appreciated. If, when you read your News-Letter, you find a request for some suggestions for news or something of that kind, make it your business to get in touch with your chairman. He will certainly appreciate it.

The News Letter in Pamphlet Form Approved

CHAIRMAN EMERSON: Mr. Nutt, I am sure the Section and the officers appreciate very much the splendid work you did on the News-Letter during the past year.

MR. NUTT: We were fortunate in being able to get the National Safety Council to agree to publish the letter in the form of a printed pamphlet. I just want to warn you that unless some drastic steps are taken this year, we will have to go back to the mimeograph form of letter.

CHAIRMAN EMERSON: Mr. Hellmuth, do you wish to make a report at this time on your connection as chairman of the committee on cooperation with the claims committee?

MR. HELLMUTH: In 1926, as a result of action taken in 1925, and again this year, 1927, there has been a committee on cooperation of the Electrical Railway Section and the Claims Association of the American Electric Railway Association. That committee on cooperation in 1926 was appointed to arrange for the appearance of the president of the National Safety Council (last year, Charles B. Scott), before the Claims Association at Cleveland, and Mr. Scott talked to the Claims Association on the object and purposes of the Electric Railway Section and Safety.

There is so much similarity between the work of our Section and the Claims Association that we have many points in common, and indeed we have many members of the one who are also members of the other. I see in the back of the room now my friend H. K. Bennett, who is a past president of the Claims Association, and who has been very active in work for the Electric Railway Section.

Not to be outdone this year by what was done last year, and through the work of Mr. Emerson, our chairman, who has been tireless in his promotion of the work of this Section, it has been arranged that Lucius S. Storrs, who is managing director of the American Electric Railway Association, will address us at the joint luncheon to be held on Wednesday.

There will be a talk before the Claims Association at Cleveland next week by James P. Barnes, president of the Louisville Railway Company on "The Value of a Local Safety Council." He is to be the representative of the Electric Railway Section at that meeting. That, of course, is as good a subject and presents as good a speaker as the Electric Railway Section could possibly want to tender to the Claims Association. Mr. Storrs also is to preside while here at a general meeting.

CHAIRMAN EMERSON: I think that concludes the reports of Committee Chairmen. Before proceeding with the regular program, Mr. Reid has an announcement to make.

SAMUEL H. REID (Bureau of Safety, Chicago, Ill.): I just want to say a word with reference to the program. I want to take this opportunity of expressing our appreciation to those who have consented to discuss questions and certain subjects before this Section. When this program was prepared, we selected those whom we thought were competent to discuss the subject assigned, and no man was selected because of any position he occupied; at least, that was not the determining factor; but selected because we thought he was qualified to discuss the question assigned to him. I want to express the appreciation of this Section and the Program Committee for the splendid way in which all of these men have responded to these requests.

CHAIRMAN EMERSON: If there is nothing further, we will proceed with the program as outlined for Tuesday morning. I will call first on Mr. Truman Curtiss, superintendent of Transportation, Chicago, Aurora and Elgin Railroad Company.

Synopsis of the Best Things Which Have been Brought Out in Previous Congresses

**Truman Curtiss, Superintendent of Transportation
Chicago, Aurora & Elgin Railroad Co., Chicago, Ill.**

The subject assigned to me would appear easy to write a paper on, but when we review the subjects handled during the past Congresses, as particularly for the past eleven years, we find them all not only interesting but each paper has filled some particular place in the building of this great Safety Movement, and if we were to eliminate any of them, it would be like removing a pillar from a great super structure. Probably never in the history of any organization has there been such a brilliant collection of master minds, all imbued with the spirit of the saving of human lives. These men were all thoroughly conversant with their task, because they came from the rank and file of the officials who handled the problems of accidents as their particular duty where they were employed.

During the 1916 Congress, we find the adoption of several safety rules that have been put into practice on nearly all transportation lines; all of which are recognized as foremost among safety achievements. I call your attention to a few of these:

First: Universal adoption of near side stops.

Second: Precautions against accidents at grade crossings by installation of uniform "Danger" signs. Providing crossing flagmen with a disc sign twenty-four inches in diameter painted white with the word "STOP" painted thereon in black letters five inches high, instead of the vari colored flags. The uniform paintings of all crossing gates with alternate diagonal stripes of black and white.

Third: Educational campaigns for employees to be followed by a regular organization of follow-up methods.

Fourth: Compilation of data in regard to car equipment, such as whistles, corrugated or anti-climbing buffers, controller lock, dead man's grip, signal lights for doors, safety signs on cars, safety tread on steps, tail lights, flags, fuses and many other details. Most of the Electrical Railway properties placed these safety recommendations into effect.

The mechanical part was easily handled; it only meant so much money for installation, but the education of the employees did not seem to progress as fast as it had been planned. Some properties sought to educate their employees by letters and printed matter while others called meetings of the employees and read a skillfully prepared paper to them and then dismissed them without

asking them to voice their opinions. Several properties appointed safety supervisors whose duty it was to enforce safety rules, but the individual interest was still lacking, the very thing needed for the success of this great movement. Mr. Hemming, of the Fort Wayne and Northern Indiana Traction Company, in analyzing the thing from time to time, stated he had found one obstacle and that was the fact that we were trying to cure all of the ills by mechanical devices. Mechanical devices are no better than the human factor behind them. It is the human factor we have to deal with and if that fails, your mechanical devices fail.

In the Congress of 1919, F. R. Phillips, superintendent of equipment, Pittsburgh Railways Company, in his talk on "The Human Factor in the Safe Operation and Maintenance of Rolling Stock," made an interesting reference to "The Personal Appeal" which so impressed me that I believe this paper would not be complete without it. He stated in part:—

Importance of the Personal Appeal

"A personal appeal, however, to be effective, must be clothed with sincerity and earnestness of purpose. We must neither preach, patronize nor command. Moreover, if a personal appeal to an individual is to be productive of the greatest good, we must first establish the right to make such an appeal. The mere fact of your being the superior officer does not give you that right. How, then, shall we establish that right?

"At this time of the golden harvest when the sower is reaping his reward, may we not with profit look to our farmer friend and his method? When he desires to secure the greatest result from his effort, does he take the seed haphazardly and plant it with the thought that since he is the owner of the seed and soil, therefore, by right of ownership and superiority to seed and soil, success must come? Hardly! He adopts more practicable and sane methods.

"He first chooses the field which gives the greatest promise and is best adapted to the particular crop under consideration. He plows and plows deep, and in a certain way, and at a certain time. He discs, harrows, and drags the soil, until it is mellow and sweet. In other words, he carefully prepares the seed bed. Furthermore, the seed is chosen after much thought and experiment before planting. Then he cultivates again and again, and in the fullness of time, his efforts are rewarded, we are told, an hundred fold. The plant endures through hail and wind and storm. Sometimes his efforts fail, but rarely.

"If we are to be successful in our relationships with men, we must eschew subterfuge and insincerity, and without other purpose than mutual good, meet them on their own plane. Cultivate their acquaintance until we know them and know them by their first names. Know their families, their associates, and home surroundings—their hopes, joys and sorrows. In other words, there must first be prepared the seed bed of mutual understanding. Judgment and due regard for the other's welfare and viewpoint must be exercised in planting the seed of desire, and the growing plant must be nurtured and cultivated until it blossoms forth into the maturity of accomplishment. Then, my friends, may the winds and storms of demagogism, bolshevism, and all other isms of social unrest come, a relationship founded upon such mutual confidence and respect will weather the storm.

"Perhaps the importance which a personal appeal to the individual occupies in safety work may best be emphasized by reference to the results of observations made by the writer during the pre-war period. A personal examination into the underlying causes of a large number of accidents of

major and minor degree covering a period of several months, showed that over 93 per cent were the result of man failure and less than 7 per cent to equipment failure. In practically all of the accidents charged to equipment, there were evidences of lack of proper care on the part of some individual. I can recall but two or three cases directly chargeable to defective material. One, a broken brake rod—one, a frozen air brake, and—one, a defective axle, which developed in the gear fit. The accidents under observation included collisions, derailments, controller burnouts, and others of a similar nature."

To me, the discussion by John H. Mallon, then safety engineer, Metropolitan West Side Elevated Railway, in that meeting, sounded the keynote for the stimulation of interest by the employees when he stated:

The Keynote for Stimulation of Interest

"It seems to me that cooperation in safety work on an electric railway should come from the top; that is, the example should be set by the heads of departments. Some years ago I worked under a general manager who had been with a steam railroad and his idea of railroading was to keep the various departments fighting all the time, so that they couldn't get together to frame up something. He was working, we now realize, against himself. The real big success of our organization is due to the character of our officials. Some three or four years ago our President, Mr. Budd, called in the heads of the departments and instructed them that in disciplining the men of whom they were in charge, the greatest patience was to be shown. 'Don't suspend a man on slight provocation; don't impose a hardship upon his family,' is our rule. We have gotten wonderful results. I met our president last Monday when he came back from his vacation. He was in a hurry but when he saw me he let the elevator go, came back and said 'Hello, Jack, how are you feeling?' That is the spirit that is all through our organization. You can't set yourself on a pinnacle because you are a step above the other fellow. That day has gone. When the boys began to return from the war, the president of our company said to me, 'I want to see any of those boys who come back. I want to say hello and to shake hands with them.'

"He would say to them, 'How do you feel? Do you need any money? If you do, Jack will fix you up.'

"If they needed any money I would give them advance pay until they had an opportunity to get settled again.

"I think the most effective way of getting real safety results is for the man who observes a violation of safety rules to tell the man at the time that he has done wrong. Strange to say, few of us have the nerve to do it. Instead, we go to the office and write a letter to some one else to tell him about it."

"Today we realize the wisdom of Mr. Mallon's statement and the far reaching effects of Mr. Budd's policies which have stood as a bulwark against all adverse criticism of the dissatisfied employee, until today a man who does not believe in safety is an outcast among the employees in all branches of the service by the action of the rank and file themselves. I do not know of any one act that would draw more disfavor from an employee co-worker than to have him scoff at safety.

Again in the 1920 Session, Mr. Mallon, then assistant general superintendent of transportation, Metropolitan West Side Elevated Railway Company, Chicago, forcefully brought out the following points in his paper entitled "Duties and responsibilities of Foreman and Men in Advisory Positions with Reference to the Safety of Men Under Their Jurisdiction."

"Selection of foremen: Attitude of chief executive reflects on subordinates. Interest must begin at the top, efficiency and safety are inseparable, the kindly word of caution registers"—and in closing he said, "I know of no better rule for the foreman to follow than: 'Do unto your subordinates as you would have your superiors do unto you.'"

With the education of the employees we should aim to impress them with their individual responsibility, that the matter of safety is their first duty which should receive their personal attention at all times.

I have reviewed with much interest the Bonus and Award Systems. I believe in some form of recognition of special service by an employee. It might be by letter, by personal compliment, by giving the employee a day's vacation with full pay or reimbursed for loss of time; but I hardly feel that it is proper to pay a man wages for doing his work and then a cash reward for safety. An employee should feel that safety is part of his duties and not a special duty for which separate money should be paid.

I believe that every accident should be thoroughly investigated by taking the employees involved in on the investigation. All details should be considered and a study made of how the accident could have been avoided. In all accidents there must be a cause, and a careful study will almost invariably reveal a contributing cause where an employee could have helped to avoid the accident, and the time to impress the employee is while the accident is fresh in his memory. Investigation of the minor accidents will no doubt prevent larger ones. Employees are not all alike, some of them may be reasoned with, an appeal to their pride may reach others, to compare the public with their own family may set other employees thinking, while others may need a more forceful handling; therefore no set rule of education can apply and it is the duty of the executive and supervisory forces to study their employees and try to reach each one individually.

The Comparison of Gross Earnings to Claims

In reviewing the past congresses I often noted the question "What part of your gross earnings is paid in claims?" Now that is a rather unfair comparison for safety, as nearly every Electric Railroad has different hazards in connection with their operation. It would not be fair to compare grade crossing accidents of an elevated railway with an interurban or street railway. Some railways have elaborate crossing protection while other lines have little or no protection; some lines have slow schedules as compared with the high speed lines. Therefore, we must study the existing conditions of operation before passing judgment as to whether they are doing their part in the promotion of safety.

The railway which I represent is an Insull property which is under the supervision of the Bureau of Safety with a regular organization of our employees. This Bureau has a staff of practical men as field men who attend all of our meetings. The field men are all different in their manner of addressing our employees so by this variation in the field men we can better convey the thought of safety to the minds of our rank and file. But even with the splendid organization and their years of training in their line of work, we feel that it is still our problem and that it is not for any individual or group to shoulder the burden; it is, rather, the load of all. That brings us back to Mr. Mallon's idea that safety must start from the top and permeate the entire organization to the humblest workman in his daily task.

CHAIRMAN EMERSON: We will now have a discussion on Mr. Curtiss' paper. I hope that the members here will take an active interest in this discussion. I think

we get as much out of the discussion as we do out of the paper. Don't hesitate to put any question you may have in your mind with regard to his paper.

W. H. BOYCE (Pittsburgh Railway Co., Pittsburgh, Pa.): I would like to ask Mr. Curtiss if he was quoting Britton I. Budd when he read about the suspension of employees?

MR. CURTISS: No, I was quoting from a speech made by Mr. Mallon in 1916.

MR. BOYCE: Do they suspend on the Chicago Elevated now?

MR. CURTISS: Yes. They do on our property, at least, which is under Mr. Budd's supervision.

MR. BOYCE: In connection with what you said about the safety work that is done on your property, I notice you have a system of crossing protection that I think is very fine and very effective, and it consists of the center installation of stop lights. These stop lights, as I remember them, are cut on and cut off.

Center Installation of Warning Lights

MR. CURTISS: Yes, there are two bull's eyes on a standard, and they flash on and off. The red light shows when the train is approaching. Then, there is a cut in the metal shield, which shields the light so that it can be seen in the daylight. Then, there is a green glass set in there so that the same bulb that lights the red in the light as you approach down the highway lights green on the side of the light to advise the motorman that the signal is in operation. Those stop lights are set in the center of the highway. They are protected by means of a concrete base which is large and substantial enough and striped black and white, so as to render it highly visible.

I think that is a very fine type of installation. They compare, for example, with the wigwag type of crossing alarm signal that you see set on the side of the highway. I think I prefer the center installation, and I can say that through this summer of heavy highway traffic and intensive train movement, they have proven themselves through the fact that there has been astonishingly few automobile collisions on those highways. I would like to hear that discussed.

MR. HELLMUTH: I think that is a proper branch of the paper that Mr. Curtiss has submitted. I want you all to remember, too, if you will, that you have come here from miles and miles and this is your opportunity to have a meeting of your minds. Bring out as many subjects as you wish for discussion. Confine, if you can, your discussion to the limits of the paper that is presented. Let us all get together and get to know each other.

J. M. LOFTUS (Pittsburgh Railway Co., Pittsburgh, Pa.): I would like to ask Mr. Curtiss if the cost of the signal just described is borne by the State Highway Department or by the railway company.

MR. CURTISS: The expense is borne by the railway company. However, the Highway Commissioners in the counties through which we operate agreed to leave an open space in their new pavement for these installations. They leave the opening in the center and that is filled in with the signal at the expense of the company.

MR. LOFTUS: Is your property in the whole state of Illinois?

MR. CURTISS: Yes.

L. R. BROWN (New York State Railway Co., Rochester, N. Y.): I would like to ask Mr. Curtiss the cost of that signal per crossing, and whether there is any difficulty at night with automobiles running into the signal which is in the center?

MR. CURTISS: The installation costs from \$1,300 to \$1,500 per crossing. There is no danger of anyone running into the signal at night. We have a yellow pilot light and a red flex 10 or 12 feet in advance of that. We have had two cases where automobilists ran into the signal, but in both cases the drivers were intoxicated, and we turned them over to the chief and they paid for the damage done.

G. R. WHITMORE (Illinois Traction System, Peoria, Ill.): I have consistently opposed the center installation of these signals. I think they produce more accidents than they prevent. They might prevent accidents with ordinary cars and trains, but I do think they produce accidents with automobiles. I favor the side installation but not the center.

In Peoria we have a center installation. I believe that most every week an auto crashes into that concrete base and injures two or three people. We are after safety all the way through and not for our individual companies only. That is the way I look at it.

MR. CURTISS: In answering your question the only thing I can say is that it hasn't proven so on our property. The standard for this signal is diamond shaped and the pavement is swung out around it in such a manner that the car would have to leave the pavement in order to strike the base.

I think that it adds to safety, inasmuch as one man going in the same direction as the preceding car cannot pass that car after it has come to a stop at the signal. The highway is just wide enough for one car to pass in each direction. In some places, we took the signal out and installed gates.

Deaths in Des Moines Due to Center Installation

MR. BOYCE: I would like to ask Mr. Curtiss if those signals are track circuited or operated from overhead?

MR. CURTISS: It is an overhead wire with a cut-in at a given distance from it.

MR. BOYCE: Trolley or track?

MR. CURTISS: We use the third rail; it is track contract.

D. W. FINCH (Des Moines City Railway Co., Des Moines, Ia.): We have the center installation in our city, and it is very unsatisfactory indeed. We have had at least ten deaths in Des Moines caused by center installations. We find that it is bad practice with us.

MR. CURTISS: We have no center installations in cities. We only have the center installations on the country roads. In the towns we use the gates. We have had the flashlights installed on the side, a sort of wigwag.

MR. BOYCE: I have just one other question. Who installs the signals and who stands for the damage?

MR. CURTISS: The Chicago, Aurora and Elgin Railroad Company install them.

MR. BOYCE: Are you responsible for aily damage done?

MR. CURTISS: We haven't had any as yet.

D. W. FINCH (Des Moines City Railway Co., Des Moines, Ia.): The signals that I speak of are installed by the railways themselves. At the dangerous crossings, the city installs them. As to the damages, the party who puts in the signal pays for it.

MR. BOYCE: You are only considering material damages. I am thinking of those ten deaths that you were speaking of. Is there any liability on the part of the company for those deaths?

MR. FINCH: No.

MR. BOYCE: On account of the erection of the signals?

MR. FINCH: We haven't had a case where it was on our own lines. These accidents happened on the lines of the steam railroad company, and there were damage suits connected with them.

EDWARD McMORROW (Amalgamated Association of Street & Electric Railway Employees of America, Detroit, Mich.): Mr. Curtiss, have you endeavored to have the authorities in the several counties where you operate bear the expense of those lights?

MR. CURTISS: No.

MR. McMORROW: The reason I raise that question is this: I am interested in

costs and it is one of the things where companies are charged with the installation and the liability as well.

As an employee of one of the oldest companies in this country, I hate to see them bear all these expenses. If we had nothing to protect but ourselves, it would be different. We are protecting the public, and we are running a necessary business, and I believe that this Section, represented by the many companies and associations, should start an effort to try and alleviate that enormous expense which comes from installing safety. If we are forced to install the safety device, the question raised by this gentleman from Pittsburgh will ultimately leak into the other expense resulting from damage to the individual or his vehicle that we are supposed to protect.

I am somewhat familiar with Mr. Curtiss' property and the country through which it runs. It seems, while we are seriously interested in the question of fewer accidents and the protection of life and property, and everybody seems to have a desire to pluck our industry, as an employee of one of those old companies, I would also like to get the fellow that needs protection bear some of the expense of it. I think the fellow running his automobile over the highways needs protection, and I think the authorities in these respective counties and municipalities should bear their reasonable share of the cost of these installations.

MR. BOYCE: Don't forget the safety platforms, too.

CHAIRMAN EMERSON: Does anyone else wish to discuss Mr. Curtiss' paper?

E. R. RAUCH (Illinois Traction System, Danville, Ill.): I am a motorman. We have these signals. My biggest problem is to get the public educated to stop when they see a red light. I would like some way of educating the public.

MR. CURTISS: In the city of Glenellyn we have the center installation, and at Manheim Road, which is a very busy thoroughfare, I noticed the people were disregarding the signals. I took it up with the Chief of Police. Now they have a uniformed officer there during the day. He takes them in if they don't observe the signal. A signal of any kind won't keep everybody off the crossing.

CHAIRMAN EMERSON: Before proceeding with the next paper, I understand there is a large delegation here from the South Shore. I wish the gentlemen representing the South Shore Road would please rise.

We will now proceed with the program, and I will call on Mr. Clinton D. Smith of the Cleveland Railway Company to read his paper.

Selection and Training of New Men and Their Relation to Safety

Clinton D. Smith, Superintendent of Personnel, Cleveland Railway Company, Cleveland, O.

Freedom has been taken to rearrange this subject to read, "The selection and training of new men in the sale of safe transportation." Safety must be the first consideration in our initial choice of applicants who are to serve as employees of the transportation industry.

The great advance of safety in transportation service calls for praise for the multitude of men and women who have worked so faithfully for humanity. The enthusiasm is so keen that we anticipate results which will be beyond comparison with present accomplishments.

In our desire that the advance be rapid, we gather here to check up on ourselves, to plan further, create new enthusiasm and analyze our problems.

A close study of the operation of our successful transportation companies reveals a fact, not new, yet not generally accepted. We find that management is securing satisfactory operating results from a scientific analysis of its problems. Each and every task is considered a job, is assigned a job number and given a position in a

priority list. By this method a problem must be solved: inspirations cannot die, initiative is rewarded, and all of the men involved learn to analyze this work with the purpose of eliminating lost time.

There is no mystery in science. The scientist merely observes facts, makes distinctions, draws inferences and passes judgments, but excels in his art by observing most accurately, distinguishing most clearly, inferring most safely and judging most soundly.

This habit of detail analysis that is now being adopted is worthy of our consideration in the selection and training of new men.

Is our accident prevention work, and particularly the training of our men, a little bit "hit and miss"? Is it possible that we organize a safety committee which is given freedom to function, but in its freedom, fails to reach the new man? Is it true that a new man is asked several questions regarding his ideas on safety, and, after squeezing through, is then called a safe man? Does the management merely express its belief in safety, and expect results without further effort? Does our investigation of an accident consist of indifferent conversation with the employee involved, or does it follow the order of the thorough research, demonstrated so forcibly to us last year; and moreover, are the results and conclusions given further analysis and made available for the rest of the employees? Our training of new men may be hit and miss or it may be scientific.

Three High Points in Training of New Men

In making particular comment on the training of new men, three items at least may be given special consideration.

1. Safety should be made easier to understand. It should be placed before the new man with the same assurance as mechanical instruction is given.
2. The responsibility of the training is one of management, and calls for as close daily follow up as any other detail of operation.
3. The employment manager is a powerful unit in the selection of a safe man, and should use his power to greater extent.

Taking up item number one. The new man usually is enthusiastic about his new work. If he has passed the regular requirements, the chances are that he is interested; the employment manager really has failed, unless he has secured a man who fundamentally shows interest. This new man is instructed in the mechanics of operation, to motor a car or to act as a conductor, and again, chances are that he is turned in as a satisfactory employee. The reason is that there has been something concrete about his instruction. He knows what happens when he notches a controller or applies air. He knows the results of changing gears, he learns the difference between smooth and rough starting or stopping of his power. With his enthusiastic mind he absorbs, although not all in one day, of course.

Are we making the safety instruction as easy as the mechanical? Perhaps we tell the new man that the safe employee is the man who thinks. Is there not a ton of challenge to that word, think? Should not our attitude be that the safe man is the one who analyzes, and should we not convince the new man in our instruction that we will analyze the accident prevention problem with him.

Think, in safety language means to "analyze", to "consider." Safety suggests freedom from danger, and the man who escapes danger, generally is the one who considers, who analyzes. May we not avoid the blind use of the word "think" and substitute, "Let us analyze?"

A new employee in his enthusiasm will welcome safety instruction, if it is given to him with enthusiasm and by a routine determined by proper analysis. If we wait until the employee has been with us a few months, and then casually tell him we have a safety program, he will treat it just as we give it, as something distinct from regular routine of operation and as something in which personal whim is a factor in his going along.

This brings us to the second item, the responsibility of management in the training of his employee as a safe salesman.

Success of any kind is obtained only by analysis, consideration of facts, planning, and the maintenance of keen enthusiasm. Success in safety is impossible without enthusiasm. This must come and be maintained by management. The general manager and other operating officials must make safety an operating problem, and put their enthusiasm back of it, just as in other successful practices.

The general manager surely has a keen appreciation of safe operation, of the qualities that he desires to see in a new employee who is to be his salesman. Of all employees, we expect the general manager, or his representative, to be most enthusiastic and it is from him that we should receive the greatest inspiration on company policies. Moreover, the general manager sincerely wants the new employee to have the same keen conception of safety and company policies as he himself. How is the new man to receive them? Surely, not by relay from general manager to superintendent to employment manager and to instructor? Each one of these, to be sure, should share the same high degree of enthusiasm as the general manager, but should not the general manager take time to see the new man before he becomes permanently set in the organization?

The Normal Reaction of the New Man

Let us think it over. A new man. He receives the usual instruction established by routine. He is talked to by various officials, and then, very early in his start as a regular employee, he has the opportunity of chatting briefly with the general manager. What is the reaction? I know how I would feel. Every word of the general manager would sink into my mind so deeply, that after I left the office, I would keep repeating to myself all he had said. I would start to analyze. I venture, regardless of the size of the company, that this practice, if followed enthusiastically, would reduce turnover, reduce accidents, create inspiration in the new man, all of which would be the stepping stone in the development of a salesman.

Third, and last, but not the least item, the employment manager. He is a corner stone. Employing a new man is comparable to the exercise of courtesy. Courtesy is of three varieties. First, the kind that we cannot swallow, discourtesy. Second, the form that makes us smile and feel happy that it is extended to us. Third, that large volume of indifferent courtesy.

There are many people who are not discourteous, yet do not stand out by the performance of any particular attentive act of courtesy. This class of people are not offensive, yet we do not call them salesmen.

The analogy in employing a new man is this. We do not take on the undesirable applicant. We readily employ those who stand out as being courteous, but also allow the indifferent class to pass because we do not know any particular objection.

We know by experience that in the great indifferent group there are those who prove themselves to be exceptionally courteous and we reason that out of the great group of employees who pass as indifferent there are those who might display wonderful sales ability; but the unfortunate part of it is that we pass a large number of the indifferent who develop as discourteous employees and generally as unsafe ones.

It is easier to say "Yes" than "No." When a candidate for employment is once started it is easier to let him travel on an indifferent course than to stop him, even though we may have some doubt as to his qualifications.

This all boils down to the need of having the employment manager make a most careful analysis of his qualifications of new employees. The process of selection should be so exacting that no one is passed along as an indifferent applicant.

The selection will be more painstaking then, perhaps as the practice generally increases, but when we start to appreciate the need of having a safe salesman, and

getting my best men to break in new men. It is a hard task. They don't like to do it. How do you do it?

MR. SMITH: I feel sure I can't answer your questions satisfactorily, because I haven't worried much about that. In my two months' experience with the Cleveland Railway Company, I have found that the road instructors have been with the company a long time. I imagine there has been no real problem in that connection.

CHAIRMAN EMERSON: I might say that on our property those who are given the work of breaking in new men receive additional remuneration for their work, and the men appreciate the fact that they are chosen for the reason that they are better qualified to instruct new men, and we are very glad to have those men. We pay them an additional ten cents an hour for work while they are breaking in new men.

MR. POWELL: I am glad you mentioned that. Ten cents an hour is quite an inducement. We pay an additional sum also, but not that much.

I would like to ask another question. Do you select the new men just by oral examination or have you a written examination? Do you use any of the so-called psychological tests?

No Psychological Tests Are Used

MR. SMITH: At the present time there are no psychological tests. The applicant sits down and has a chat with the employment manager, even when the employment manager knows there are no vacancies. He works on the theory that here is a man that six months from now when there is a vacancy may be a very desirable employee. After this chat with the applicant, which may run ten minutes, he is able to tell him that he will take his written application and should there be an opening at a later date so advise him.

At the present time, it is purely observation, talking with the man a sufficient time to find if he is interested in taking up street railway or motor coach work, but also talking with him sufficiently to bring out some interest in him. As referred to previously, it might be that the mere filling out of an application and the examination by the employment manager would not reveal the true worth of the man. But, in the course of a few minutes, he may show some signs of interest which would cause the employment manager to take him at the time or mark his application so that when he is in need of a good man he knows where to turn.

MR. ISHAM (St. Louis): I would like to hear from anyone present who does go a step further in the original selection of men for motormen and conductors. I believe that Milwaukee does, for one: not particularly a psychological test, but seeing this arrangement on Mr. Emerson's desk reminds me of articles I have read, a test of their reaction, how quickly they can react to dangers and so forth. That is coming to the front. We haven't adopted it in St. Louis. I would like to hear the experience of some of the other companies that are using it now.

W. H. BARNES (T. M. E. R. & L. Co., Milwaukee, Wis.): We use the system that the gentleman spoke of. Whenever a man in our employ has an accident for which he is chargeable, this test is looked up, and I am given his name. I compare his accidents with the test, and invariably I find that the test is correct. I think that is what you are trying to get at.

CHAIRMAN EMERSON: Won't you tell us what the nature of the test is?

MR. BARNES: I am not very well acquainted with the nature of that test. The educational department takes care of that.

G. T. HELLMUTH (Chicago, North Shore & Milwaukee Railroad Co., Chicago, Ill.): I believe it was first introduced by the Yellow Cab Company of Chicago. It was devised by Professor Snow of Northwestern University. I believe Professor

Snow was in the Department of Psychology there and later employed solely by the Yellow Cab Company.

It is a sort of time reaction test. It consists of taking a candidate for employment into a small room and sitting him at an instrument board and telling him that he has certain things to do, and that in the event anything unusual happens he is to move a lever or press a pedal, and then an electrical circuit is set up. There is a flash, or something decidedly unnerving happens, and a stop-watch—the time element—is then used. The stop-watch starts in motion when that unusual occurrence takes place and it records the lapsing of seconds and split seconds until the man responds correctly. That is the test, I believe, that the Milwaukee Company has in mind.

One Vital Point in Training Is Emphasized

DWIGHT L. SMITH (Chicago Rapid Transit Co., Chicago, Ill.): I can't speak of transportation employees because the men with whom I have to deal are the electrical employees. I cannot say anything of the methods used in selecting these men. But, as to training, there is one point which we believe is vitally necessary when we get a new employee. In general, our electrical employees are drawn from the class of men who have been employed rather in light and power work than railway work. There are a great many more men in light and power work than in the electric railways.

The majority of us operate on 600 volts direct current. There are some exceptions, to be sure. We find that the man who is used to light and power work is used to handling circuits either below or above that on which the electric railways operate, and that he has very little appreciation of the dangers (if you wish to call them such) or the means for handling this 600 volts. We always make it a point when taking on a new employee to call his attention to the fact that this power with which he is going to work is a rather peculiar beast; it isn't a low voltage such as 110 volts, and neither is it a high tension, which means certain death; it is betwixt and between, and contact with it will not necessarily kill him; in fact the chances are that it will probably do him no damage.

There are very few of us in the electric railway work for sometime who haven't got a shock and have told the story. There are certain precautions necessary that he does not need to take in other lines of work, and by calling that to his attention we try to fix in his mind that this is a little different from what he has probably had before, and we try to impress this upon him so that he will know something about the way in which it should be handled and take proper precautions.

G. H. SHAW (Northern Ohio Power & Light Co., Akron, Ohio): I would like to ask Mr. Smith a question. After the man has been trained and given road instructions, is he given a definite examination upon operating rules, safety regulations and so forth?

MR. SMITH: He is given an oral examination by the division superintendent. This examination is more or less of a final test to see if the man has absorbed his instructions as given by the regular instructor on the cars and also by the trainmen instructor. There is no regular examination, that is, no written examination.

E. K. EASTHAM (United Railways of St. Louis, St. Louis, Mo.): What is the average time, or have you a minimum time, for breaking in conductors and motor-men?

MR. SMITH: There is no definite fixed time. The average time would vary between ten days to two weeks. I suppose there is a minimum time, inasmuch as you would expect that a man could be broken in thoroughly for a number of lines operating from any one station in less time than approximately ten days. The ten

to fourteen days of training follows a three-day instruction period at the employment office.

MR. HELLMUTH: I think some of the western systems today are requiring anywhere from one to three months of instruction.

MR. SMITH: I am not familiar with the details. I really believe there should be a longer period. I also feel that there should be some compensation to the men while breaking in.

MR. EASTHAM: You don't give any compensation at all, do you?

MR. SMITH: Not while he is breaking in. I think every man ought to have a month to six weeks of instruction. We could devise a course of instruction for that length of time. It would be fairly difficult to hold the men without some compensation.

MR. EASTHAM: You would have to have some, undoubtedly.

Safety and Production Go Hand in Hand

M. PASCHE (Chicago Surface Lines, Chicago, Ill.): I have been following very closely Mr. Smith's paper and some of the other remarks. It seems very clear to me that Mr. Smith intended to bring out just this fact, that accident prevention and good operation go hand in hand and cannot be separated. It is absolutely impossible to separate the two in any railroad company.

I am just new in this work. I have come out of the operating department as a division superintendent of the largest car house, which car house did win the accident prevention contest in 1926. When I was brought down as the accident prevention supervisor, I said to myself, "How can we best discuss accident prevention without trying to go clean up to Heaven and over the men's heads?" I took the matter up with Mr. Evanson. He suggested that the way to do the job would be to find a simple manner of classifying the accidents, and then later on discussing them with the division superintendents, who in turn would receive an education on accidents.

Now, here is what we do, and I believe it is simple: We classify the accidents into three grades; one means questionable; two means not chargeable; and three means chargeable. I mark each and every one of these accident reports every day. Then, the next morning, they go to the division. When the division superintendent gets them, he has something to guide him. He then calls the man involved into his office as soon thereafter as possible, and discusses the accident with him.

He then calls me up and tells me that the man said so-and-so. Just about that time, the division superintendent is in the place of the trainman when he is talking to me. He is bidding his experience against mine. I am watching carefully every day. I ride a great deal on the cars. This is what I find. I find that our men do not sound the gong enough. I find conductors do not call the streets enough. I find that conductors do not look outside of the door enough to see whether there are prospective passengers close to their rear end. I believe if those simple points of operation are brought to their attention that we will get our story home.

I have taken as my slogan in the accident prevention department just this: Accidents are prevented by efficient operation; efficient operation means better service; better service means more business; more business means more and better runs.

I think that is what Mr. Smith has been trying to do on the Cleveland railways. We have on the Chicago Surface Lines accomplished this since this method has gone in, that in the month of June (I am just quoting from memory now) after we had been classifying accidents for 30 days in the month of May, we showed a decrease of 282 accidents over June of 1926; in the month of July we showed a decrease of 609; in the month of August we showed a decrease of about 645. This month the record is not so good, but it is still a decrease.

I believe the idea is correct, because it gives you an opportunity to discuss the

matter thoroughly with the division superintendent. It teaches in a way how to carry on his discipline, how to standardize on his work. We don't shoot any more in the dark. In other words, we try to find the condition surrounding the particular accident and what the man did.

We often have calls on cases where the report shows or indicates at least that it was a head-on collision. I contend that if a man sees another man coming down the street in an unusual manner that he should use exceptional care in approaching that man.

We sometimes ask the accident prevention department to make an investigation along that line and we are getting fairly good results.

J. H. MYRICK (United Railways Co., St. Louis, Mo.): I would like to ask Mr. Smith if they require their new men to stand a medical examination? Do you examine their teeth and so forth?

MR. SMITH: Yes, each and every employee is given a physical examination. It is not a very thorough examination. It is an examination which would reveal any defect which would interfere with the man operating the car.

We are going to have a dental clinic for all employees which will bring about the examination of the teeth by a company doctor.

MR. MYRICK: We have a medical dispensary in our general office. It takes care of all employees and their families free, and it is compulsory for the employees to be examined.

High Blood Pressure a Common Handicap

MR. SMITH: We are following a program which might be a compromise between present methods. We don't know what the final outcome will be.

MR. MYRICK: Our greatest trouble now seems to be, especially with the older men, high blood pressure. We have a great deal of that. By taking the examination when they should, it will probably eliminate that.

D. W. FINCH (Des Moines City Railway Co., Des Moines, Ia.): Do you have an examination for sight, hearing, and color? How often do you have these examinations?

MR. SMITH: There has never been any re-examination, although the policy of having one is sound, and undoubtedly a program will be arranged for that.

MR. FINCH: In our experience, it would be wise for all of us to do that. We recently had an examination of our employees, all of them, and we found some startling developments. We found one man operating a car with one eye gone and the other very nearly gone and who couldn't distinguish colors. I think as a result of the examination that many of the motormen and conductors had to begin wearing glasses.

MR. SMITH: We have the examination, but we do not have any periodic re-examination.

CHAIRMAN EMERSON: In connection with this discussion, I understand Dr. Fisher is in the room. I wish Dr. Fisher would enlighten us a little.

DR. HART E. FISHER: I really just came in at the close of the paper, so that I am not thoroughly conversant with the discussion.

The companies that I happen to be associated with have been doing this for about 15 years. They require an examination every two years. The general employees are examined more frequently. Those that have defects are put in a tickler system, and those on that tickler system, every so often, according to the defects, are pulled in and re-examined.

We just completed an examination on one property and are now taking care of those defects. I might say that a man is operating a railroad under a hazard if he does not know the physical conditions of his employees, and especially of your front end men.

A simple medical inspection is not worth a row of pins. Forget about that. You want a thorough medical examination, the same as you get in your private factories, because the other things, the things that cause your disasters and cause your troubles, are the things that are never brought forward in a simple medical inspection. If the man is examined and put in physical shape, he is less hazardous and less liable to have accidents.

How often should the men be examined for color sense? Every man should be examined every two years for the special senses. Blood pressure is an insidious thing; if you don't have an examination, how do you know the man has it. He is very liable to fall down when he needs the complete control of all his faculties. Blood pressure is producing a lot of our accidents. You must have an examination on that. You can't be arbitrary on that blood pressure question. If a man's blood pressure is higher than normal, take him out, if possible, but if he has the symptoms that accompany it and after frequent observations you find that his symptoms are such that his blood pressure is equalized, you don't have to be afraid of him.

An Interesting Experience in Industrial Medicine

MR. HELLMUTH: Dr. Fisher happens to be chief surgeon of the companies with which I am connected. I have seen over a period of the five years or more the increasing number of employees who voluntarily come into his office for treatment. I wish Dr. Fisher would say just a word about what he is able to do for an employee to keep him in the service.

MR. BOYCE: May I say a word in connection with that? I had the pleasure of spending a half day with him six years ago. I want him to take into consideration that there are a lot of hard-boiled railway men here, and I want you in a few words, if you will please, tell them how you brought about this feeling of confidence in you and got the men to learn that you are doing a good work for them as well as for the company.

DR. FISHER: I am glad I am in the back of the room.

The first thing about bringing medical examination to employees, organized or unorganized, has been a very serious debate in the past. Why? Because medical departments and company doctors, as constituted in the old days, had an ulterior motive and purpose back of them; with the result that there was a lot of things done (not intentionally, a great many of them), and a medical department was looked upon as a place to take out those fellows who were radicals and the man that was getting too old to be in service any longer. That is the attitude that went around through medical department twenty years ago.

Then, since industrial medicine and surgery was only in its infancy (and it is only in its infancy now) a doctor was looked upon as a pioneer unless his value was proven. Now, in order to start with any company (and I don't care what the nature of the company is) you have first to sell your product; you first have to have salesmen to sell that product. Then, you have to have your company and your officials wholeheartedly back of you; to sell it to them first before you bring it to the employee. If you cannot sell the president of the company, you might just as well leave it alone. You have first to get wholehearted cooperation for what you intend to do.

Then, you take your employees into your confidence and tell them what you are going to do. I was just talking to a gentleman who is going to have the plan started on his railroad this month. I told him what I am going to tell you, that it is for detection of those incipient things that if undetected lead to accidents or disability on their part. You have to show them that it is not the company standpoint so much as it is their own. Tell them that the company wants the examination for their protection; they also want it because that man is going to be main-

tained in an efficient manner as long as possible, because it costs dollars and cents to break a new man in.

When an employee knows by past experience with your company that your medical policy is free and above board and you have nothing to cover up, and you show that by your actions, then that employee is very quick to adopt your methods and submit to these examinations.

Now, you cannot examine an employee with the idea that he is any different from a private patient. He must give all he can in courtesy and you must give everything you can in the way of human kindness. This hard-boiled egg business on examination and contact with employees is not the thing that brings success to a medical department or a medical policy of a company.

As to the employees' confidence in the medical examinations, we can say that over a period of some 15 years we can cite hundreds of cases where incipient diseases were discovered in time; that they were brought to the medical attention of their own doctors and as a result have been able to become a constant factor and work every day.

Then, we have the man that we keep under observation who comes in periodically. We had one man with a high blood pressure who was taken away from his front end work and put into another position earning the same money but doing less hazardous work.

The Health of Employees Should Be Known

You want and should know about the health of your employees. The employees want to know what their physical defects are. They are just as anxious as you are or I am to know what they are. I happen to be fortunate enough to have the confidence of the employees to the extent that their families come to me for medical attention. The number of children we have to take care of now is getting to be a problem.

We give the medical advice to them and suggest that they go to their own doctor. We, however, cooperate with them in every respect. If they haven't the means or happen to be financially embarrassed, we are glad to take the case over and give whatever aid we can.

We were the first industry to have periodical medical examinations. Our president had a big meeting, and all the men were invited. I was introduced at the time as a kid and was told to say from my own standpoint what I was going to do. I explained to them what I hoped to do. We started in with one man and one room. Today, we have a full medical department with some nine rooms, and we are going to take nine more rooms. We have 16 or 17 in our medical department.

Does it pay? It pays from the standpoint that safety engineers, coming in to check up the records of accidents, find fewer accidents in a place where medical supervision is in progress or in vogue.

Physical examinations in the transportation industry are absolutely necessary. I have two more papers to present this week. I am going to speak before the Public Utilities Section on Thursday, and my talk will cover this thing in detail.

I want to make a plea, that a medical man has a place with the safety organization; he is not a man that you should take lightly. You don't have to discharge the man out of the service; you can find a place where he will be less hazardous to himself and to his fellowman.

CHAIRMAN EMERSON: Dr. Fisher, we are indebted to you for coming in and enlightening us on this subject.

The time is growing late. We come now to the final paper of the morning session. I am going to call on Mr. Lemuel M. Brown, vice-president of the Interstate Public Service Company.

Courtesy and Its Relation to Accident Prevention

**L. M. Brown, Vice-President, Interstate Public Service Company,
Indianapolis, Ind.**

Safety is the first thing a passenger buys of a railway. You may think you are selling him transportation, but let him suspect your transportation is unsafe, and see whether he buys it. He wants to go safely from A to Z. He wants to go without risking an arm, a leg or his neck, and he will not buy unsafe transportation. The subject of safety, therefore, while perhaps an old and hackneyed subject, is nevertheless the most important thing an electric railway man, like myself, may discuss.

I should say the passenger buys three things when he buys a railroad ticket. He buys safety, then the transportation itself, and then comfort. Given all three, he is a satisfied customer. Substituting the word courtesy for the word comfort, we have the three essentials of railway service,—safety, transportation and courtesy; and I like to think of safety and courtesy as the "Gold Dust Twins" of the transportation business. They work together, and together they put over the job. Like pepper and salt, or cream and sugar, they work in pairs. They make the transportation dish more palatable to the consumer, our passenger.

Safety has been practiced on the railways since 1825, when the first steam train was preceded by a horseman carrying a red flag for the purpose of providing a safety zone ahead of the train. But the true worth of courtesy was never fully appreciated until after the abandonment of the "public be damned policy" in the early history of railroads and some public utilities. Today the terms courtesy and safety are used almost inseparably.

The need for courtesy has been emphasized so much of recent years because it brings peace, joy, happiness, contentment, safety and efficiency in all things. The practice of courtesy is the common sense application of the Golden Rule. Solomon said "A soft answer turneth away wrath," but "A grievous word stirreth up anger" and "A wrathful man stirreth up contention; but he that is slow to anger appeaseth strife."

The point at which courtesy should begin, not only in the prevention of accidents, but for all reasons, is at the top. Employees in dealing with each other and in their contact with the public reflect the attitude of their superior officers. The character and conduct of all officials must be such that it will inspire confidence in their subordinates and give them the proper respect for their superiors.

The majority of the employees in any concern take the official valuation of an idea. If the official scoffs at a project or effort the employee does likewise. If the official takes it seriously the employee does the same.

Not long ago a man in high public life told of his first job, which chanced to be in a coal mine. He was only a boy and had the boy's desire to idealize the man at the top. The boy learned that the "big boss" came every two weeks with the payroll, and he lived in constant hope of sometime being fortunate enough to meet his ideal. One day he went down the trail for two buckets of water. The trail was narrow and difficult and the boy was tugging along with right good will when he happened to see the boss coming toward him. A feeling of exultation filled him. At last he was to meet his ideal and perhaps have a few words with him as he might step out of the trail for the boy to pass.

Nothing of the sort happened. The boy himself was forced to step from the trail as the boss, without a sign of notice, passed by. From that time on

the boy's attitude toward his employer and his company changed and he soon left it because of lack of interest.

There is hero worship in all of us and there is always the possibility that a lack of friendly greeting or courteous treatment on the part of a person in even a minor supervisory capacity may cause anger or hurt feeling which would so fill the mind of a subordinate that he would not take all necessary precaution to prevent injury to himself or others. Thus we have as one of the big factors in accident prevention, the courtesy of the official for the subordinate.

Courtesy of the employees toward each other deserves consideration. Courtesy, as extended by one working man to another, should be that of a sincere wish that nothing may happen to injure either of them. After all, courtesy is merely consideration, and proper consideration for fellow employees will prevent accidents.

There is no courtesy in spite work; getting even or taking an unfair advantage among workmen tends to fill their minds with thoughts other than those of their work and makes them an easier prey of the accident bug.

Of no less importance is the employees' consideration of the public, for therein lies the reason for our being. To the public the employee is the company. This statement, though often repeated, is no less true, and employee courtesy is, after all, company courtesy. The conductor who meets his passengers with a friendly greeting and a smile usually puts them in the right mental attitude toward the company, and by creating this favorable impression helps to prevent accidents. Likewise a pleasant "move up," "wait until the car stops," "watch your step" or whatever the caution may be, will prevent accidents. The same words spoken by a grouch may cause accidents. Others meet you as you meet them.

Prevent Accidents by Little Courtesies

It takes but a few minutes to add a word of caution or remove the package over which some one might stumble. It is very little effort for the conductor to lift the bag or basket or give a hand which may save some one a painful fall. It is usually just as easy for the motorman to start and stop a car smoothly as it is to jerk it so that passengers and packages are thrown all over the car. It is courteous for a conductor to call stops clearly and distinctly and thus avoid possible accident to a passenger who realized it was his stop too late to be prepared to dismount from the car.

Examples of this kind might be cited indefinitely but would all tend to show the same results. Prevention of accidents to the public through the courtesy and consideration of the employee is a workable, practical thing.

The trainman who is courteous is usually in the proper frame of mind and maintains his equanimity particularly under trying circumstances. He is likely to have fewer accidents than the man who goes about his work with a grouch. Such a person inevitably and many times unconsciously creates an atmosphere which is conducive to safety both to himself and his passengers, who are in a sense under his care and protection.

In the selection and training of employees, consideration necessarily must be given to the matter of courtesy. A man who is discourteous is naturally careless. This is evidenced in dress and manners as well as work. The courteous employee will close the door or remove the obstruction to prevent another from falling. As one man has so well put it, "If the man's heart is right and he is thinking, he may be expected to perform satisfactorily."

Benjamin Franklin said "The way to be safe is never to be secure," which might be a good slogan for this group. In our experience we have found that

accidents began to occur after we had operated for a considerable length of time without any accidents, and had probably reached a self satisfied condition. We must have believed ourselves so perfect in the part of accident prevention that nothing could possibly happen. That really is the most dangerous period. That is the point where a general let-down begins, and as a result accidents will happen. I might suggest an epigram something like, "In time of no accident, prepare to continue to have none."

The company, as represented by the executives who determine its policy, may bear a large share of the responsibilities of accident prevention through courtesy. They are in a position to provide what might be termed "Courtesy equipment." Courteous treatment of passengers means more passengers and fewer accidents. This may be accomplished by the kind of equipment which prevents slammed doors, noisy operation, tardy opening and discourteous closing of doors.

A number of years ago one company changed the color scheme of their cars from a dark green to a bright orange. It was found much more satisfactory both in appearance and from an accident standpoint, on account of greater visibility. It was decided to have uniform interior arrangements so passengers would know the location of all equipment. Trolley wheels and poles were given the closest inspection so the fullest safety could be depended upon and the passengers not annoyed by trolley wheels that make a noise multiplied many times by the roof and headlining. This company was courteous in the larger sense, because it tried to supplement transportation with comfort as well as safety.

Condition of Offices, Stations and General Property

I may be digressing somewhat from the subject assigned, but I feel justified in including another factor in this paper because it bears so closely on courtesy and in some measure on accident prevention. I wish to mention the condition of offices, stations, platforms and general property. In a number of cases stations are reconstructed buildings. They are furnished with uncomfortable benches, are poorly lighted and unsanitary. They are improperly cleaned, they are cold in winter and hot in summer. As one man puts it, "The wayside station and the terminal and office buildings are the gateways to the utility—the portals to service; no matter how well advertised or maintained, they suffer by their unkept appearance, they are monuments of indifference to what the public considers essential to its comfort. Ten minutes in a leaky, unkept way-station has bred many a bitter enemy." And bitterness and discomfort in turn breed accidents.

Poor and improper lighting and loose boards in a station platform may cause accidents to public and employees alike. The courtesy of good lighting is essential. When the idea of courtesy and its relation to accident prevention is analyzed we find that after all it can be contained in the one word so often used—cooperation. Cooperation has been defined by the wizard Steinmetz, who said "cooperation is not a sentiment, it is an economic necessity."

Courtesy is that part of real diplomacy which tends to draw society into a closer union and a better understanding, whereby the individual can work at a higher degree of efficiency and do it in the safest possible manner. To conclude, and in a way re-word the sentiment of Steinmetz, I should like to paraphrase the language of the small boy in school who rebelled and told the teacher his answer was not merely good, but perfect. Safety and courtesy are not merely important, they are absolutely essential. If we do not give both as a bonus with transportation, our customers will leave us for some other service.

CHAIRMAN EMERSON: Before bringing this meeting to a close, I wish to introduce a gentleman who has charge of the destinies of the American Electric Railway Association. We have been privileged to have the managing director of the association attend this Congress. I am going to call on Mr. Storrs to say a few words to us.

LUCIUS S. STORRS (American Electric Railway Association New York): I get a great deal of kick out of these meetings, particularly because it is not only a meeting of the management but the men who are interested in carrying on.

The whole thing, of course, relates back to the question of the urge behind it all. Starting out with Mr. Smith's personnel relations, I am reminded of my own experience after having left college and for a number of years working with the most delightful and charming gentleman. The so-called silver panic of 1893 was the occasion of my losing my first job.

After losing the job, I spoke to the gentleman. I was wondering if I could get a letter of recommendation from him. He said, "Hell, yes; I will recommend you to anybody."

I said, "I have worked for you for five years and I never heard a good word."

"Well," he said, "you never lost your job, did you?"

I made up my mind at that time, if I ever became a man in direction of labor or a group of men, that once in a while I would comment on some of the things that they were doing.

Somebody said a few moments ago that you didn't have to consider the financial side, that it was a humanitarian interest. Of course it is humanitarian running these juggernauts of public service equipment through the streets. You have got to recognize the humanitarian side not only of the passengers that you carry but the motor vehicle fellow that tries to run you off the tracks. Let me call your attention to the fact that the financial side is of no less importance, when it takes the fares of a million and a half passengers a day to settle accident and damage claims of an industry, it does run into dollars and cents.

CHAIRMAN EMERSON: Before adjourning, I would like to call your attention to the fact that there were over 200 present at this meeting. I think that is an excellent attendance. On the other hand, we only have 133 cards signed. I wish that those who have failed to fill out their cards will do so either today or tomorrow, because we want it as a matter of record.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session was called to order at nine-fifty o'clock by the chairman, Ralph W. Emerson.

CHAIRMAN EMERSON: In opening this meeting, I want to express to you the gratification that I feel about the meeting which we had yesterday. I think we had a very lively, interesting and instructive meeting, and I want to thank everybody in this room for the help they rendered.

The officers this year have rendered such wonderful service to the chairman that I feel more or less apologetic, standing here before you. There has really been very little for me to do, and I want to thank them for their assistance. I want to thank you gentlemen for your patience in bearing with the unpleasant conditions here yesterday, and those who took part in the discussion. I think that we get more out of the discussion of these matters than we do out of the papers. I appreciate the time that is put in by the gentlemen who have written the papers, and I want to say right here that we have 100 per cent representation of authors of papers. There are no papers to be read in this section of the congress by proxy. I think that is a splendid record.

I neglected yesterday to announce the committee on recommendations for new officers. I will take this opportunity to tell you whom I have appointed as members of that committee. Mr. Samuel H. Reid is the chairman, and Mr. Hellmuth and Mr. Bennett are the other two members. I would ask those gentlemen to get together some time this morning and decide upon what the recommendations are for the coming year and report back before the end of the session this morning.

We are going to make these meetings as snappy as possible. We are going to get as much as we can out of them, and we are going to adjourn this meeting in plenty of time to be prepared to go ahead with the joint luncheon of the Public Utilities Section and the Electric Railway Section at noon.

It gives me great pleasure indeed to present Mr. Harry H. Adams, superintendent of shops of the Chicago Surface Lines, Chicago.

Design and Maintenance of Equipment as a Factor in Safety

**Harry H. Adams, Superintendent of Shops and Equipment,
Chicago Surface Lines**

In the design of modern street railway equipment the safety idea is playing an increasingly important part. Safety in car design not only means safe riding conditions for passengers, but also safe operating conditions for operators. The entire car and all its equipment or auxiliary devices have to be studied from a safety viewpoint.

The feature of car design that, as a whole, has helped more than any other to make street cars safe, probably has been the adoption of the low-floor, low-wheel type of construction. This has resulted in the elimination of some of the steps with their attendant dangers to passengers.

The use of pneumatic doors has aided greatly in the advancement of safe car design. These have now been developed to a point where the design of a safe door installation has become a matter of choice of units. In regard to this choice, too much cannot be said about the study of conditions to be encountered and the careful selection of the units necessary to meet these conditions. The proper location and installation of these units also has a

bearing on their safe operation and maintenance. Pneumatic doors may be obtained with manual or automatic control and should be interlocked with car control so that they cannot be opened before the car has come to a stop with brakes applied, and the car cannot be started until they are properly closed in operating position. They should also be provided with some means of preventing their closing as long as a passenger is in danger of being caught by them. They may be provided, as a safe precaution, with a device that will arrest the door's operation as long as an obstruction is in the way, or that will cause the door to reverse and fully open, then close, upon striking any obstruction in its path.

Folding steps are frequently used in conjunction with pneumatic door design as a safety feature in surface car operation. These are so co-ordinated with the doors that they fold up out of the way as the doors close and open downward into place as the doors open. This prevents passengers riding on the steps, and accidents from that cause. They should be chosen of the simplest design and of adequate strength to carry the loads imposed. Attempts to reduce weight on a car should not be allowed to affect the design of such parts to a point where the steps are not safe. Pneumatic doors and folding steps have contributed to the safety of larger platforms. Any safety feature of the doors or steps may be entirely overcome by the failure to provide for sufficient lighting for use of passengers at night. One of the earliest safety features to be incorporated in step design was the use of a metal safety tread. These can be obtained in a number of designs, either for the full width of step or for a narrow strip along the outer edge. These treads are advantageous, particularly in wet or snowy weather.

Employment of Line Breakers

The use of line breakers is another feature that takes its place in safe design. Aside from their function of interlocking pneumatic doors with car control, they eliminate the breaking of overloads in the motor circuit from the car platforms. This feature is a well-known safety idea. The danger of personal injury to passengers from flashing controllers or circuit breakers is recognized, and with the use of line breakers and the new controller handles that have been developed all interruption of power in motor circuits is eliminated from the car platforms. The new controller handles provide for a definite opening of line breaker before any motor circuit is broken by the controller and the controller thereby becomes merely a commutating switch. Carrying this idea still further, comes the use of contactor control with which all motor circuits are removed from the car platforms and are closed and opened underneath the car body or in cabinets protected from passengers. This type of control is used for train operation also.

Another safety device that occupies an important place in one-man car operation is the dead man's handle feature. This handle can be fitted to any type of control and provides for automatically cutting off the power supply and applying the brakes in case of man failure.

The location of the lightning arrester on the roof of cars is another safety feature required by the Fire Underwriters. Properly installed, this provides a path for lightning discharge that will prevent breaking down of trolley wire insulation and the resultant flash and fire.

Trolley bases should be so located that the trolley wheel may be replaced on the wire without leaving the car platform. This requires, as well, that the vestibule design be such that the operator may lean far enough out of the window to see the wheel when it is in contact with the wire at an average

height. Proper care in this design will eliminate the necessity for operators going between cars to replace their trolley, or being hit by vehicles while in street incident to such replacement. In this day of congested traffic, this precaution is essential.

In designing cars for operation upon city streets and highways, due care should be given to see that the rear of the car is illuminated to give a proper indication to other moving vehicles. On double end cars this is usually taken care of by the general illumination of the platform or of the sign box. On single end cars, where the platform and sign box illumination is missing, it is desirable to provide some other designating signal, such as a red bull's eye, properly illuminated. A clear ringing gong of distinctive type is an important safety feature of car design. It should be properly located and protected so that it is available for use and dependable in operation.

Last, but not least in car design, comes the provision for adequate brakes. By adequate brakes is meant brakes that are so proportioned to the car weight that sufficient pressure may be exerted at the wheel rims to secure reliable braking without excessive piston travel. Cars whose braking ratios are excessive require close maintenance and are not safe if the brake shoe wear is not adjusted frequently. They are costly also on account of the high energy consumption usually encountered, due to close-fitting brakes. The proper ratio of the total brake shoe pressure to brake cylinder pressure should be about 9 to 1. Good practice also dictates that the total braking pressure for city cars should run from 85 to 100 per cent of the light weight of the car, although some conditions may require even a greater percentage. To obtain a 9 to 1 braking ratio may require a larger brake cylinder than usual, but the results obtained warrant its use. Coupled with the use of the larger cylinders and adequate brakes, is the use of a quick-service valve which passes air directly from the reservoir to the cylinder until the desired pressure is reached. This aids materially in securing high braking pressure in the shortest possible time and is an aid to safe operation thereby. On cars that are equipped with a great amount of air brake piping, or where two-car train conditions are encountered, the quick-service valve becomes more important on account of the length of time necessary to secure braking pressures in the rear car if all of the air required for same is passed through a motor-man's valve at the head end of the train. Accidents may frequently be avoided by the saving of a fraction of a second in securing quick brake applications. With the quick-service valve the air for each brake cylinder is fed directly to the cylinder from reservoirs on their respective cars. In designing brake systems, provision should be made for securing pressures that will insure high rates of braking. It has been found that rates as high as 3.5 to 4 mphps. can be reached in everyday service without discomfort to passengers if the braking action is smooth. A group of street railway properties are also adopting trucks equipped with magnetic brakes as an added safety feature for emergency use.

Maintenance

Safe operation is dependent to a great extent on good maintenance. What is good maintenance? One might say that safe maintenance is good maintenance. That is to say that it is not safe maintenance to use a given piece of material until there is danger of failure from excessive wear—neither is that good maintenance. Every equipment failure is not a factor in an accident, but some equipment failures may be potential factors in accidents.

Frequent close inspection of all main car parts, to detect weak parts or dangerous conditions, is one of the first requisites of good or safe maintenance.

All wearing parts that can be case-hardened or provided with case-hardened bushings, should be so treated to provide long wearing conditions, but even under these conditions excessive wear should not be tolerated. Certain parts which are more susceptible to wear than others, and also those which would create the greatest hazard in case of failure, should receive daily inspection. For example, it is good practice to make a daily inspection of all brake pins, hangers, levers and mechanism. Also, fenders should be tripped each night when the car is spotted, making it necessary for the trainmen to reset them before taking the car out the next morning, thus insuring fenders in proper working order, should the occasion for their use be met.

At regular intervals, based on work done by car in service, the car should be thoroughly inspected and lubricated. Brake pins inspected and lubricated. Wheel flanges inspected for excessive wear. Motors and controllers thoroughly cleaned and any adjustments made that are necessary. Gongs tested for proper tone.

When principal parts of car equipment are at the shop, careful inspection should be made of the same, and where vital parts are involved, they should be thoroughly tested. For instance, when an axle is in the shop for replacement of wheels, it should be thoroughly inspected for flaws before new wheels are pressed on. This would apply as well to truck parts when truck overhauling or rebuilding is being done.

Special Tests in Checking Electrical Equipment

As a part of our maintenance program we have developed special tests and instruments for checking the condition of our electrical equipment. Knowing that in the past flashing motors, controllers or circuit breakers have caused accidents and even passenger injuries, due to panic, we believe that anything that will prevent motor or controller trouble is a safety measure. These instruments are used for this purpose. And not only is it safe maintenance to provide for these instruments and tests, but we find it to be good and economical maintenance.

General and careful inspection and testing of equipment result not only in improved safety, but greater reliability and fewer interruptions to service. Considerable attention is being given to this particular question throughout the country, with an endeavor to reduce the number of equipment failures. Upon our own property, progress has been made along these lines to such an extent that for the month of June, 1927, our system averaged 31.042 miles between equipment failures, which compares with 14,948 for June, 1926, or an increase of 108 per cent. This is upon a system operating over 11,000,000 miles per month, and an average of 3,346 cars per day. It can be readily appreciated that improvements along this line in the matter of equipment failures, result in improved safety of operation.

In conclusion, it might be said that cars should always be designed with safety of passengers and operators in view, and from a maintenance viewpoint eternal vigilance is a great aid to safe operation.

CHAIRMAN EMERSON: Gentlemen, you have up here in this corner, where he can't get away from you, one of the finest authorities and one of the best maintenance men in the United States. He is here with his coat off ready to answer your questions. Let us have a frank and free discussion of these papers. I know you operators have thoughts in the back of your heads about the operation of your own cars that you want to ask Mr. Adams about, and you want to find out if his operation compares with yours, and what he does under certain conditions.

D. J. MAHONEY (Pittsburgh Railway Co., Pittsburgh, Pa.): I was very much interested in the address. It looks as though he gave great study to this subject and covered every detail. There was one thing, however, he omitted which is very important, and that is the sand. When the sand is applied, it should keep running until the car has come to a stop. On many of those newly adopted cars, the sand will only run as long as you hold your hand on the lever. That takes your hand away from the brake or the controller. That is a very important thing.

The next important thing is the gong. We have had a considerable amount of discussion in Pittsburgh on the question of the hand gong and the foot gong. It can be shown that you can miss the foot gong very frequently in the case of an emergency. You have to be standing in a certain position in order to hit that foot gong effectively. By the time you move your foot to get the gong, probably you are too close to the object. With the hand gong, you are always holding the strap in your hand, and you can use it more frequently and more effectively.

Discussing the Question of Sand

MR. ADAMS: The chairman has put me up against a real proposition. I did omit the question of sand, and I will be free to admit it. We make provision for that in our cars by having on double end cars four sand boxes, two of which will operate at either end of the car upon the application of a small air valve directly over the engineer's valve; so really the operation of that is taken care of at the same time the brake application is made by simply the movement of the thumb. It doesn't require any change of the position of the hand. The motorman has his hand on the brake valve and the little lever to apply the sand, so he can get as much of it as he needs. We find he uses a lot. I don't know how many yards of sand we have at our Lake Shore shop.

The question of the location of the gong is a very important one in the design of cars. I think I mentioned that the location of the gong was important. In the design of our cars, we give a great deal of study to the particular location of the gong and the gong pin, and in these modern cars where you have couplers and a large amount of air piping to contend with, it is not an easy job to get the gong located in the proper position for the motorman. After making any decision, we call upon our transportation superintendents to pass upon the subject to see whether it is in a position that they desire.

E. K. EASTHAM (United Railways of St. Louis, St. Louis, Mo.). Mr. Adams rather stressed as one of his safety features the folding step. What has been your experience as a safety measure between the folding step and the stationary step?

MR. ADAMS: Well, we perhaps do not have quite the same design of car that you have in St. Louis.

We have never used here in Chicago the weld step except where we have trailers involved, and our experience has been that with the folding step we get a little wider platform; we can carry our platform a little closer to the side of the car by folding the step up, and for that reason we have not considered the use of the weld step.

MR. EASTHAM: Don't you have any claims in connection with boarding and alighting accidents: people claiming that the step did not go all the way down?

MR. ADAMS: I presume on a system of this size, we have all kinds of claims along that line. Mr. Pasche, I am sure, can answer that, because he analyzes each accident every morning.

MR. EASTHAM: Our experience in St. Louis over a period of years was that in those cases they would always claim that the folding step did not go all the way down, whether it did or did not. We know, as a matter of fact, that in the best equipment kept in the best possible manner that now and then it will not quite go all the way down. We have spent quite a bit of money in converting our folding steps into weld steps. Only about 20 per cent of our cars have the folding step.

I thought it might be of interest to these gentlemen to bring up that subject, because there does not seem to be any standard practice even among the larger companies who have given a great deal of thought to the matter.

MR. ADAMS: I think, however, that the majority of cars built for the surface lines are of the folding step type.

MR. EASTHAM: I have one other question that I would like to ask at this time. You speak of inspecting the cars for different types of defects, which, of course, is very important, but I take it that it is impossible for your shop department to have enough inspectors to look at each car every day, to go over each controller every day. I am wondering what your system is in bringing to your attention defects with reference to gongs and brakes, controllers, which I believe is perhaps the most important thing in the whole subject of maintenance of equipment. In other words, how do you get your men to report their defects? They are out on the road, and can determine defects, as a rule, better than an inspector out in the yards, because defects will show up when a car is running that will not show up under any ordinary inspection out in the yards. I am wondering how you get it over to your men to insure a complete reporting of any and all defects?

MR. ADAMS: That is taken care of by the usual sign-in sheet. The motorman or conductor is supposed to sign in whether the car is O. K., or whether there are any defects. That sheet is turned over to the mechanical department for their attention, and the cars are taken care of along that line. That is the usual method in vogue here in Chicago.

MR. EASTHAM: Do you have any trouble in getting them to do that fully?

An Inspection of Brakes Made Daily

MR. ADAMS: We frequently find that they will not report defects, but we get a great many reports of defects, and we are constantly following the thing up. The matter has gone to the attention of the transportation department, and they get after the particular individuals who are lax in reporting defects.

H. ASHWORTH (Pittsburgh Railway Co., Pittsburgh, Pa.): I would like if Mr. Adams would give us a more detailed statement as to their brake inspection. At our meetings, that seems to be the greatest controversy. The men claim one way and the company claims another.

MR. ADAMS: Our brakes are inspected daily and adjusted if necessary. The regular brakemen in the car house cover those brakes every night to see that they are in proper adjustment. It is a daily performance.

P. L. SPECHT (Pittsburgh Railway Co., Pittsburgh, Pa.): I would like to inquire about the sand apparatus. Don't you find in throwing a car into emergency, your thumb will often slip off the sand apparatus? We have a great deal of trouble with that.

MR. ADAMS: I think usually that one application will cause the sand to run for some little time after it has been applied. In case of an emergency, in a good many cases, the controller is off, and the man has his other hand in case he has to meet a condition of that kind.

W. F. HANNA (United Railways & Electric Co., Baltimore, Md.): I would like to ask the gentleman if he made any deceleration tests to determine for various weights of cars the proper pressure in your air tank and your piston; and what is your standing on the piston for the surface cars?

MR. ADAMS: We have made a number of tests along that line. I haven't the data with me that I can quote from. When I made the statement in connection with the three and one-half to four miles per hour per second on our new cars, that is the result of some of our tests. We have spent a good deal of time along that particular line.

On the matter of the piston, we believe good practice dictates that it should travel four to five inches.

T. H. KENDRIGAN (Public Service Co. of New Hampshire, Manchester, N. H.): I would like to ask whether or not the gong has become obsolete. The gong we used with the old horse car and the original street car was adequate for the occasion. But, with the inception of the automobile and the speed that the automobile driver uses approaching an intersection, I don't know what good, if any, it does to warn him.

I think personally, and speaking from experience, particularly since the inception of the automobile, that the gong as a warning at intersecting streets has become obsolete. This might be a good place to start a discussion, and I would like to have the men who drive automobiles enter this discussion in order that we may determine whether it is obsolete or not. I personally think it is no longer a warning to motorists approaching intersecting streets.

CHAIRMAN EMERSON: That let's you out for a moment, Mr. Adams. I would like to hear an expression from the other gentlemen present on this matter of gongs.

When the Controller Is on One Point

H. A. BRIGGS (San Antonio Public Service Co., San Antonio, Texas): My personal opinion is that they are not obsolete but are generally entirely inadequate. I think we need a better one instead of none at all. I think we can reduce our accidents very much by improving the condition of our gongs.

I have a question that I would like to ask Mr. Adams. Recently we purchased five line braker equipment for cars just as a trial. We haven't them rigged up yet, because we have a great deal of run-in on them. I notice a number of your cars run with the line braker. When the motorman has finished unloading at the front end, he closes his doors and sets the controller on one point, and when the conductor closes his door, the car starts. I believe that is right. Is there any danger of the motorman losing hold of just what he is doing at the time and striking a pedestrian when the car starts when he has his mind on something else? We are forbidden to use that practice in view of the fact that the men get into the habit of leaving the controller on one point. Do you think it good practice or bad practice?

MR. ADAMS: I would like to talk on the question of the gong first. There are gongs and gongs. If you are going to purchase a cheap gong you get a cheap one. We find it advisable to get a gong that has a real tone to it. Some of the gongs that have been properly tin coated will prevent the rust coming too soon. We find that by the use of a gong 14 inches in diameter, properly located, with a good mechanism and pin, we get a real sounding gong that is a warning, and it meets the requirements of our congested situation here very satisfactorily.

On the matter of the first point of the control, I think I will let Mr. Pasche talk on that, because he has had a good deal of experience with it from the operating standpoint.

MR. PASCHE (Chicago Surface Lines, Chicago, Ill.): On the line braker car and on the door being opened with our motorman having the controller on the first point, if he does not turn his door cutout button off, his car cannot start. We have had no accidents from our cars starting with the controller on the first point. The only time that he can start the car is if his door cutout button is off. That button is immediately over the motorman's head. If the cutout button is off, the car cannot start and does not start, and we have had no accidents from that source.

WILLIAM H. PONSONBY (Pittsburgh Railway Co., Pittsburgh, Pa.): In your statement that you brake three and one-half miles per hour per second, what effect has it had in the falling-in-car accidents, if any?

MR. ADAMS: The braking is smooth. You won't find any difficulty on that. I have personally stood in the cars when we have been braking at that rate, and I will

say I had hold of the strap, but it is not necessarily uncomfortable, and it is operable, in my judgment.

MR. PONSONBY: What effort do you make to control the time that the motorman uses in going from the first to the last notch on his controller, assuming that it is a hand controller and not an automatic control?

MR. ADAMS: The question asked was whether we put any limit of time on the application of the controller handle by the operator.

We do not limit it. We have no automatic feature on there or time element that would require him to take a certain amount of time to feed up. We believe that we want to have our equipment in such condition that it can be, if necessary, punished for schedule. We try to keep the equipment up so that they can make as high a schedule as it is possible to make in the city of Chicago.

My understanding is that we are operating at the present time at a scheduled speed of 11.2 miles per hour between terminals.

CHAIRMAN EMERSON: Pretty nearly as fast as Cleveland.

MR. ADAMS: We never hope to catch up to you, but we are after you. We do not limit the time; we leave that to the individual.

Chicago People Expect to Be Slammed Around

MR. EASTHAM: There apparently is a great difference in conditions in Chicago and other big cities, not only a difference with reference to traffic conditions but a difference with reference to your people and the people that make claims against the company. If in St. Louis we were to feed up the controller with a view to schedule alone, we would have 25 claims a day of people claiming that they fell in the car on account of the car starting with an unusual jerk. I don't know, but I imagine from the question of the Pittsburgh gentleman that that matter has come up there.

I think you are very fortunate here if your people fall and so forth without making claims, just considering that it is part of the game. But we have to watch that, and instruct our men that they shall make a smooth start even if they lose some time in doing it.

H. H. FENTON (Pittsburgh Railway Co., Pittsburgh, Pa.): I have three things that I want to bring up. Most of them are information, though. The first one is the matter of lightning arresters, the new lightning arresters, the condenser type. I would like to hear an expression of experience on other properties from accidents they have had from the body of the man who climbs the roof to renew a fuse on cars that are equipped with condenser lightning arresters. You know, the condenser lightning arrester will absorb a certain quantity of electricity. It being on the hot side of the fuse when the fuse blows, when a man attempts to put in a new fuse, his body as he touches the terminal on the trolley side of the fuse will absorb part of that shock. It is not dangerous, but it surprises a man. We had one man fall from the car and get hurt in just that way. I would like to know what is being done in other properties.

The second point is this: Some of you have had the privilege of being in Boston. In the matter of retrieving a trolley, I found there that on some of the cars they are mounting the trolley over the forward truck, and the trolley line for the conductor, who is in the center of the car, is put there to retrieve the trolley. That seemed quite novel and worth while.

My third point is on the gong. There seems to me a chance for a little study there as to the rapidity at which the going is struck. I think we should stick to the gong as against the claxon or a horn of any sort. They are being used on trucks and autos and the people have become accustomed to them. If we went to a claxon or a horn, the people hearing that might stop on the car tracks.

I think we should stick to the gong, but study the rapidity with which it is struck; as an example, an electrically operated bell controlled by a push button at the end of the controller handle.

On the matter of the piston, we believe good practice dictates that it should travel four to five inches.

T. H. KENDRIGAN (Public Service Co. of New Hampshire, Manchester, N. H.): I would like to ask whether or not the gong has become obsolete. The gong we used with the old horse car and the original street car was adequate for the occasion. But, with the inception of the automobile and the speed that the automobile driver uses approaching an intersection, I don't know what good, if any, it does to warn him.

I think personally, and speaking from experience, particularly since the inception of the automobile, that the gong as a warning at intersecting streets has become obsolete. This might be a good place to start a discussion, and I would like to have the men who drive automobiles enter this discussion in order that we may determine whether it is obsolete or not. I personally think it is no longer a warning to motorists approaching intersecting streets.

CHAIRMAN EMERSON: That let's you out for a moment, Mr. Adams. I would like to hear an expression from the other gentlemen present on this matter of gongs.

When the Controller Is on One Point

H. A. BRIGGS (San Antonio Public Service Co., San Antonio, Texas): My personal opinion is that they are not obsolete but are generally entirely inadequate. I think we need a better one instead of none at all. I think we can reduce our accidents very much by improving the condition of our gongs.

I have a question that I would like to ask Mr. Adams. Recently we purchased five line braker equipment for cars just as a trial. We haven't them rigged up yet, because we have a great deal of run-in on them. I notice a number of your cars run with the line braker. When the motorman has finished unloading at the front end, he closes his doors and sets the controller on one point, and when the conductor closes his door, the car starts. I believe that is right. Is there any danger of the motorman losing hold of just what he is doing at the time and striking a pedestrian when the car starts when he has his mind on something else? We are forbidden to use that practice in view of the fact that the men get into the habit of leaving the controller on one point. Do you think it good practice or bad practice?

MR. ADAMS: I would like to talk on the question of the gong first. There are gongs and gongs. If you are going to purchase a cheap gong you get a cheap one. We find it advisable to get a gong that has a real tone to it. Some of the gongs that have been properly tin coated will prevent the rust coming too soon. We find that by the use of a gong 14 inches in diameter, properly located, with a good mechanism and pin, we get a real sounding gong that is a warning, and it meets the requirements of our congested situation here very satisfactorily.

On the matter of the first point of the controller, I think I will let Mr. Pasche talk on that, because he has had a good deal of experience with it from the operating standpoint.

MR. PASCHE (Chicago Surface Lines, Chicago, Ill.): On the line braker car and on the door being opened with our motorman having the controller on the first point, if he does not turn his door cutout button off, his car cannot start. We have had no accidents from our cars starting with the controller on the first point. The only time that he can start the car is if his door cutout button is off. That button is immediately over the motorman's head. If the cutout button is off, the car cannot start and does not start, and we have had no accidents from that source.

WILLIAM H. PONSONBY (Pittsburgh Railway Co., Pittsburgh, Pa.): In your statement that you brake three and one-half miles per hour per second, what effect has it had in the falling-in-car accidents, if any?

MR. ADAMS: The braking is smooth. You won't find any difficulty on that. I have personally stood in the cars when we have been braking at that rate, and I will

say I had hold of the strap, but it is not necessarily uncomfortable, and it is operable, in my judgment.

MR. PONSONBY: What effort do you make to control the time that the motorman uses in going from the first to the last notch on his controller, assuming that it is a hand controller and not an automatic control?

MR. ADAMS: The question asked was whether we put any limit of time on the application of the controller handle by the operator.

We do not limit it. We have no automatic feature on there or time element that would require him to take a certain amount of time to feed up. We believe that we want to have our equipment in such condition that it can be, if necessary, punished for schedule. We try to keep the equipment up so that they can make as high a schedule as it is possible to make in the city of Chicago.

My understanding is that we are operating at the present time at a scheduled speed of 11.2 miles per hour between terminals.

CHAIRMAN EMERSON: Pretty nearly as fast as Cleveland.

MR. ADAMS: We never hope to catch up to you, but we are after you. We do not limit the time; we leave that to the individual.

Chicago People Expect to Be Slammed Around

MR. EASTHAM: There apparently is a great difference in conditions in Chicago and other big cities, not only a difference with reference to traffic conditions but a difference with reference to your people and the people that make claims against the company. If in St. Louis we were to feed up the controller with a view to schedule alone, we would have 25 claims a day of people claiming that they fell in the car on account of the car starting with an unusual jerk. I don't know, but I imagine from the question of the Pittsburgh gentleman that that matter has come up there.

I think you are very fortunate here if your people fall and so forth without making claims, just considering that it is part of the game. But we have to watch that, and instruct our men that they shall make a smooth start even if they lose some time in doing it.

H. H. FENTON (Pittsburgh Railway Co., Pittsburgh, Pa.): I have three things that I want to bring up. Most of them are information, though. The first one is the matter of lightning arresters, the new lightning arresters, the condenser type. I would like to hear an expression of experience on other properties from accidents they have had from the body of the man who climbs the roof to renew a fuse on cars that are equipped with condenser lightning arresters. You know, the condenser lightning arrester will absorb a certain quantity of electricity. It being on the hot side of the fuse when the fuse blows, when a man attempts to put in a new fuse, his body as he touches the terminal on the trolley side of the fuse will absorb part of that shock. It is not dangerous, but it surprises a man. We had one man fall from the car and get hurt in just that way. I would like to know what is being done in other properties.

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I think we should stick to the gong, but study the rapidity with which it is struck; as an example, an electrically operated bell controlled by a push button at the end of the controller handle.

There is a relation between the nervous system and the rapidity at which that bell can be struck. That can be easily seen if you think, for a moment, of the tolling of a church bell as against the rapid striking of the gong on an ambulance. I think there is a field there for study and something can be gotten up.

CHAIRMAN EMERSON: Won't some of you gentlemen answer all or any of the questions that have just been put? The first is in regard to the fuse. We would be glad to hear from anybody. Mr. Adams, have you any observation to make on that?

MR. ADAMS: We have had no experience with lightning arresters of that type here in Chicago.

CHAIRMAN EMERSON: His second question was in regard to the trolley on the Boston cars. You certainly have some comments to make on that subject. It is a new one to me.

W. F. HANNA (United Railway & Electric Co., Baltimore, Md.): We have that on the articulated type of cars in Baltimore. We found after a few weeks' experience, it was necessary to clear the roof in order to prevent it catching when the car was going around the curve. The conductor has to go out and adjust it to the wire.

I might say in that connection that there is a conflict sometimes. We found that a car of the articulated type would upset the automatic switches. We have to be very careful when the cars go around loops with that particular type to see that the trolley is always down and the rear trolley is always up.

CHAIRMAN EMERSON: How does the conductor see the trolley?

Further Discussion About Gongs

H. H. FENTON (Pittsburgh Railway Co., Pittsburgh, Pa.): There is a slot, a longitudinal slot across the car with a lid that the conductor can lift up to see where to place the trolley.

MR. HANNA: I should have said that our conductor has to get off the car to make that adjustment.

CHAIRMAN EMERSON: The gentleman asks about gongs and the rapidity with which they are struck and so forth: whether or not the gong should be supplanted by some other device?

MR. ADAMS: I would like to speak on that. In an experience with the old pneumatically operated gongs which carry forward the same thought, we had a number of those in operation here in Chicago along in 1912, and we found that there was considerable objection from the public to that type of gong. In addition, we also found that the plunger punched holes straight through the gongs and we had to keep turning the gong so as to get another place to punch a hole through.

W. T. HARVEY (United Traction Co., Albany, N. Y.): I don't believe that we should quite pass up this question of gongs as easily as we have. I am inclined to think that there is a good deal of merit in that suggestion. I submit that an operator of a car with a gong such as we have does not stand much show to be heard when there is a five-ton truck loaded with stone alongside of him in the street.

As far as the repetition of the stroke is concerned, in some places we are not permitted to use anything that approximates the fire department or ambulance gongs. It seems to me we ought to water up and see if there is a suitable whistle that isn't annoying and at the same time can be heard.

CHAIRMAN EMERSON: You have Mr. Adams in the corner now, gentlemen. Are there any more questions?

D. W. FINCH (Des Moines City Railway Co., Des Moines, Ia.): In regard to the gong, I think that we cannot do away with it. The only thing we can do that will give satisfaction and get away from the kick of the public is the gong.

In regard to the accidents at intersections, I have recently made a check of the accidents occurring on our road, and those accidents occurred principally on the cars that

had poor bells. We are now equipping our cars with a proper gong. I think the proper gong is one that is clear and one that can be heard distinctly. A whistle is deafening. People even raise Cain about ringing a gong, and they certainly would raise more Cain about the whistle. You can't get too good a gong.

MR. BABBITT (Pittsburgh Railway Co., Pittsburgh, Pa.): I think that we have come to a time when we should have an emergency gong as well as a hand gong. There are times when one ringing of the gong will save a life.

I would also like to ask Mr. Adams what he would think of a forty-eight hour inspection of city run cars instead of a daily inspection?

MR. ADAMS: For the very vital parts like the brakes, I believe in the daily inspection, absolutely. I don't want to take any responsibility with any other system.

E. HOLLIBAUGH (Pittsburgh Railway Co., Pittsburgh, Pa.): What I had in mind was the fact that we have had the gongs for a number of years, and we know that our body becomes toned to the condition in which we live. When we move into a certain community, we take on the habits of that community.

Is it necessary that we change the tones or go to some other device that the body hasn't become so accustomed to? Has our body become so toned to that that we don't notice it? I kind of think it has.

The Automobile Pays Little Attention to Gongs

GEORGE LANSTER (T. M. E. R. & L. Co., Milwaukee, Wis.): I should like to ask Mr. Adams what type of gong he uses, a steel gong or a metal gong?

MR. ADAMS: We are using a 14-inch gong which is a steel gong; it is zinc coated.

MR. LANSTER: It has been my experience that gongs that are new and those that come out of the paint shop are very clear and can be heard, but after a few months of use they become dead. Is there any company here that has thought of such a thing as changing the tone of the gong or the gong itself about once every three months?

MR. HELLMUTH: I would like to say a word about Mr. Adams' gongs, because I have observed them for many years rather enviously. Go hire an automobile this afternoon and drive down the street in front of one of his cars and hold back the progress of it, or watch a wagon on the track that is holding it back and hear the way that gong sounds. Those gongs can be sounded so loud that you can hear them a couple of blocks away. A good deal of the question of the volume of sound is up to the motorman in the way in which he taps the gong. They are very splendid gongs, in my judgment. I think if they are properly tapped they are as adequate a warning as you can secure.

You must remember that you can't, for example, put a locomotive whistle on a city street car. The volume of sound that you are allowed to give out as you go down the street is limited by the likes and dislikes of the people that live in the city. So, you can't get something that is going to be used just in the country. You have to have a gong that gives out the maximum sound that the public is willing to have. I think that these surface line cars here have just such a gong.

MR. ADAMS: If any of you gentlemen carry out that performance, please report any to me that are dead.

CHAIRMAN EMERSON: It seems to be agreed that the gongs used in Chicago are satisfactory. I would like to ask Mr. Adams who makes them?

MR. ADAMS: I cannot tell you the name of the manufacturer right now.

CHAIRMAN EMERSON: Gentlemen, are there any other questions anybody wishes to ask Mr. Adams about his maintenance of equipment in general? Let us leave the gongs out of it for a minute.

H. YOUNG (Chicago Rapid Transit Co., Chicago, Ill.): Irrespective of the fact that the brake pins and slabs are case hardened, do you find it necessary to inspect them every 24 hours in addition to the regular mileage inspection? If so, what is your average daily mileage?

MR. ADAMS: We inspect the vital pins daily; that is, those on the foundation brake levers and so forth. Of course, we couldn't make a daily inspection of all pins throughout the entire brake. We do, however, cover that particular situation on the general inspection, which is covered on a kilowatt hour basis, averaging about once a month.

With regard to the mileage we make a day, we run on the average, in round figures, about 600 miles.

E. HOLLIBAUGH (Pittsburgh Railway Co., Pittsburgh, Pa.): I have one question on the matter of sand equipment. With that button you use with your thumb at the same time you use your air valve, what experience have you had concerning the wearing out of the pin? I have noticed with our equipment that that wears or appears to wear very quickly.

MR. ADAMS: We have a very simple valve on most of our cars. We don't have much difficulty along that particular line. It is a very simple valve that we use and one we have made in our own shops.

I might add to that question on the application of the sand in conjunction with the brake valve, that on the modern cars where we have the M2S valve, all you have to do is press down the valve lever at any point and you can get your sand.

CHAIRMAN EMERSON: Gentlemen, we have four other papers, and we have the luncheon at twelve-thirty. I think the Program Committee made a mistake in putting any other papers on this morning's program.

Mr. Adams, we are very much indebted to you, and we thank you very kindly for coming here.

GENE R. NAUGHTON (Pittsburgh Railway Co., Pittsburgh, Pa.): I would like to ask Mr. Adams what his experience has been with people falling off the cars; that is, on the open door cars?

MR. PASCHE: We don't have very much of that. The only time we have anybody thrown off the car is when the conductor gives the bell too quickly. That is the only trouble we have.

Many Accidents Occur on the Back Platform

EDWARD MCMORROW (Amalgamated Association of Street & Electric Railway Employees of America, Detroit, Mich.): I notice the motormen around here are getting the best of it this morning. I would like to ask Mr. Adams or Mr. Pasche if they have made any arrangements for the conductor to mechanically handle the various rates of fare that he is confronted with.

I find in my travels throughout the country a great many accidents occur on the back platform. I find, too, that owing to the changing of fare and the different kinds of fare that our valuable older men are being gradually eliminated from the service because of the fact that there isn't attention enough given to the ordinary expediting of the work. For instance, I notice in St. Louis they have a specially made equipment for the conductor where he carries bunches of pennies and transfers. I have noticed in Chicago and Cleveland and other places that a man will get on the car with a \$2.00 bill and two pennies, which is a warning that he must have no pennies in return; he will get on with a five dollar bill and two pennies, which is another warning that he don't want any pennies back; he will get on with a quarter and two pennies, which is another warning that he don't want any pennies back.

The reason that prompted that question was because the chairman of this meeting yesterday made an observation about the conductor looking down the side of the car. I sometimes think that I am really cross-eyed from looking down the side of the car. I hope somebody will bring in a paper that will help us old, poor, decrepit conductors.

CHAIRMAN EMERSON: I think Mr. McMorro has asked several questions and

answered them himself. I am not going to permit any discussion on them, because they are complete in themselves.

We will now continue with the reading of the second paper by Mr. A. W. Koehler of the Milwaukee Electric Railway and Light Company.

The Organization and Functioning of Safety Committees

A. W. Koehler, Superintendent of Accident Prevention, The Milwaukee Electric Railway & Light Company, Milwaukee, Wis.

In discussing my subject I am going to take the liberty of reversing the order in which the two factors, organization and functioning, appear in the title of my paper.

It is because of the fact that the proper functioning of the safety committee determines the order and manner of organization that I prefer to give first consideration to the functioning.

To determine and fix the functions of a safety committee it is necessary first to have an accurate conception of what is intended to be accomplished by such a committee. In other words, why a safety committee—what should it do—what are its advantages, its limitations—what are its specific functions—what can it do on our property? Having satisfactorily answered these questions in the light of our individual conditions and problems, we may then consider the form of organization adapted to deal most efficiently and expeditiously with our own individual or particular situation.

If we are prepared to accept, as fundamental, that the functions of the safety committee will be just as efficient and productive of worthwhile results as those responsible for its conduct will permit and inspire, we may proceed to discuss and consider the matter of functioning and organization.

We are agreed, I think, that accident prevention work (safety work, if you please), is in its largest sense a matter of education. Mechanical guarding, important as it is, is only a physical manifestation of sincerity of purpose, or good faith on the part of the management. The electric railway business (and I have in mind now the transportation end of the business) does not lend itself readily to the application of mechanical guards. We must depend, in the main, upon educational effort.

This educational effort to be most effective must be through personal contact. Bulletins and posters have their place and are part of any efficient safety program, but the real, lasting results come from personal contact.

Every general manager, superintendent, division superintendent, supervisor or instructor will recall instances from his own personal experience where by a heart to heart talk he has been able to show a man the error of his ways and has been able to inspire and exert a very helpful influence upon him. Safety may be and is imparted to the individual in the same way.

It would be an ideal situation, but a manifestly impractical and impossible one, if the superintendent of each department might appeal personally to every man under his authority.

The function of the safety committee is to provide a substitute for the personal inspiration and influence of the superintendent through the person of the safety director. The influence of the superintendent is imparted to the members of the safety committee, who, in like manner, pass it on to their fellow employees until the entire personnel of the department is imbued with the spirit of safety.

The degree of enthusiasm and efficiency with which the safety committee functions is dependent, first, upon the degree of sincerity and enthusiasm of

the management, and, secondly, upon the ability of the man who makes direct contact with the members of the safety committee. By his sincerity, enthusiasm and personality, he can most effectively interpret the management's attitude and sell safety to the men.

Perhaps the most important function of the safety committee is to inspire confidence in and respect for the company's safety activities. This it can do only when its own members are fully in sympathy with and confident of the management's genuine interest and support, as evidenced by the adoption or rejection with good reason by the management, or its recommendation and findings.

A second function of the safety committee is to stimulate its own members, as well as the personnel of the department of which it is a part, to offer constructive safety suggestions intended to eliminate unsafe conditions or practices.

A third function of the committee is the dissemination of information concerning safety among other members of the department. Safety inspections in their own as well as in other departments are made by the safety committees, it having been found that the committee from another department will discover conditions which the regular departmental committee has overlooked by reason of the members being too familiar with their surroundings.

Another function is the investigation of accidents in the department. Fellow employees who have been involved in lost time accidents or those of a nature that warrant special attention are often invited to appear before the safety committee and make a full, detailed statement of all the factors which would enable the committee to find all of the facts in connection with the occurrence of an accident, to fix responsibility for the accident and recommend to the department head, with whom rests the final disposition of a case, the kind and degree of discipline to be administered.

This does not in any way encroach upon the prerogatives of the head of the department as a disciplinary officer, nor does it relieve him of the responsibility of administering disciplinary measures. It does, however, materially aid him when it is known to every man that a group of his own associates have fixed the penalty imposed upon him for carelessness or the infraction of a safety rule which has adversely affected the safety standing of the department, and that their chief is confirming the judgment which they have rendered.

Safety Responsibility Assumed by Committee Members

Another function, subconsciously developed, but nevertheless unmistakably evident, is the acceptance of responsibility by safety committee members which they know is not only implied but imposed upon all members of the committee. It is rare that members of the safety committee are themselves involved in accidents. By reason of their position as safety committeemen they are consciously and subconsciously aware of the management's faith in them as safety leaders of their fellow employees and accordingly by precept and example they demonstrate their fitness to be safety committeemen.

It is a function of the safety committee to keep the department head advised, through written reports of safety meetings, of all matters pertaining to safety, whether they be recommendations for newer and more efficient safeguards, supplanting old methods and practices with newer and safer ones—in short, to provide the head of the department with a running record of perpetual inventory of the safety situation in the department.

It has been the experience of those companies which have encouraged the development of safety committee activity that concurrent with the expansion of the regular functions of the committee there develops in the safety com-

mitteeman a keener pride in his job and a more pronounced evidence of interest in other phases of his work. He has been given recognition, he has been allowed opportunity to manifest his initiative and talents, and he has been given credit for ideas that may be useful to his company.

Service on the safety committee promotes group effort as well as individual effort, a desirable function in that it teaches men the necessity for subordinating individual preference, when the best interests of the division or the department are served thereby, to the collective judgment of the committees.

These by-products of the regular functions of the safety committee may become, if wisely and skillfully developed, invaluable to any company. It is not intended to convey the impression that the functions which have been described constitute the sum total of activities of the safety committee. They are but some of the more important functions which will furnish us a foundation upon which to build the superstructure of our safety organization.

Organization of the Safety Committee

Having now quite clearly in mind the duties which the safety committeemen are to assume, we may proceed with greater assurance of probable success to select the men who are going to discharge these duties.

Safety committees are organized in a variety of ways, the proponents of each plan enthusiastically endorsing that one which in their judgment holds the greatest promise of results.

The number of men constituting the committee depends upon the size of the property, its location (whether centered in one community or scattered over a number), upon the accident exposure, the manner of organization of the company itself and upon a number of other factors which will suggest themselves to those charged with the responsibility of organizing safety committees.

The controlling unit is usually a central safety committee, the chairman of which is a responsible executive of the company. He may be the general manager, vice-president, the assistant general manager or the head of one of the operating departments. The personnel of this committee usually consists of the heads of the operating departments, the medical director, claim agent, and the director of safety, who acts as secretary.

The central safety committee meets either monthly or bi-weekly and passes upon all matters of policy relating to safety. In the larger companies it may be divided into sections, each concerning itself with the more intimate problems of the more closely related departments.

The departmental safety committees, composed of the men on the platform, the men at the bench and those in the field, are the committees which supply the grist to the mill, and it is their organization to which we are about to give thought.

The most democratic method of organizing workmen's committees is to call a meeting of the men in a given department and invite them to propose the names of five, ten, or twenty of their number, depending on the number of men in the department, to serve on the safety committee. This will be preceded, of course, by a short, snappy talk by the head of the department, supplemented perhaps by a few words from the chairman of the central safety committee or the director of safety, during which the aims and objects of the committee, duties of members, etc., are outlined.

If there is any reticence on the part of the men to take the initiative, the department head may tactfully precipitate action by suggesting the names of two or three men who would make good safety committeemen. It will be found that the natural leaders, the men who are popular, who have the respect

and confidence of their associates, are usually nominated as members of the committee.

Their term of office should be not more than three months, so as to provide an opportunity for an influx of new blood to stimulate and keep the spirit alive. It is well to retain one or more members as hold-overs to act as spokesmen, to preserve the continuity of effort, and to supply the conservatism which may at times be needed to counterbalance well-intentioned but perhaps misguided enthusiasm.

When the safety committeemen have served their designated terms it is customary in some companies to permit them to name their successors. Here again, it is well for the department head or safety director to offer a few tactful suggestions reminding the outgoing committeemen that in naming men who are succeeding them, they are sponsoring these new men and that the success or failure of the men whom they have selected to succeed them will reflect creditably or discredibly upon them.

Sometimes a man is selected as a member of the safety committee because he is known to be out of sympathy with safety activity. He thinks it is "the bunk." When such a man comes into actual contact with the work of the committee and sees results, he often becomes an ardent booster.

Some department heads prefer to choose their own safety men from an intimate knowledge of their characteristics. This is less democratic than the method just described, but may serve just as effectively as the other plan. This is a matter of preference which must rest with the individual company.

Since the transportation department is confronted with the more difficult problem of contending with accidents, many of which arise out of dual responsibility—that of the employees and those not in the employ of the company—the organization and functions of the safety committee in the transportation department deserves special mention.

Separate Safety Committees for Each Division

On those properties whose transportation departments are divided into a number of divisions there are usually separate safety committees in each division.

It is well to include in the personnel of these committees—motorman or one man operators and conductors—one man from each of the lines operating out of the division. The selection may be further refined by choosing early and late men, since conditions in the same territory vary at different times of the day and the night.

The division superintendent may act as chairman, and the car-house foreman or another representative of the rolling stock department makes a valuable addition to the committee. The supervisory forces of the transportation department should not be overlooked, as these men certainly have an interest in safe operation and their initiative and talents may be employed to good advantage.

The form of organization for the transportation department lends itself admirably to various forms of competition which stimulate interest and promote additional incentive.

A dissertation of this kind would not be complete without mention of the character of the safety meetings held by these committees. The organization of the committees may be ideal, the functions set up for them beyond reproach and yet unless the *modus operandi* is congenial and conducive to sustained effort, the preliminary organization work will have been for nothing. The meetings must be interesting—they should not be permitted to drag. It is much better to

adjourn ahead of time than to sit through the full hour simply to "go through the motions" or because "we're expected to put in this time on safety."

The meetings need not be without humor; it is not necessary to sit with a long face that might be appropriate to an undertakers' convention, even though serious matters are being discussed. It is well to relieve the tension now and then by an appropriate story, as this brings home a point many times more forcibly than a more serious presentation would.

Suggestions made by the men should be considered seriously. They are offered that way and should be so received. If it is necessary to reject a suggestion, the reason for its rejection should be made known to the originator.

In conclusion, to achieve lasting results be sincere, be receptive and encourage the efforts of your safety committeemen. Endeavor at all times to show your appreciation of the work they are doing, for their energies and zeal depend in large measure upon the degree of interest and enthusiasm which you arouse and sustain in them.

The Committee Recommends the Form of Discipline

CHAIRMAN EMERSON: In calling for the discussion on Mr. Koehler's talk, I am going to ask you gentlemen to confine yourselves absolutely to the questions that you wish to ask him, because our time is getting short and we don't want to have an elaboration of the points Mr. Koehler brought out. We want to ask questions about what he said.

STEPHEN A. HART (Pittsburgh Railway Co., Pittsburgh, Pa.): Mr. Koehler's remarks specify that the safety committee recommends the form of discipline to be administered to a man in case of an accident. I would like to know the method he uses in Milwaukee.

MR. KOEHLER: In one or more departments, the committee makes a thorough investigation of the accident. If, as a result of that accident, it is a violation of a rule or by gross negligence or carelessness that the man injured himself, then they find the accident, the disability and lost time were occasioned by negligence, and the committee recommends that he be suspended for a day or two or even a week, depending upon the seriousness of the offense. That decision is confirmed or denied by the head of the department.

H. ASHWORTH (Pittsburgh Railway Co., Pittsburgh, Pa.): What is your method of getting the attendance at meetings?

MR. KOEHLER: We don't have any trouble on that score. In the first place, our safety meetings are held on the company's time. A definite and specific time is set aside for a safety meeting. In the case of the men in the transportation department, they are relieved from their runs and are permitted to come to the meetings. In the case of the men in the operating department and others, those men, too, meet at a given specified time, and that time is set aside for that and no other purpose.

MR. ASHWORTH: I mean your general rallies.

MR. KOEHLER: We try to make our meetings popular. We try to appeal to a man's reason. We don't try to cram anything down his throat. We appeal to him. We conduct our meetings in a way that we don't bore them. They are not too long. We try to make them short and snappy. We don't have some fellow talk for an hour. We inject a little humor into our meetings. We show a picture and have some refreshments and cigars and that sort of thing. That does the trick.

MR. ASHWORTH: Do you observe the violation or do the members of your committee do that? Do you feel that it would be more effective to report that man or have the safety director talk to him in a heart-to-heart fashion?

MR. KOEHLER: I prefer to reach a man by an appeal to his own reason. My own reaction would be this: If I saw a man who did something that I thought was un-

safe, and I felt that by an appeal to him and by calling to his attention the fact that he was jeopardizing himself and perhaps was denying his family opportunities that they might have, I would tell him about it. I should much prefer to go to a man and talk to him, and I am convinced that that is appreciated. Does that answer your question?

MR. ASHWORTH: We in Pittsburgh have a different system. We don't believe in any suspension whatever for a man. We give the men a new sheet every January. If he has an accident that looks very much like his own fault, he is given a note with his name on it, and if he thinks he is guilty he signs that and it goes against his record. If he can show that it was not his fault, there is nothing said about it. We get wonderful results in Pittsburgh on that. We put the men on their honor.

MR. KOEHLER: I think that is a good plan. We introduced an innovation last year, in that instead of the suspension or anything of that sort, we had the man who was responsible for an injury to himself appear before the general safety committee of his own department and there acknowledge his responsibility for the accident; tell just how it happened, what he did to contribute to it, and how he might avoid it in the future. That is a form of discipline that is perhaps more acceptable.

GEO. K. CONKLIN (Augusta, Aiken Railway & Electric Corp., Augusta, Ga.): I would like to ask Mr. Koehler if it is a good plan to have one meeting of all the conductors, and have one meeting of all the motormen, and then have all the members criticise the particular department.

MR. KOEHLER: I think that is a very fine plan. There is such a thing as not being able to see the forest because of the trees. You become so close to a situation that you no longer see hazards that are there, and by bringing in the men from the other departments, you get that interchange of ideas and opinions that is so helpful. I think it is a mighty good plan.

W. H. BOYCE (Pittsburgh Railway Co., Pittsburgh, Pa.): Do you pay for safety and other suggestions?

MR. KOEHLER: No, we do not.

CHAIRMAN EMERSON: I certainly am glad to hear this discussion. I think we get a lot of meat out of the discussions. Our time is limited. We still have two more papers. I am going to call now for the third paper of the session. I take pleasure in presenting Colonel Edward C. Spring of the Lehigh Valley Transit Co., Allentown, Pennsylvania.

The Power of Safety in the Electric Railway Field

Edward C. Spring, General Superintendent, Lehigh Valley Transit Company, Allentown, Pa.

Upon the horizon of human events there appears a new agency destined to revolutionize the business and economic standards of the world. Flooded in all the glory of the morning sun it has already begun to radiate its influence over the land. This influence is destined to be world-wide and predominate in every vocation of life. It is the answer to thousands of problems yet unsolved.

For "Safety" is the most powerful word in the 5,000 languages and dialects of the earth. A universal language in itself, it is understood by all. Webster gives as a definition of safety "freedom from danger." What a power lies in that definition! What vocation in life does not have its dangers, which should be avoided!

If there is a guide or power that will safeguard all interests, is it not to be cultivated and adopted?

Safety, although known in theory as far back as the Creation, is a comparatively new word in industrial and commercial life. Brought into promi-

nence in 1912 by the organization of the National Safety Council, its real constructive meaning in modern civilization began to be more thoroughly understood. The activities of the National Safety Council have kept pace with the onward march of progress until today industry recognizes in the safety idea, one of its most potent powers for efficiency and production.

The safety department in all big business not only strives to eliminate the accident hazards of the plant, but ties all department and division employees and the management into a coordinate whole.

For 15 years industry has spent millions of dollars and made countless studies and analyses of safety problems.

What can the public utilities, particularly the electric railways, derive from the experience of industry?

There Are Four Outstanding Problems

There are four outstanding problems with which the electric railways are confronted today and which must be brought to a speedy solution, in order that the industry may cope with the many new developments in the transportation field:

- 1—Greater efficiency in operation.
- 2—Reduced costs in production.
- 3—Coordination of employees with management.
- 4—Better public relations.

Has industry not been confronted with the first three and worked them to a fairly successful solution?

Do we not find that the most effective work in connection with these three problems has been done in the past 15 years, during which time the plant safety organizations have functioned most prominently?

Is it not a fact that the safety departments have done more than any other agency in plant management to bring about a solution of these three important problems?

Every close student of economics and every industrial engineer will substantiate the affirmative of these questions.

What, then, is left for the utility to do, except go and do likewise? Profit from the experiences of others, knowing that their results have been obtained along the lines of good and sane American business management. Simple, is it not, yet how many public utility executives are ready to be convinced of its logic?

Unlike most projects, safety must work from the head downward instead of starting from the ground and working up. Unless the executive or managerial heads are in sympathy with the idea, that safety work is going to solve in a very large measure their major problems in operation, and have implicit faith in the results, it will be useless to enter into the work.

It is the example set by management that is reflected down the line to the lowest subordinate.

There is a wonderful ally awaiting the Electric Railway industry in accident prevention and safety work, if this is made an integral part of any organization. It must not be spasmodic in character but strenuous and persistent if it is to be successful.

Let us consider briefly the power safety offers toward the solution of the four important problems referred to:

First: greater efficiency in operation is gained through education, by a better understanding of work and coordination of interests. One of the most important influences in accident prevention is the proper selection of men. Great care should be taken that the very best material available is secured,

that this be followed by thorough training and close supervision, constantly emphasizing the importance of safety, and that this be accompanied by fair, reasonable disciplinary action for infringement of regulations.

Under a program of this character a high state of efficiency will be developed in every department.

In the study of accidents, both from a public and employee standpoint, every phase of safe and sane operation must be thoroughly investigated. What better medium can be mustered into service than the department organizations and employee groups? Almost instantly you have a highly trained force that is being educated through investigation and study. Its work will give the organization a better understanding of the problems to be solved and the coordinate interest is held secure by the various committee chairmen. Greater efficiency is almost automatic.

Second: reductions in cost of production are a result of constant study and close application to problems unsolved. Constant vigilance on the part of the foreman and worker are imperative for reduction in production costs. The trained safety committees are constantly on the watch for carelessness, waste and safety in the work of the department. They are trained to a keen sense of duty and loyalty to the management. They can impart this spirit to the worker as no other agency can possibly do.

With the elimination of carelessness, waste and imperfect work, costs are bound to decrease. In this connection the fact must not be lost sight of, that a safe man is not a careless or wasteful man, but a highly efficient man, made so by his safety training; therefore reduced costs in operation are secured.

Safety Offers the Common Ground of Mutual Interest

Third: industry has given the business world a wonderful illustration of the value of the plant safety organization in the relationship of the management and employee. In this case safety offers the common ground upon which all matters of mutual interest can be clearly met and discussed. Here enters the human touch so necessary to desired results in modern business management. Again, no other agency can function with greater success than the safety organization.

When employees are successfully grouped into working forces, encouraged by the management and marshalled by the department heads, superintendents and foremen, a better understanding of working conditions and problems is the inevitable result.

Fourth: better public relations is a problem akin to the utility and does not enter into the industrial problems. In the public utility field, and very pronounced in the electric railway field, the problem of public relations is perhaps the most important one to be solved.

To reach the attentive ear of the public so that we may tell our story in our own language is a diplomatic feat. Industry has found that the one common ground upon which the management and employees can meet and be understood is the ground offered by safety. We are fast realizing the same in the electric railway field. This being the case, should it not be easily understood that safety is the only common ground upon which the utility and the general public can meet and converse in the same language?

Already in the electric railway industry many companies have given much thought to this subject and have successfully carried out programs that have brought splendid results. Their work should be closely studied and followed.

Certain tie-ins with the public are most necessary for better public relations,

the most important of which are:

- 1—Chambers of Commerce.
- 2—Schools and playgrounds.
- 3—Churches.
- 4—Luncheon clubs.
- 5—Women's clubs.
- 6—Large industrial plants.
- 7—Motor and drivers clubs.
- 8—State, City and Borough officials.
- 9—Community and civic associations.
- 10—Parent-Teacher associations.
- 11—Boy scouts and camp fire girls.
- 12—Local press.
- 13—Broadcasting stations.
- 14—Local safety councils.

That all community activities should be closely in touch with their transportation interests is highly desirable for good service. The relationship between the electric railways and the community should be of such a nature that matters of mutual interest can be discussed and adjusted in a most friendly spirit.

Thorough Cooperation Secured Through Safety

The cooperation desired is accomplished best by the safety and accident prevention work. Tied in with the home, factory, highway and schools, an entering wedge is immediately made with the public, after which the introduction of other matters is a simple proposition.

There is not one of the fourteen tie-ins mentioned that cannot be won over through the safety idea. It will win where politics fail, and will overcome personal prejudice.

The safety organization of the electric railways is the one factor that can carry the management's message to the public.

In the field of safety the opportunities are exceptionally great for men of vision and power; they are also great for men of ordinary power and intelligence. Greater capacity is being conferred upon each man in this country to do something of note.

There is great need today for a better understanding of the conditions of our lives, national and industrial, in order that the forces making for national greatness and industrial happiness shall be shaped to better serve and protect our nation and communities.

The power of safety is destined to take supremacy over all other agencies in the civic, economic and commercial life of our nation in meeting some of the perplexing problems.

The power of safety is the one outstanding influence that can bind the public, the management and the work together into a coordinate whole, making success an assured result.

CHAIRMAN EMERSON: Colonel Spring, I want to thank you very much for reading such an instructive paper. I am going to ask the members to defer discussion on it until tomorrow, however. I think we will have a little more time tomorrow than we have today.

I now take pleasure in presenting Mr. P. J. McGrath, international fifth vice-president of the Amalgamated Association of Electric Railway Employees of America.

What I Think of Safety

P. J. McGrath, International Fifth Vice-President, Amalgamated Association of Electric Railway Employees of America, Pittsburgh, Pa.

The subject allotted to me should appeal to every man, woman and child, for surely there are none who are uninterested in their own safety, and they should also be interested in the safety of their fellowman. Therefore, I am strongly in favor of safety or any measure that would tend to promote safety, either by way of improved machinery, by the adoption of proper safety legislation, by the education of the public by personal contact through holding meetings along safety lines, by bulletins posted in conspicuous places where they may be read by the vast majority of the people, or by organized newspaper publicity in every large city of the country.

I am of the opinion that arrangements could be made (for little cost, if any) to have the newspapers print an article every day, on the same page of the various publications, (so the people would know where to look for it), dealing with the subject of safety. The people, I believe, would become interested and would look for that item, the same as our younger people look for the baseball news.

What I am trying to suggest is some possible way of constantly having the subject before the masses of the people.

We might hold our various meetings of employer and employee, and discuss the subject very diligently and with extremely good results; but that would only be between employer and employee, and would not be apt to reach outside of that group.

There is nothing more important to which a man may devote his life than safety in the interest of others, and the word "Safety" in meaning has an extensive realm.

No one realizes the importance of safety more than the wage worker. But for a wage worker to contribute to safety, aside from his own personal safety, he must possess a sense of freedom in the exercise of his duties to his fellowmen; and the expression "fellowmen" includes both employer and employee.

The first question that comes to the wage worker is, "How far am I at liberty to participate in the safety of others and in the interest of the property with which I am employed?" A further question is, "How far can I participate in advancing my safety ideals?" But the latter question is wholly dependent upon the former and inclusive within it. Then what is the limit?

Wage workers are classified. One class of wage workers can have very little to do in the extension of safety plans. The other class really has all to do in the matter of extension of safety plans. I might take considerable time in identifying these two classes, but I feel it unnecessary. There is not a safety law on the statute books of the Federal or State Governments, (nor in the Dominion of Canada) in the interest of safety as applying to the wage workers, which was not brought forward and sponsored by that element of wage workers with which I identify myself.

I cite this fact to show that through cooperation of wage workers and the managements of employing concerns the safety plans can be instigated and extended, to a far greater degree than without this cooperation.

Safety plans come without the enactment of laws to enforce them. But there must be a liberty of action, without which such safety plans can be of little value. Employees must be interested in extending safety to others. There is only one way in which this can be accomplished and that is by a spirit of

freedom. That spirit leads the wage worker not to look upon his employment as a mere rain check, but makes him understand that it is his duty and a source of satisfaction to him to contribute to the advancement of his fellowmen, recognizing that in this is his own advancement.

I take pleasure in stating therefore that within my class of wage workers this spirit of safety is active and it inspires in each individual a concern for all others.

There is a common interest in safety among employing investors and wage workers. The wage worker recognizes that he has even a greater interest in the safety and success of the employing property than may be had by the individual stockholder or investor. His employment is the source of his income. Therefore, he has a common concern and interest in the employing property. His possibilities are dependent upon its prosperity. He knows it is to his own interest to protect the employing property and safeguard it to the extent of his ability.

Why should it be necessary to urge upon employers and employees the importance of cooperating in safety? Both are dependent upon the employing property for income; yet there are some to whom this common interest is not apparent.

This makes necessary special endeavor in the interest of safety so that these ignorant ones may be brought to a full understanding of their co-ordinate interest.

Then we may go beyond the immediate sphere of the employing property and its employees. Naturally, we observe that in transportation service it is imperative that the safety of the general public be conserved. There is a large element of the public in whose interest we must be eternally watchful. This requires rules and regulations in the operation of transportation service; and we may well know that the best service in conserving safety comes from those who harmonize in watchfulness, who cooperate and recognize a full freedom within that cooperating field. In the general association of wage workers in their various crafts, they are continually alert to this duty of conserving safety in transportation.

Every wage worker should be a safety expert. In so far as his concept of his personal safety is concerned, he is a safety engineer, but without proper association with his fellow wage workers of all crafts, he is without the possibility of extending his service in the field of safety to others.

There is no doubt that wonderful results can be, and probably are being obtained through thorough cooperative safety effort between employer and employee. But we may promote still further that spirit of cooperation and confidence and eventually obtain the goal to which I trust we are all aspiring.

Report of the Special Committee on Safety

MR. McGRATH: With your permission, I would like to read just a small item that was taken up at the recent convention held last week which I believe will be of interest to you, and will show that the street car men through their organization are becoming more and more interested in the question of safety.

It came about after the two general managers, Mr. Perkins of St. Louis and Mr. Fitzgerald of Pittsburgh, spoke at the convention of the street car men. Both gave a splendid talk on safety, and were given a great ovation. As a result of their talk, a safety committee was formed who brought back the report that I intend reading to you.

Birmingham, Ala., Sept. 16, 1927.

Mr. Chairman and Delegates to the Twentieth Biennial Convention held at Birmingham, Alabama:

It is only after careful consideration and study on the subject submitted to them that your Committee on "Safety First" brings back to you the following recommendations for your consideration.

Before doing so we desire to preface those few remarks.

First of all, we recognize that the question of "Safety First" is somewhat of a new question in our development as Street Railway Workers. We feel that while it is practiced by some of our members on some of our roads, it has not reached the great bulk of our membership. Therefore, it needs be given deep study and earnest consideration by our membership before putting into practice on our various systems, for while it may be practical and beneficial to our membership on one road or system, it may possibly be to the contrary on another, for we believe that unless there is a true spirit of co-operation between men and management, the question of "Safety First" will not be a success.

By that we mean that if there should be an ulterior motive, other than that of sincere and unbiased co-operation, then we can expect nothing but disaster and dissatisfaction as far as the question of "Safety First" is concerned. On the other hand, who is there among our membership who is not (or at least should be) interested in, to the extent of safeguarding the life and limb, not only of our men employed in our industry, but our people in general, whether it be in the mine, mill, factory, in the home or on the street car. We feel that we were not deserving of consideration among the human element were it not so.

Accident Prevention Resolution Is Adopted

President Mahon has given to us in his report figures taken from statistics as to the number of lives lost and the number of people maimed through accidents in the various industries every year that is appalling. For instance, let us take the year of 1926, where there were twenty-three thousand (23,000) men, women and children slaughtered on our highways of the United States, an increase of one thousand (1,000) over the records of 1925. So we say, Mr. Chairman, and Brothers, who is there among our membership who is not willing, with due care, judgment and precaution, desirous of alleviating as far as possible, this tremendous slaughter that is happening in our midst every year.

We have heard from Mr. Perkins, General Manager of the St. Louis Street Railway Company, where they have a Safety Committee System that splendid results are being obtained and that the amount of accidents are being reduced considerably. And again, from the city of Pittsburgh we hear from Mr. Fitzgerald, General Manager of the Pittsburgh Railways Company, where they have a co-operative, as well as a Safety Committee System, that their amount of accidents are being reduced considerably.

So while we, as your committee on 'Safety First', do not recommend that our membership should follow particularly either one of those systems, we do suggest and even recommend that our membership take up for earnest consideration some method whereby the tremendous amount of accidents happening will be reduced to a minimum thereby bringing due credit to the Amalgamated and its membership; bearing in mind whatever system there might be adopted, that our members see to it that their membership in the Amalgamated remain intact, for it is through it, and it only, that they will be sought, for either Safety First, co-operation or any other system that might be considered an advancement to civilization.

Resolution No. 22, presented by the St. Louis delegates, read in part as follows:

Resolved, that the Amalgamated Association of Street and Electric Railway

Employees of America make application for membership in the International Safety Congress and have at least one representative at their conventions.

Your committee recommends that this be amended as follows:

Resolved that if the Amalgamated Association of Street and Electric Railway Employees of America is requested by the International Safety Congress to affiliate with that body, the same be referred to the Executive Board, and if in their judgment there be no conditions restricting our affiliation, that President Mahon or his appointee act as our representative.

CHAIRMAN EMERSON: I am now going to ask Mr. Hellmuth to read the report of the Nominating Committee.

Report of Nominating the Committee

The Nominating Committee recommends the election of the following officers of the Section for the year 1927-28:

Chairman, A. W. Koehler, Superintendent of Accident Prevention, Milwaukee Electric Railway & Light Co., Milwaukee, Wisconsin.

First Vice-Chairman, H. K. Bennet, Safety Manager, United Electric Railways Company, Providence, Rhode Island.

Second Vice-Chairman, E. K. Eastham, Safety Director, United Railways of St. Louis, St. Louis, Missouri.

Third Vice-Chairman, Melvin W. Bridges, Safety Engineer, Chicago Rapid Transit Company, Chicago, Illinois.

Secretary, J. E. Stott, Georgia Power Company, Atlanta, Georgia.

Respectfully submitted,

Samuel H. Reid,

G. T. Hellmuth.

MR. HELLMUTH: The committee moves the adoption of this report and the election of these officers.

(The motion was seconded and carried.)

ADJOURNMENT.

Thursday, September 29, 1927

The third session was called to order at nine forty-five o'clock by the chairman, R. W. Emerson.

CHAIRMAN EMERSON: The meeting will please come to order. Gentlemen, the official registration of this section is now 227, by far the largest attendance ever had in the Electric Railway Section. Those of you who have not yet filled out the registration cards please do so. It is very gratifying to have 227 and we would like to make it still larger if possible.

The first paper this morning will be read to you by J. S. Kubu, assistant superintendent of Accident Department, Cleveland Railway Co., Cleveland, Ohio.

Specific Ways to Prevent Collisions With Other Vehicles In Urban Centers and at Grade Crossings

J. S. Kubu, Assistant Superintendent, Accident Department, The Cleveland Railway Company, Cleveland, Ohio

Chicago's initiative and successful leadership in the realm of human endeavor are facts of history. Her creative and aggressive spirit, characterized by "I WILL," has lent her world-wide fame. Today we are cognizant of association with minds that flash thoughts as stars flash light and we feel it an inspiration to breathe the atmosphere of this great city.

Only recently Chicago made a traffic survey at an outlay of \$50,000. Men experienced in safety work were represented in that survey. Some of them may be here and could enlighten us with abundant material upon this particular phase of the many sided question of safety.

Every automobile accident involves three agents: automobile, driver and place. The automobile is a significant factor in many disastrous collisions. The records of these collisions admonish us to insistently advocate regulation of the possible speed of all automobiles.

Upon bill boards and double pages of magazines are spread attractively decorated advertisements of automobiles, and we frequently notice that while manufacturers claim their product will wear well, they give a primary importance to the speed possibilities of their machine. Sometimes dates and places of automobile races are mentioned where this speed was demonstrated. And so we have organizations providing parks with speedways, charging admission to automobile races made spectacular beyond description, and attended by serious and often fatal accidents. We hold that the real purpose of these occasions is to give the widest publicity to the startling speed of the machines, and that the manufacturers are directly responsible for them. Who can question the psychological effect of such races upon the public and upon sensitive minds in search of thrills?

The automobile winning the race is purchased mostly by venturesome young men who care little or nothing about the mechanical construction and value of their automobile. The one word "speed" impresses them above all else; and having the speediest known automobile they test its possibilities upon urban boulevards and the common highways, and not only endanger human life and property, but often cause accidents most appalling.

As a means to prevent this whole panorama of thrills, wrecks and deaths, why not demand that our government institute laws forbidding the making of automobiles capable of being insanely driven?

In this connection where the institution of laws is imperative as a way to prevent automobile accidents we may mention Compulsory Liability Insurance. These laws should be instituted by the government and be universal, including every state. Such requirement *might*, for a short period of time, impose apparently excessive burdens upon insurance companies, but difficulties now magnified would be speedily overcome. Unsafe risks would be eliminated. A high grade of automobile driver would everywhere be found. Thousands of worn out and unsafe automobiles would not be on the street or road. Drivers of automobiles would enjoy a feeling of ease and safety, and a continuously increasing pleasure in the possession of an automobile.

Fundamental to all specific ways of preventing automobile collisions we may mention "education." It is an all inclusive term. It seems to be *the one way* to solve all problems confronting safety workers. It stands over against a multiplicity of appealing needs of a heterogeneous company of automobile drivers. It aims at awakening an ideal conception of human relationships, promises to create a refined and sympathetic state of mind and to so equip each automobile driver that he will invariably show a just and courteous regard for every other driver's rights. Each passing day furnishes abundant proof that laws and ordinances will not in themselves lessen the number of accidents; and we are startled by the educational needs of the general public upon all matters related to safety.

Education Sheds Light on the Problem

Education means light. It means light adequate to reveal to automobile drivers their personal deficiencies, and then to allure them into habits of safety. It means light for law makers, awakening in them the high purpose to have written at once into the statutes certain definite requirements and tests before the state will permit a person to drive an automobile.

Similar accidents are everywhere occurring, and the amount of light necessary in one neighborhood is demanded in all other sections of our country.

The Southern California Automobile Club made an eight months traffic survey. They reported that many automobile accidents are caused by "right of way" violators. The next highest number of accidents were caused by drivers incompetent to handle an auto. Referring to grade crossing accidents, the report states there were few accidents of that kind although those were spectacular and were given wide publicity. Consulting magazines and various publications in the interest of safety, you may be surprised to note that investigations in many places are in keeping with the California report.

Reports of surveys, and publications of safety organizations are parts of an educational process but they seemingly touch few individuals with commanding influence. Forward steps are slowly taken.

It is not expected that the whole country will be suddenly illumined and changed, but there may be gratifying returns from the good seed scattered; a more perceptible awakening would immediately result if some "National Committee on Safety" were endowed with legal authority, and that committee's efficiency would be immeasurably augmented if the government would make it a liberal appropriation to carry forward a comprehensive educational work in every urban and suburban district. The time has come for action. The ideals of safety workers must be incarnate in the life and conduct of the masses. Good things have been said. Specific things must be done.

In March, 1926, the Second National Conference on Street and Highway Safety assembled in Washington, D. C. Representatives of Governors of 43 states gathered there. The many questions and problems of safety were analyzed. What ought to be done in a myriad directions was indicated. The writer of this paper therefore urges the immediate doing of the things we see ought to be done.

Who will see to it that automobiles are so constructed that only sane driving will be possible, and that no such accident as occurred in California a few days ago will ever happen again, wherein young fellows in an automobile attempted to race with a railroad train and dashed out their young lives by running into a concrete wall?

Who will see to it that every automobile driver is subjected to a critical examination? First a physical test. Such test would eliminate people of seriously impaired physical strength, unsound heart, poor eyesight, color blind, the alcoholic, and those whose public behavior may rightfully be challenged.

Second, a test of intelligence. That test would disclose one's familiarity with the English language, knowledge of traffic laws, and ability to operate an automobile.

Who will see to it that compulsory liability insurance laws are instituted? Who will arraign those in places of authority for their indifference and laxity and for their prejudiced discrimination in the prosecution of offenders against the law? Sometimes people are arrested for violating a traffic law and causing an accident. Immediately thereafter a scheme is devised to escape punishment. Influences at the offender's command are enlisted and men sworn to protect society are threatened, and in many instances the ultimate outcome is that nothing is done. Who is going to see to it that all these wrongs are righted? How many cities and suburban districts have responsible committees thoroughly organized whose business it is to investigate and report every accident, and see that the negligent are justly dealt with?

To realize our ideals, to achieve the end toward which men have been striving, we believe that all safety organizations should at once be correlated in cooperative effort, and over all as one administrative head should be the National Committee, having back of it the authority of the nation. It should touch and command every individual through efficiently organized committees, and find every member of every home in all the land an evangel of "Safety First."

Similar Recommendations at the Hoover Conference

CHAIRMAN EMERSON: I don't want you gentlemen to think that Cleveland is taking a monopoly on this program. As for the discussion of Mr. Kubu's paper, I hope you will be as free about asking questions today as you were yesterday.

E. K. EASTHAM (United Railways of St. Louis, St. Louis, Mo.): I found a great deal of interest in this paper of Mr. Kubu's. It is a matter that the electric railway industry is more interested in perhaps than anything else—how to prevent collisions with motor vehicles. This matter embraces with most city companies more than half of the total accidents. I, however, only want to touch upon one feature of his paper.

He spoke of certain laws that he thought would help in cutting down motor vehicle accidents. I would like to say that most of the recommendations in Mr. Kubu's paper had already been covered by the recommendations made at the Hoover conference on uniform motor vehicle laws. I believe that the best way for the electric railway industry to go after this proposition is to back up in every possible way those recommendations of the several Hoover conferences which culminated at the last conference in the drafting of specific laws, suggested laws to be presented in all the states of the Union with the hope that they would be passed and in that way make our legislation along that line uniform.

I attended all those Hoover conferences. I think the electric railway industry was represented in a measure at all of them. However, I don't think this industry was represented as strongly as it should be. I would like to suggest to the electric railway executives present that when national moves of that kind come up, no matter how badly off you are financially, there is no way in which you can spend money, in my

belief, that will bring greater returns to you than to send a representative, or to go yourself (you, the executive), to those national meetings.

There was one thing that came up at the last Hoover conference when those proposed laws were drafted. It had to do with the passing of street cars by automobiles when those street cars were discharging or taking on passengers. Owing to the lack of representation by the electric railway companies, I presume, it was originally suggested by the conference to permit automobiles to pass cars while taking on or discharging passengers if they had a certain amount of clearance and if they proceeded slowly and cautiously.

Our experience in St. Louis under a similar experiment proved that people in St. Louis were killed, maimed and injured day in and day out by automobiles running into passengers while trying to get on and off cars.

With the help of a couple of friends, we were able to have that changed, and the final recommendation of the Hoover conference was put in such shape as to require that all automobiles stop eight feet to the rear of all street cars. That has gone all through the states now as the final word of safety covering that particular point.

Representation Necessary at Every State Meeting

I merely bring that up as an illustration showing how important it is that street railway men realize in full that it is up to them to protect their industry along these safety points, because they are better qualified to give an opinion on such matters, and have the information and experience along these lines which no other group has.

I would like to suggest, too, that when your states call state conferences along these lines that the electric railway industry be represented at every single meeting, and that every system in the state send a representative to those conferences. Also, when those laws are introduced in the state legislature, you men as citizens, you men representing in each particular state one of the biggest and most important of our industries, should get busy and see that you have a voice in these matters. Most of you know how to get busy, you are connected with board of aldermen and so on.

Let's have these Hoover laws passed in all the states of the Union. Some states will merely require a slight change, but when we make up some uniform, common-sense laws and get them passed by the respective states, the nearer we will come to carrying out what Mr. Kube had in mind in his paper. I feel very strongly on that, and that is why I have taken more time than I perhaps should on that matter.

CHAIRMAN EMERSON: We are very fortunate, gentlemen, in having Mr. Fitzgerald of the Pittsburgh Railways Company with us. I am going to ask him if he will say a few words to us at this time.

T. FITZGERALD (Pittsburgh Railways Co., Pittsburgh, Pa.): Gentlemen, I hadn't intended to say anything, but I just asked the chairman to let me say a few words about the gentleman who has just sat down.

I heartily agree with practically everything in the paper. I feel the time has come when strenuous pressure will have to be brought to bear on this question of vehicular collisions. I think the suggestions made are well worth while.

The provision I wanted to speak to you about particularly is the suggestion that representatives of the electric railway industry attend the Hoover conferences, or other conferences of this nature in the future. I plead guilty, gentlemen, I was a part of that representation, and I had to do with this question of automobiles passing street cars at stops.

I can realize the force of what the speaker has said. But we have traffic conditions in a metropolitan community like ours, where it is a question of either choking the traffic back more than absolutely necessary, or to allow it to flow as freely as possible. It may be a safer proposition to allow more freedom of movement than to have the automobiles come to a complete stop.

My position at this conference was, where ample room was had to pass street cars, and get them out of the way, allowing traffic generally to operate, that it would be the proper solution to the problem.

I plead guilty to the lax representation of the electric railway industry. It is a pretty hard job in itself, and I want to say for the Electric Railway group that I believe they have done everything they could think of doing, and it is only a lack of brain power to cooperate in the safety movement and in the regulation of traffic.

Mr. Storrs, I know, is doing everything possible to reach that end, and in so far as I know, the Electric Railway group is trying as hard as it can to cooperate with all agencies. I think that criticism of this kind is just what we need. We are doing what we consider possible, but we are still out to go a little bit stronger. I hope it will stimulate us to greater efforts than we have made in the past.

MR. EASTHAM: The freedom of movement, Mr. Fitzgerald, was taken care of in metropolitan sections by allowing them to pass if there was a properly designated safety zone. Safety zones are what we should have in cities like St. Louis and Pittsburgh, otherwise if you merely say eight or ten feet clearance, there is no way to enforce that. A man will edge in one, two or three feet and the policeman cannot make a case and prove that it was less than that clearance. It is from actual experience in St. Louis that we have insisted on real safety zones, something that would protect the passengers.

Education More Necessary Than Laws

EDW. McMORROW (Union A. A. of S. & E. R. E. of A. Detroit, Mich.): During the various meetings, I have made observations, and I believe what we need is education more than laws. I think we have too many laws. In the city where I work, when we hear others talk of additional laws, we look upon them with a holy horror. Education, in my mind, is better than law.

While there might be some good features in these proposed laws, my friends, I approach any law having to do with the electric railway industry with a holy horror. We are lawed here and lawed there, and practically lawed out of existence. If they keep it up, we as operators of street cars can see nothing in the distance but the poor house, because all the money that is to spare has been legislated for in the most foolhardy, ridiculous manner I can think of.

I am one of the street car men who don't like automobiles. I don't like to see the management run vehicles that are in competition with our industry. I don't believe that an automobile is a necessity in our industry. I surely don't believe that it is an asset. I have never seen an automobile yet that was an asset. It is a liability in our industry.

So I say to you men, coming down here today some 12 miles from my home, I saw the result of law affecting this industry. I saw a large body of men paving the public highway at the expense of this industry. We are paying for it. We, who are in this industry are doubly and triply taxed. Therefore, I say when you talk law to me, I approach that in a measure of holy horror. But, when you talk education—that of which I never had enough—then I appreciate it.

There is only one real law—one real rule to operate this industry by, and that is good, common, everyday horse sense.

D. C. KING (Pittsburgh Railways Co., Pittsburgh, Pa.): I think that the question of the enforcement of law is a different proposition. In the city of McKeesport, they seem to have very little enforcement of laws enacted. If an automobile runs in front of a street car, there is no use of the policeman arresting that man because he will get off clear anyhow. Pennsylvania has had a uniform traffic law passed recently, but what it is, I don't know. However, there is no use in having these laws unless they are properly enforced.

I have been informed of an agency selling automobiles guaranteeing to the purchaser that they will get a driver's license, in order to sell the machine. If these things are going on, there is no use of passing strict examinations, because if they have pull enough to get the purchaser of a car a license, we will have dangerous conditions throughout the country.

C. E. ROGERS (Chicago & Joliet Electric Ry. Co., Joliet, Ill.): Can you give me information on whether they have done anything in the cities to warn pedestrians of the overhang in street cars when going around corners? You take a 45-foot car going around a 35-foot radius curve, and the car overhangs on the rear end about three and a half or four feet. Have they done anything in marking lines around cars to warn pedestrians and motorists of just how far they can pull in without being side-swiped?

WM. H. WILSON (Pittsburgh Railway Co., Pittsburgh, Pa.): We take care of that by painting yellow lines on the streets at all curves where the car makes a corner, saying, "Watch cars turn here!" We also have markers on the street in different portions of the city with a white cross with the number of people killed at that point marked on it.

MR. MERRICK (United Railways, St. Louis, Mo.): We have a complete system of this in St. Louis. Every curve is marked with the width of car when it swings around a corner. The front and rear of the car are also marked. Some of the cars extend further on one end than on the other platform, but any curve where there is any possibility of a car catching an automobile, in every suburban district and even downtown, there is no place where the corners are not marked. Most places downtown a place about four feet wide is marked for passengers to stand while waiting to board and leave the street cars. There is also a post about four feet high marked "Safety Zone," and on the outside of that, the street is wide enough for an automobile to pass while the street car is standing still.

The Overhang of Cars Plainly Indicated

MR. BENNETT: Regarding the overhang of cars, in Rhode Island we have some one hundred of those white markers in the city where we think they are necessary. Prior to the installation of these lines some three years ago, we had accidents almost daily at some streets. Since that time you can count them on your two hands. The improvement is almost inestimable.

Mr. KUBU, what did you mean by reckless driving, speeding?

MR. KUBU: It doesn't mean miles an hour—not at all. It might mean reckless driving when going through some districts at the rate of nine or ten miles an hour. What I had reference to was to enact laws prohibiting the manufacture of automobiles that will develop such a high rate of speed. I notice in one of the magazines that Mr. Keating, in the Research Department of the General Motors Company, is trying to perfect a car that will go faster than any of the present cars. He compared the gas explosions to that of a gun. A rapid firing gun will shoot 1,250 shots a minute. This engine now perfected can fire sparks at the rate of 1,600 a minute, which probably gives an automobile a speed of 85 miles an hour. They ought to be checked on the speed so that they wouldn't have so many serious accidents.

W. F. HANNA (United Rwy. & Elec. Co., Baltimore, Md.): What do you think of compulsory accident insurance?

MR. KUBU: Just as I read in my paper. It will eliminate the fellow that has a \$25 automobile from going out and having accidents. It will eliminate the fellow who has a good many accidents. If he has a license, as he should, he will be free from accidents. They won't insure the reckless driver. The State Workmen's Compensation does not make any difference, but there should be some device to eliminate that kind of people.

MR. HANNA: In Massachusetts there is a compulsory insurance law, but up to this time I am unable to say that the law has had any effect in the reduction of accidents. In view of the many features of the compulsory insurance law, I think it would be very appropriate to have a committee in this section to study it.

MR. KUBU: Of course, the insurance company is opposed to liability laws. They fear the heavy verdicts rendered by the juries. They sometimes give the limit when they really don't deserve it.

MR. HANNA: In Massachusetts and Connecticut this law has been modified. So many think of this from the standpoint of having responsible people only, own automobiles that I think it would be a very helpful thing to study these features.

CHAIRMAN EMERSON: Do you make that a motion?

DR. C. P. SEGARD (Third Ave. Ry. System, New York): Before that motion is put, I should like to voice my humble protest regarding any law upon the restriction of automobile manufacturers in the speed of cars.

You may remember, those of you who were at the Hoover conference, that this subject came up in the form of a proposed recommendation covering that suggestion, that all automobiles come to a dead stop at all railroad crossings before crossing the tracks.

The Department of Motor Vehicles in North Carolina put a crimp in its having effect by saying, "Yes, we would do that provided that the traffic on the railroad was greater than the traffic on the highway. You may know of cases where there are not more than one or two trains a day, and in this case the steam train would have to stop where traffic was greater on the highway than on the steam road. I am afraid that there will be a back-kick to any such proposal of this kind.

Opposition to the Marking of Safety Zones

CHAIRMAN EMERSON: Mr. Hanna, will you state the motion again please?

MR. HANNA: I move that a committee be appointed by the Electric Railway Section, National Safety Council, to go into the subject of compulsory automobile insurance and find out the experience in other states, particularly Massachusetts, and to report to this Section on what their findings are.

CHAIRMAN EMERSON: Is there a second to that motion? I hear no second, Mr. Hanna.

D. W. FINCH (Des Moines City Ry. Co., Des Moines, Iowa): With reference to the gentleman's statement with regard to the safety stops in St. Louis, I am opposed to the marking of safety zones. Our experience recently in Des Moines was this: A car was coming east, making a turn to the left. A woman came across the street going north, and stopped within the safety zone. Another car going north hit her. The decision was against us when the verdict was reached, because she was in the safety zone. I would suggest that all safety zones be changed to "loading zones." Ours have been changed. The safety zone will only lead to trouble in my opinion, and you will get more judgments against you than you want to take care of.

CHAIRMAN EMERSON: I will ask you to defer any further discussion on this subject until later when they can be taken up with those who wish to discuss the last two papers read yesterday.

This has been a very successful and profitable meeting. There are several things that have happened to show that this Section is meeting with recognition, and is stirring up the industry as it has never been stirred before. We are very fortunate to have the managing director of the American Railway Association, Mr. Lucius Storrs, with us for a few moments. We know he has been here, and the Congress as a whole knows he has been here. I am sure we are very grateful to

him for coming. His time is valuable, and before he leaves I want him to say an additional word to us.

MR. LUCIUS STORRS (American Railway Assn., New York): You know, they coined, or rather derived, a word at the meeting last night, and I think we can all use it. You can get a lot of "kick" out of this—even the President of the University of Chicago.

It has been a perfectly wonderful experience for me to see the interest, the serious interest of the groups in the work they are doing and in achieving the results. The only suggestion I have is, that I wish you could have a group of electric railway executives at least as large, if not larger, than this to come in and hear matters of prime moment at all times.

Another thought in this work brings forth the possibilities in using a power which this industry has that has been dormant, latent and not used to the maximum extent. You have the possibility of using the large mass of interested workers to carry on the propaganda and education to the public in their constant contacts with them, and that is what you need.

Transportation Agents Should Lead the Safety Movement

One thing we have lacked that other industries have utilized, is the possibilities through customer and employee ownership. This cannot be done as yet in our industry with returns to a full financial success. You have a power that is shown in the fact that McMorrow here has been delegated to represent the labor side, and I do hope that can be capitalized and used and its full effect obtained.

I could go on, but I just want to give you a little picture in connection with the Hoover movement. I have maintained for a long time that in matters of safety, and in matters of traffic and civic affairs—all these matters that refer to the mass of people moving through the highways—the transportation agents in the community should take the lead in regulatory and educative measures. They are all too sensitive of criticism because these things happen to be of particular interest to the corporation that does serve the community as transportation agents for 75 per cent of the public in daily life. This is a great inarticulate mass which nobody knows anything about, and the transportation group should take up and keep alive such questions of vital moment.

If representatives are sent to these Hoover Conferences, the Electric Railway group should take on the leadership and its purpose should be to have a committee not solely of electric railway men, but under the sponsorship of this group, representatives of all civic organizations, service clubs, national and local.

I had the privilege of talking with Secretary Hoover two or three times at the time Mr. Coats was president, and we went down to talk with him. He believed in this work and talked very strongly, but we failed to get it across simply because the executives in our own industry were not alive to its possibilities at the moment. I wish such a group of 200 or 300 people as there are here, could be interested in things of that kind.

CHAIRMAN EMERSON: Another indication of the recognition which the Electric Railway Section is gaining was the action taken yesterday afternoon in the election of officers of the National Safety Council. Among those officers is Mr. G. T. Hellmuth, of the Chicago, North Shore & Milwaukee Railroad Company, Chicago, Illinois, who was elected treasurer of the National Safety Council. On behalf of this Section, I wish to congratulate him. If I had any finances of my own, I would be perfectly willing to leave them in his charge. We will now proceed with the reading of the next paper, by Mr. G. R. Whitmore, General Claims Attorney, Illinois Power and Light Corp., Peoria, Ill.

Statistical Review of the Accident Experiences of Electric Railways

G. R. Whitmore, General Claims Attorney, Illinois Power and Light Corporation, Peoria, Ill.

We suspect this subject sounds to you as it did to us, fearful in its dryness, and to be covered only by a lot of meaningless figures. Well, we will do our best to get away from a lot of figures and hope that the paper will not be meaningless.

It is not our endeavor to touch upon accident costs, claim department expenditures and the like, but our principal object is to discover, if we can, how electric railways are getting along regarding the frequency of accidents.

When a basis is to be figured out upon which accident frequency can be determined most justly, each one of us probably will have a theory of his own. Some would figure the number of accidents per million passengers carried, others the number of accidents per ten thousand car miles, while to the writer the most appealing and most common sense basis is that of number of car miles per accident. With this method you do not have to stop and figure in millions nor make mental calculations, but if you find that your cars are operating 5,000 miles per accident, that is a final statement in itself.

The data for our figures are the reports emanating from the offices of the American Electric Railway Association and are about as complete as it is possible to find on this subject. No individual company is to be cited in any way in this paper, but the figures are for companies from all parts of the United States, which have made reports to the American Electric Railway Association. The number of reporting companies varies from year to year and the figures vary with the number of companies that have reported. We have gone back to the year 1923, the first year reports are available to us: at that time 104 companies reported complete figures for both 1923 and 1924; in 1924, 105 companies reported complete figures for the years 1924 and 1925; in 1925 and 1926, 113 companies reported complete figures for 1925 and 1926 and for 1926 and 1925 respectively. It would seem that when more companies report, a greater accident frequency is shown; however, it is also apparent that the accident frequency is greater when reporting companies show a greater proportion of street railway over interurban and combination street railway and interurban companies. From the 1926 reports it is possible for the first time to give separate figures for street railways, interurbans and companies having combined street railway and interurban operation.

Comparisons are said to be odious but we know they are interesting. Many conditions should be considered in connection with comparative figures and they should not be taken as absolutely accurate, yet we have tried to figure out the average car miles per accident and per injury for electric railways in the United States as based upon the reports to which we have had access, and to give comparative figures for five years.

The table used in connection with this paper, shows the car miles per accident and per injury, based upon reports made by various companies to the American Electric Railway Association in the five years beginning with 1922, where the companies reporting have given all the figures requested by the association.

From the table, you will note that, taking all accidents into consideration, in 1926 there was one accident for every 2,680 car miles, or, stating it another way, electric cars operated about the air mail distance from New York to San Francisco for each accident that occurred. For street railway companies alone.

the car mileage was 300 miles less in 1926 than the average of all companies; the interurban mileage was about 10,000 miles greater, and the companies having combined street railway and interurban operation showed 1,000 miles more per accident than the average of all the companies. If you will look back in 1922, you will see that electric cars operated over 3,000 miles for each accident, which figure should be compared with the first figures stated for 1926, namely 2,680. This comparison shows that there has been an increase in accidents, in view of the fact that the mileage is less now than in 1922 for each accident.

Automobile accident figures are always of more or less interest, and we find that in 1922 the electric cars operated 6,380 miles for each automobile accident, while in 1926 they operated only 5,110 miles for each auto accident. In 1922, the automobile accidents constituted 44 per cent of all the accidents, while in 1926 they constituted 52 $\frac{3}{4}$ per cent of all the accidents. It would seem, from these figures, that automobile accidents are increasing considerably; but it is a wonder that we have as few automobile accidents as we do when all circumstances are taken into consideration.

Car collisions are more frequent now than in 1922, and the figures show that the mileage of cars per car collision is practically equal to the distance of five times around the world. From the information we have, it appears that all accidents, other than those in which automobiles are involved, are decreasing from year to year.

Personal Injuries Are Decreasing in Number

Now, passing from accidents to personal injuries, we find that in 1922 the cars operated 14,250 miles for each personal injury, while in 1926 they operated 13,880 miles for each personal injury: the words "Personal Injury," in this sense, include injury to passengers, employees and others. We find that the car mileage per passenger injury is increasing, meaning a decrease in personal injury to passengers, and that the cars travel more than the distance around the world for each personal injury to a passenger; employees are injured 35 per cent less frequently, according to the latest figures, as compared with 1922, while persons other than employees and passengers, are injured about 37 per cent more frequently now than in 1922. In view of the fact that there is less frequency of injuries to passengers and employees and more frequency of injuries to others than employees and passengers, it would seem that the increase in automobile accidents accounts for the increase in personal injuries as a whole.

Fatalities, including passengers, employees and others, have increased to some extent, but even now we find that the cars operate considerably over one million miles for each fatality.

Again in 1926, for the first time are bus accident figures made available, and we can make a comparative report for the years 1925 and 1926. The chart shows that the accident frequency is much less in bus operation than in electric car operation, and we further find that the accidents in connection with bus operation increased in 1926 over 1925. It appears, however, that there are more frequent injuries to persons as a whole in bus operation, while the injuries to passengers and employees are less, and the injuries to persons other than passengers and employees are much more with reference to bus operation than electric car operation. Interurban buses have much less accident and personal injury frequency than buses engaged only in city operation.

With this table before you, giving the average over the country of the number of car miles operated per accident and per injury, if you will take the time to figure out the car mileage per accident and injury for your own companies, you can tell whether or not your company is operating better or worse than

**Electric Railway Accident and Personal Injury Frequency Expressed in
Car Miles Per Accident and Per Injury**

Year & No. of Report- ing Cos.	Aver. Motor Ve- All Acci- dents	hicle Col- lisions	Car Col- lisions	Aver. All Personal Injuries	Pass- enger Injuries	Em- ployee Injuries	Other Persons Injuries
1922 (104).....	3,030	6,380	146,940	14,250	25,040	62,320	70,490
1923 (104).....	2,800	5,600	124,280	14,250	25,730	58,440	70,460
1924 (105).....	2,610	5,150	123,770	13,780	24,820	96,220	45,620
1925 (113).....	2,750	5,030	149,250	13,660	28,050	66,450	43,110
1926 (113).....	2,680	5,110	115,040	13,880	26,620	84,480	44,270

COMPARISON FOR 1925 AND 1926—57 CITY COMPANIES ONLY

1925	2,420	4,770	117,920	13,640	26,630	74,380	44,760
1926	2,380	4,710	111,950	12,970	24,250	81,580	42,310

**COMPARISON FOR 1925 AND 1926—13 INTERURBAN
COMPANIES ONLY**

1925	11,890	25,020	346,060	56,110	241,620	119,120	217,130
1926	12,100	24,850	550,480	58,610	183,490	134,300	232,530

**COMPARISON FOR 1925 AND 1926—43 COMPANIES COMBINED
CITY AND INTERURBAN**

1925	3,870	6,590	184,960	16,500	37,340	82,110	46,130
1926	3,630	6,020	167,890	15,480	32,060	88,940	41,000

**Bus Accidents
Bus Miles Per Accident and Per Personal Injury**

	Aver. All Accidents	Vehicle Collisions	Aver. All Personal Injuries	Passenger Injuries	Employee Injuries	Other Persons Injuries
1925 (20).....	4,780	10,670	10,720	38,960	91,020	17,660
1926 (20).....	4,520	9,510	10,510	34,000	75,170	19,090

COMPARISON FOR 1925-1926—10 CITY COMPANIES ONLY

1925	3,660	7,730	7,400	30,180	56,870	11,840
1926	3,750	7,940	8,510	32,920	49,380	14,960

COMPARISON FOR 1925-1926—4 INTERURBAN COMPANIES ONLY

1925	11,850	16,070	278,540	835,630	1,671,270	557,090
1926	14,620	22,760	179,840	359,670	899,180	599,460

the general average of electric railway companies. We have figured the mileage for our own street railway companies in connection with accidents and injuries for the year 1926 and we are pleased to know that our record is generally better than the average. However, our bus record is not quite as good as the average.

It is interesting to note in this connection, that not long ago it was announced from Louisville that the street cars in that city operated over 10,000 miles per

accident; this, we believe, being the record for one month. This is certainly a target at which all of us can aim and the Louisville company is to be sincerely congratulated upon this marvelous record, which is about four times as good as the average shown on the chart.

We believe that the electric railway companies, and particularly the safety organizations thereof, are to be congratulated upon their accident record. Why? Because accidents and injuries over which the electric railway companies have some control show a general decrease from year to year and, in our opinion, their good work is keeping the other accidents and injuries from mounting to overwhelming heights. However, we must not stop here, but must carry on, always aiming at a more perfect record. Let our aim be "5,000 Car Miles Per Accident"—then, raise this 1,000 car miles per year. When we can say truthfully that we operate our cars a distance equal to that around the world for each accident, we will have accomplished something truly remarkable, but very possible.

Motion to Continue News Letter Form

CHAIRMAN EMERSON: One of our group, Mr. T. G. Brabston, of the Birmingham Electric Company, Birmingham, Ala., has received recognition from the National Council. We congratulate you also, Mr. Brabston.

Gentlemen, one of the outstanding things during the past year has been the news letter. This news letter has been such an improvement over those preceding it, that I myself, think it is a very splendid thing. I understand that there is some danger in that it may not be continued during the coming year. I think we should go on record in regard to this.

A. W. KOEHLER (Milwaukee Electric Railway & Light Company, Milwaukee, Wis.): Mr. Chairman, I suggest that we adopt a motion expressing the sentiment of this group and request that the National Safety Council make it possible for the Electric Railway Section to continue the excellent news letters in the same form in which they appeared during the past year.

(The motion was seconded by Mr. E. J. Harrington, Cleveland Railway Company, Cleveland, Ohio.)

CHAIRMAN EMERSON: Gentlemen, you have all heard the motion. Is there any discussion of it? If not, all those in favor please say "aye." Those opposed, "no." It is unanimously carried.

I would like to announce, gentlemen, that part of the last paper is going to be broadcast over the radio. Mr. Bennett will talk to us first on his subject and at the conclusion of his paper, the microphone will be placed on the table and he will talk to the school children of Chicago from this room. I want you all to stay to hear his message.

The time is getting rather late and we will have the discussion of Mr. Whitmore's paper now. If any of you gentlemen have any questions, I wish you would ask them at this time.

B. C. BELL (United Railways, St. Louis, Mo.): I don't know how it is in other cities, but in St. Louis they do include cars running into barns and things of that kind. I didn't know whether Mr. Whitmore's paper included the figures on that sort of accident or not.

MR. WHITMORE: I am taking the figures from the reports made to the Electric Railway Association. I believe that is coming up for discussion at the meeting next week of the American Electric Railway Association.

PAUL HODSON (East St. Louis & Sub. Ry. Co., East St. Louis, Ill.): This question has come up every year since I have been attending conventions. This statistical

question is still a mystery to me. I can readily understand how some companies arrive at such good figures, but it is still a mystery to me.

Some companies consider any accident an accident. Other companies consider chargeable accidents; and what a chargeable accident is, I still don't know. I think we should arrive at some way of keeping accident statistics so that everybody will keep the statistics in the same way. I am keeping statistics on accidents, and I try to show the number of actual accidents in accordance with car miles. When you get down to chargeable accidents, you are getting into discussion.

I had occasion to investigate some of these reports sent in by some of the companies, and I find that the highest record is only made on chargeable accidents, which gives them a good record. I can cite statistics put out for advertising purposes which mean a lot when you run 60,000 car miles per passenger fatality. We have had passengers killed getting off cars. That is done by figuring that as soon as they are off the car and in the street they are no longer considered as passengers. Statistics are very misleading. As far as they are considered, a yardstick is the only thing capable of accurately measuring them up. I believe some means ought to be arrived at whereby we can have some way of comparing our statistics. I don't compare mine with anyone else unless they are keeping them the same way I keep mine.

Official Registration Two Hundred and Fifty-Two

CHAIRMAN EMERSON: Is there any other discussion of Mr. Whitmore's paper?

Our official registration has grown to two hundred and fifty-two.

CHAS. R. HENRY (Pittsburgh Railway Co., Pittsburgh, Pa.): Don't you think this would be the proper place to adopt a uniform system in regard to keeping these accident statistics?

CHAIRMAN EMERSON: We expect to bring it up at the round table discussion. There is a resolution to be presented along that line.

The time has now come for me to sing my "Swan Song." I am about to relinquish the chair to my successor. Before doing so, I wish to express the gratitude I feel toward this section for having made me its chairman.

I have never been associated with any group of officers which rendered more enthusiastic and helpful cooperation. My job has been an easy and extremely pleasant one. I wish to thank the membership for its patience under trying conditions in attending and remaining at our meetings. It has been an interesting year, and I think we have made progress.

In Mr. Koehler you have chosen a capable, conscientious man, fully able to carry on and enlarging the work of this section, which has grown so much in such a few short years.

I ask your hearty support of Mr. Koehler during the coming year.

(Mr. Koehler took the chair.)

CHAIRMAN KOEHLER: This is the first opportunity that I have had to express to you my appreciation of the honor which you have bestowed upon me. I am sensible of the responsibilities that the office carries, and I pledge you my best efforts to carry on during the coming year.

I accept these responsibilities cheerfully, and I am confident that with the help of the officers and the members of the section, we will have a year which, I hope, will compare favorably with the one just passed.

Our retiring chairman, Mr. Emerson, has served the section faithfully and well. It has been a great deal of pleasure to me, and I have derived a lot of satisfaction out of the meetings which I have attended with him and other members of the section. My recollections of those occasions are very pleasant.

Much remains for us to do, and I think it is encouraging and we should all take heart in the knowledge that an operating executive like Mr. Emerson has given

so generously of his time and thought to the affairs of the Electric Railway Section.

Our time is growing short, and I am not going to take any more of it, but I want to take this opportunity to introduce to you the other officers of the section. I should like to ask H. K. Bennett to step forward, please.

Mr. Bennett is your first vice-chairman. Mr. Bennett has been active in the affairs of the safety game with problems which have come to his attention, and I know he is going to make a very valuable man to us during the coming year.

Mr. E. K. Eastham.

Mr. Eastham has also been very generous in the time and thought that he has contributed to the affairs of the section, and I am sure as second vice-chairman, we are going to receive many helpful bits of the not only useful information which Mr. Eastham has at his command, but I am sure his efforts will be equally untiring.

Mr. M. W. Bridges.

I don't believe Mr. Bridges is unknown to you. He, too, has been very active in the affairs of this section, not only in the National Safety Council, but in the American Railway Association as well. We have served together on a number of committees, and I know Mr. Bridges will contribute generously during the coming year.

Mr. J. E. Stott.

Mr. Stott is one of the newer members of our group, and during the past year has served as chairman of the Poster Committee. He has attended every meeting we have had and has been very active and done a good job. Mr. Stott, too, will prove that our confidence in him has not been misplaced.

MR. EMERSON: I don't want to let the occasion go by without saying a word about the work and enthusiasm of Mr. Connors during my work as chairman. Mr. Connors has been a great help to me and he has been very active in the affairs of the section. He has been one of the leaders in the discussion for the past few years, and I think the section should be very grateful to him for his contributions.

E. K. EASTHAM (United Railways of St. Louis, Mo.): Mr. Koehler, I believe one of the first actions, or really the first motion before you as the new chairman, would be that of recognition of the very splendid work that retiring President Emerson has done for this section during the past year. You have handed him compliments, but I think this section should give Mr. Emerson a rising vote of thanks.

(The audience arose and applauded.)

The General Round Table Discussion

CHAIRMAN KOEHLER: Our next order of business, gentlemen, is the General Round Table Discussion. I think, perhaps, as a means of precipitating this discussion, we might well be guided by the questions submitted to us on the cards provided for that purpose. We will also take this opportunity to discuss papers that we have previously heard, and for which there has been no time for discussion.

The first question I see is this: "What color street car is most visible at night and during fog?" That is a question submitted by a member of the Pittsburgh Railway Company. Is anyone prepared to offer any suggestions?

H. K. BENNETT (United Electric Railways Co., Providence, R. I.): We have just started during the last two weeks, for the first time on our streets, a car painted yellow from the sash down around the vestibule on the front and rear ends. The sash is painted white and the top deck a light buff. We believe that yellow and white are the best colors for visibility at night and in the daytime as well. I also understand from the management that every one of some 600 cars will be painted in yellow and white.

G. H. BOLLMAN (T. M. E. R. & L. Co., Milwaukee, Wis.): We have the red and yellow cars, and we believe they make a greater attraction for the people. We have the one man car and the two men car. The two men car is yellow.

W. T. HARVE (United Traction Co., Albany, N. Y.): We have the yellow car with cream above the window on the new type of cars. They are very visible at night.

SANFORD BABBITT (Pittsburgh Rys. Co., Pittsburgh, Pa.): We have about 20 cars with the front painted white, and really haven't had time to find out a whole lot about them. I find that in coming out of a fog, the white is very visible.

CHAIRMAN KOEHLER: The question is sometimes asked, "What color is best for an automobile driver to see in stormy weather. Has anyone had any experience with the white car in winter time? I am thinking particularly of the interurban cars moving at high speeds with snow banks. Does that reduce visibility or introduce hazard? Has anyone thought of it from that angle?"

J. J. CONNORS (Tennessee Electric Power Co., Chattanooga, Tenn.): We have gotten away from green colors in order to prevent the hazard of those colors comparing too favorably with the foliage. I imagine the white car in snow would be along the same line—you would want to get away from the white so as not to compare with the snow.

CHAIRMAN KOEHLER: Is there anything more on this particular subject?

The Advantage in Certain Colors of Paint

E. HOLLIBAUGH (Pittsburgh Railways Co., Pittsburgh, Pa.): It is my impression, and I would like to get the reaction of the men here as to whether it might be well to change the colors once in a while—if any change might be of some benefit. When we see the same colors day after day, we are inclined to become more or less prone to the color that is familiar to us. It doesn't stir up the proper sensation that a changed color or something new would, so I wonder if any change might not have a desirable effect.

As far as snow is concerned, and in considering green from the standpoint of blending into the foliage, why not consider the probable duration of the snow, and the probable duration of the green foliage. Then compare it and see whether the benefit derived from a white car or a green car would be greater.

MR. THOMPSON (Augustus, Ga.): We don't have snow, but we do have trouble with the lights on the dash. We have a circuit of five lights on the dash, which has now been painted white. That has been approved by the people in the city and also by the car operators.

A. H. SHAW (N. O. P. & T. Co., Akron, O.): I might say a word about changing colors, as we had some experience with that in Akron. About a year ago we painted a lot of buses with fancy stripes and shades, but finally decided that the best color to use was a light yellow. Now all the cars and busses are coming out with the light yellow.

CHAIRMAN KOEHLER: Before passing on to the next question, I want to call on Mr. Eastham, as he has something to present at this time.

E. K. EASTHAM (United Railways of St. Louis, St. Louis, Mo.): This is the committee that has to do with the committee appointed last year, and it also has to do with one of the papers just read and discussed. That was the paper by Mr. Whitmore with reference to accident statistics. Mr. Hodson of East St. Louis has also spoken of finding some basis for each company so that they could definitely know what they were doing as compared with other companies, and that the figures for all companies be uniform.

Report of the Committee on Uniform Accident Statistics

The Committee recommends the adoption of the following resolution:

WHEREAS, It appears that practically every electric railway reports its accident statistics in a different manner; and

WHEREAS, There is a great need for a uniform system of accident statistics, for the purposes of comparison of records and in order that one company may profit by the experience of another, therefore be it

RESOLVED, That the members of the Electric Railway Section are in favor of the keeping of accident statistics in such form that uniform reports will be made by each company to central clearing houses such as the National Safety Council, American Electric Railway Association, authorized committees, etc., and, be it further

RESOLVED, That a copy of this resolution be transmitted by the Secretary to the Claims Association, American Electric Railway Association.

E. K. EASTHAM, Chairman.

G. T. HELLMUTH.

Now, gentlemen, before moving this for its adoption and throwing it open for discussion, I want to say there is no thought of the peculiar conditions of different companies making it advisable that they separate accidents as chargeable, non-chargeable, questionable and so on for their own record. The thought before us is: That we agree on figures to be sent to central bodies and in turn transmitted to you on your request for information, and that we be able to know they are sending out this information on the same basis which we are sending our figures out on. Then when they translate the figures of all companies, taking into consideration the place of operation, and operating conditions, we will know whether someone else is doing better than we are, and vice-versa.

I present this report, and leave it to the crowd as to whether it will be accepted or not.

MR. BENNETT: In moving the adoption of this resolution, I want to say that the question of keeping accident statistics has been very close to me for many years. Some ten years ago I served as committee chairman in this section of the American Electric Railway Association, and worked for three years trying to whip the fellows into line to know what each other was doing, but was unable to do so.

The resolution presented, I think, is going to clarify the situation in knowing what each company will consider as chargeable and non-chargeable accidents. I think it is a step in the right direction. My company would be just as much at a loss without the proper classification of accidents as it would be for the auditing department not to have the proper information. I hope this resolution will prevail.

CHAIRMAN KOEHLER: Is there anyone else who would like to be heard on this matter?

A. H. SHAW (N. O. P. & T. Co., Akron, O.): In this resolution, is it proposed to have chargeable and non-chargeable accidents, or is it proposed to call everything an accident and give out reports accordingly?

CHAIRMAN KOEHLER: I believe it is meant that we adopt one uniform way of sending in accident figures. Probably, I would say, of counting everything. That is the way most companies do it.

MR. EASTHAM: This term "uniform report," I believe, covers the proposition. That is just what this is designed to cover. If this goes through, they will be uniform. For instance, some people have made a splendid record; aside from figures we will say 10,000 car miles per accident, not counting a large number of accidents before sending out the figures for 10,000 miles. When we send out figures from St. Louis, we send out everything that goes in as an accident. This is designed to have a thorough understanding so that all companies in making reports (we don't care how they keep the figures for themselves), but in reporting to other com-

panies and the central clearing house, these figures will be sent in in a uniform way.

CHAIRMAN KOEHLER: What is your pleasure, gentlemen? We have had a motion. Is there a second?

(The motion was seconded.)

CHAIRMAN KOEHLER: All those in favor will signify by saying "aye," those opposed, "no." It is carried unanimously.

The next question I find before me is: "Do you think a one-man car operated in a large city is a safe proposition with one man operating an ordinary two-man car?"

Is there anyone who would like to talk on this subject?

ISAAC HARRIS (United Railways, St. Louis, Mo.): We have the one-man car operating on Sunday on four lines. There is a great deal of discussion in St. Louis as to whether that one-man car is a safe proposition for one man when it is a two-man car.

CHAIRMAN KOEHLER: Is there anything else that anyone would like to contribute?

MR. BENNETT: I can give a short answer to that question. We went into one-man operation in 1923, and it was practically complete throughout the city in 1924. The reduction of accidents has been very great.

Discussion About the One Man Car

EDW. McMORROW (Union A. A. of S. & E. R. E. of A., Detroit, Mich.): I would like to discuss briefly that question of one man cars, especially that of the two-man car operated by one man. I have run into that car in every part of this country, and to intelligently get my thought across, I will have to go back to the beginning of the one-man car.

I don't want this section to get away with the idea that the present one-man car, whether the real or Birney or so-called two-man car, is the original one-man car. The first car I ever operated was a one-man car, and I used to talk in some pleasant language as to the motive power of that car. With the advent of the Birney type of car, there was a book of instructions or rules, and we as operators were told that in taking these cars into service it would do two things:

First, it would not increase the number of employees; and second, it would increase the service. And that rule book said that a man should do only one thing at a time. But after operating these cars for a short time, what did I find? I found our men violating all the rules of safety. For instance, they were conversing with passengers, issuing transfers, making change, and the car running pell-mell down the street. That condition is tolerated and encouraged by the management, and nothing is said except when an accident is concerned.

I have had a rule book for 36 years, and I only know one rule, and that is to use ordinary horse sense when the other rules don't apply. I contend that a two-man car propelled through the streets in the large city by one man is not a safe vehicle. I contend further that if the original intent surrounding the one-man car were carried out, as a matter of increasing the service as the public demanded it, the speed would be seriously impaired.

If you will go back to the original rule book or the intent behind the Birney car and compare that with the method necessary to keep the cars moving, where would we be? We would become a nuisance on the street instead of a benefit.

I think that in some instances the one-man car is absolutely necessary in order to serve the little places. Some people would have to go out of business if we didn't have something to stop intrusion. Chicago, St. Louis, San Francisco, Pittsburgh, Cleveland, and several other cities I could mention, will never be able to operate the one-man car through the thoroughfares successfully because while it is our intention to win against accidents, we are meeting with accidents. This

can only be accomplished when the desire on the part of the people for speed is forgotten, and the cars operated as they were originally intended, and that was to do one thing at a time.

In Seattle, where they have a municipal system, the city took over a lot of property, and at that time they had a lot of what was called old "camel back" cars. These cars were about half a block long, and one had to go up three steps to get to the platform. One morning I dropped in to see the innovation of new cars.

About the first thing I saw was one of those Birney cars operated by a young fellow. First, he got his passengers on, then closed the door and started the car on its way. He started to work, dishing out transfers, making change, talking with everybody, and to make it worse, he had a nice "Jane" sitting on the sand box, paying more attention to her than to anyone else. That same day, I heard a speech in the city council of Seattle on "Safety First."

You can't have safety except when the companies cooperate in operating those cars as they were originally intended—to do one thing at a time.

You can't expect a man to do seventeen things at once with a one-man car and then come here and preach safety, because it can't be done. I do not dislike the one-man car, except in so far as it relates to safety. I would like to see this industry built so that these laws I spoke about a minute ago would be eliminated and the revenue from that business would be so directed that the two-man car operated by one man would not be a necessity anywhere.

CHAIRMAN KOEHLER: Gentlemen, we have just ten minutes left, because Mr. Bennett, our next speaker, must go on at five minutes of twelve.

There are a number of questions still to be discussed and I ask you to be as brief as possible.

One Man Cars Satisfactory in Akron

A. H. SHAW (N. O. P. & T. Co., Akron, O.): In regard to the one-man car, I would like to say that we operate them in three cities, with 100 per cent one-man car operation. They are properly equipped with treadle doors and other safety devices. In fact, everything is on those cars. We are making as good headway, carrying as many passengers, and with fewer accidents than we ever did. In our experience, it is the safest operation we have ever had.

If any man ever visits Akron and talks to the old employees that have been with the company 15 and 20 years, and asks them what they think about the one-man car, and if they don't say that it is better than any other car they ever operated I'll eat my hat. We had a split service, and made comparisons as regards passengers carried per accident and miles operated per accident. The one-man car, at this time, a year and a half ago, operated 600 or 700 miles more.

When one man is responsible for the operation of the vehicle through the street, he has no one in back to depend upon to watch the side or the rear of the car. The result is that he operates cautiously, glances around to watch the overhang on curves, making fewer accidents than when we had a man on the rear end.

There was no lay-off of employees. We simply ceased, probably, to employ any additional help for some length of time, and the situation just took care of itself. Our men are better satisfied today than they ever were when we operated the two-man cars.

T. FITZGERALD (Pittsburgh Rys. Co., Pittsburgh, Pa.): We have had about the same experience in Pittsburgh. I find myself again in disagreement with Mr. McMorrow. I sympathize with his viewpoint, but our records since the installation of the one-man cars in Pittsburgh show that the one-man car operation has a slight favor over the two-man cars. There has been no indication of any increase in danger. With reference to the speed of the cars, we do not put on for the same amount of traffic more one-man cars than two-man cars. This has resulted in a

slowing up of the service or operation between stops due to the lesser number of stops to be made. The people on one line complained of the speed of the one-man car. That schedule can be speeded up with the one man car, but we are not doing this from the standpoint of taking a chance. We believe in perfect safety operation, and we believe it is a safer operation.

The service could not have been improved had it not been for the perfectly splendid cooperation of the trainmen of the Pittsburgh Railways Company. They deserve much credit. They have not been favorable to the one-man car, but the men, as well as the leaders, have been absolutely on the level in their attitudes. We do believe that before things are over they will find the one-man car has been a friend to them.

CHAIRMAN KOEHLER: In Milwaukee we have had identical accident statistics, indicating that the one-man car is making a better record than the two-man car.

The next question asks: "Do you think sixty pounds of pressure on the brakes of the average car safe in the handling of a carload of passengers?" Does anyone have anything on that?

Are Sixty Pounds of Air Sufficient for Brakes?

HENRY G. BAMBRICK (Pittsburgh Rys. Co., Pittsburgh, Pa.): In regard to 60 pounds pressure of air, that all depends upon where you are operating the car. Sixty pounds pressure on the brakes would hardly do where you are going up one hill and down another. We run as high as 90 pounds, and I find that in doing that and having plenty of sand, we get mighty good service. If you cut down from that and also on the length of the piston, you are up against a bad proposition. On level streets, you could get away with that, but not in Pittsburgh.

W. E. GOODMAN (United Railway Co., St. Louis, Mo.): I have had a great deal of experience with the 60-pound air pressure. Where you have to go up and down hill, the most difficulty we find is in running a little beyond the destination. This doesn't suit the passengers, but this is all we are allowed. The thing is, when you are coming down the line trying to make the schedule and an automobile pops up, or a child runs out in front of you, what can you do when you only have 60 pounds air pressure?

CHAIRMAN KOEHLER: Local conditions, of course, have a lot to do with it.

E. HOLIBAUGH (Pittsburgh Railways Co., Pittsburgh, Pa.): That all depends upon the brake rigging, the size of piston and cylinder, as well as the braking ratio. I don't see how that could be intelligently answered unless you were in possession of all those facts.

SANFORD BABBITT (Pittsburgh Railways Co., Pittsburgh, Pa.): Sixty pounds of air isn't sufficient whether you are on level ground or on a grade. The fact is that automobiles shoot out in front of you, and where you have a distance of 10 or 15 feet in which to stop, the air has hardly started through the pipe with 60 pounds pressure before you ram a car. I don't think a company is justified in allowing the operation of cars with such a low pressure.

CHAIRMAN KOEHLER: I believe this is a question that is of interest to many of us: "Can you give devices used by other companies, or methods employed to protect trackmen while working in city streets?"

MR. BABBITT: We have a great many trackmen in Pittsburgh carrying a red light on their backs while working at night on switches and track. I haven't heard of any of them being struck at the present time. They say it is a mighty good proposition.

CHAIRMAN KOEHLER: Do you have a white belt on which this thing is fixed?

MR. BABBITT: Yes, the "Sam Brown" type of belt. During the day time they use the white belt alone.

PAUL HODSON (East St. Louis & Sub. Ry. Co., East St. Louis, Ill.): We have experimented along this line, but there seems to be absolutely no protection from automobile drivers. We have used two methods: That of having a man selected to use the red flag, standing some distance from the work going on, and still they hit them. They hit a man with a red flag the other day and put him in the hospital. We are also using the signs 18 inches square, similar to the state highway signs in Illinois, which are set back from where the men are working. This sign says "Danger! Men Working." That has proven the most effective. These signs are set back about 25 feet, both in front of the men and in the rear. At one time we used the barricades, completely shutting off the street, but one of the most prominent business men didn't see the barricade one day, and killed two men.

MR. RAMSEY: We have a bracket with two red flags attached which is used while construction work is going on, but we had a case of a man getting hold of some moonshine and he ran into a cage where the men were working with an acetylene torch. That happened with all those precautions.

CHAIRMAN KOEHLER: We must necessarily close the discussion, as definite arrangements have been made to have Mr. Bennett speak over the radio to the school children. It is a pleasure to me to now introduce Mr. H. K. Bennett, of the United Electric Railways Co., Providence, R. I.

Utilizing the Radio

H. K. Bennett, United Electric Railways Company, Providence, R. I.

To the question, "What is the value of the radio in safety work?" one need but say "invaluable" and he would give the shortest and perhaps the best answer. However, being so positive in my valuation of this safety accessory, I must enlarge a bit in order that you may be entirely sold on the proposition and fall into line with my opinion.

If you could feel the very presence of approximately 50,000 children listening to you for a half hour every Friday evening; if you could see through the "Mike" this number augmented by perhaps thousands of others not members, and thousands of fathers and mothers near and far; if you had the living testimony of this mother, that father, and the thousands and thousands of letters right from a child's heart—would you believe then?

Well, that is my position every Friday evening, and when I call this meeting to order and ask each member to stand and repeat the pledge of the club—"I will always be careful"—I see them doing it just as plainly as I can see your faces today. Why can I see them? Because, in the first place, I have sold myself this God given touch of humanity, and I believe, from the soles of my feet to the crown of my head, that the salvation of this nation and of the coming generation lies in the child of today, and that unless we do everything in our power every day and hour in the week to keep before them the necessity of "Always being careful," wherever they are—in school, at home, at play, on the way to and from school—then we have neglected the greatest opportunity of saving human life and limb that is before us.

Last November, one cold Friday evening, "Uncle Red" broadcast from station WEAN, the Shepard stores at Providence, an invitation to every child in range of his voice to join the first A. B. C. club ever formed in this country over the radio. He told them at the outset that the only cost would be the promise to "always be careful," and that he would have a few rules for them later on. He also firmly impressed in their minds that his identity would not be revealed and that he would be known simply as "Uncle Red," and that if

PROVIDENCE SAFETY COUNCIL*This Is to Certify That***THE BEARER***Is a Member of***UNCLE RED'S
A. B. C. CLUB***As a Member of**Uncle Red's A. B. C. Club**I Will Try To***Always Be Careful**

Name

Date Address

he appeared in that character at any public gathering, he would be masked, and he has kept that promise religiously.

At the same time Uncle Red told his listeners that he would send a membership card, pin and a personal letter to each member. This has been done, but only Uncle Red and the Providence Safety Council, backers of the broadcast from a financial standpoint, know what a ball they started rolling. It was thought that one or two thousand children might respond. They did, and then some!

At the first meeting Uncle Red said that the club was to be officered and that the first eight names received in response to the first broadcast would be the president, vice-president, secretary and directors for one year. Letters came

by special delivery to the station and the election was conducted strictly in accordance with the agreement.

At the second meeting the rules of the club were given and they were simple: "Always Be Careful; never play any game, roll hoop, ride a scooter, play ball, fly kites, hook rides, or slide on streets crossing car tracks; but to play on the sidewalk, in the home or school yard and the public play grounds."

Immediately letters began to arrive by the hundreds from the children telling Uncle Red that they would do just as he had asked them to. Right here let me quote a few of these letters to show the mark of sincerity:

UNCLE RED'S A. B. C. CLUB

STATION WEAN

Providence, Rhode Island

DEAR CLUB MEMBER:

I received your nice letter telling me all about yourself and your wish to join Uncle Red's A. B. C. Club, and I am very glad to welcome you as a member.

As I promised, I am sending your membership card and button with the name of the club on it. I want you to keep this card nice and clean, for maybe some day I'll come around to see you and I surely want to find that your card is as nice as the day I sent it to you. I want you to always wear the button, and to be proud of being among those who belong to the first Uncle Red's A. B. C. Club in the whole United States.

I never knew I had so many nieces and nephews before, and some of the letters I received were decidedly affectionate but that did not hurt Uncle Red's feelings a bit. He will always remember you and keep your letters to read over again some day.

I hope you will like this letter paper and I am sure your officers will be glad to hear from you any time you wish to write.

With lots of love,

UNCLE RED.

Dear Uncle Red:

When I joined the A. B. C. Club, I learned a lesson, because I was a bad boy. Now, I am a good boy because I am doing things right.

Dear Uncle Red:

Before I belonged to the "Always Be Careful Club," I was careless in many ways. I have a nice wagon but I will promise you that I will not go on the street in my wagon.

Yesterday, I saw a boy hooking on an ice wagon. I showed him my member-

ship card. I told him not to steal any more rides on wagons. I will always be careful.

I belong to the A. B. C. Club, I am going to ride it on the sidewalk hereafter since I have heard your safety talks over the radio.

My brother was riding me on the cross bars of his bicycle and a boy threw a scooter in front of the wheel and I fell off and hurt my side but I am all right now. I am never going to get near the bicycle again since I heard your safety talk.

JEAN SULLIVAN.

Dear Uncle Red:

I take great interest in our little club. Since I started in your Club, I have stopped roller skating because when I skated it was right on the main street.

I have also told my little friend to join and she is doing like myself and will always be careful. When we are going to school we look up and down like the little mouse you told us about. Your niece,

RITA WARREN.

Dear Uncle Red:

I am writing to tell you a few things that I have been doing to be careful.

I have not been running out in front of automobiles, or playing or walking in the street. Your niece,

NORA FEELEY.

Will Keep His Scooter Off the Street Now

Dear Uncle Red:

I have not ridden my scooter in the street after that talk you gave us.

I always look carefully before crossing the street. Your loving nephew
—STANLEY BLANCHARD.

Dear Uncle Red:

I used to play ball in the street but now I am careful and play in the yard. I hope some day you will come around to see my card. I am keeping it very clean.

LOUISE TESTA.

Dear Uncle Red:

I have been very careful since last Friday, the day I joined the Club. I have a scooter and a pair of roller skates. I used to ride on them in the street but I have not since you told me the rules of our Club.

When I cross the street, I wait until the road is clear every time.

Will try to always be careful everywhere all the time.

GERTRUDE NEWCOMB.

Dear Uncle Red:

Since you have established the A. B. C. Club, I think I have been 100 per cent more careful.

I had a habit of wheeling my little sister's carriage in the street but now I know it is dangerous for both my sister and me.

I used to cross the street anywhere even if there were cars and machines coming, but now I look both ways before crossing. I used to slide in the street with my sled, but this winter I won't. I have asked my little brother and sister to be careful in crossing the street. I hope the A. B. C. Club will do for others all it has done for me.

I always wear my A. B. C. Pin and think it makes me always remember to "Always Be Careful." Your niece,

MAY GAUDET.

V. H. KUPFERER (The Studebaker Corporation, South Bend, Indiana): I move the adoption of this resolution.

(The motion was seconded.)

CHAIRMAN BOSWELL: You have heard the motion, and it is properly supported, that we are in favor of this resolution as a Plant Publications Section. Is there any discussion?

(The motion was put to a vote and carried.)

It has been suggested that the committee appointed yesterday to recommend whether or not we would have a change in name of this section from Plant Publications to Employees' Publications, or some other name, report after Mr. Dempster gives his paper tomorrow, and if there is no objection to that I will call for the report of the committee at that time.

We will now proceed with the next number on our program. Mr. R. G. Conover, of the Yale & Towne Company, is here. Mr. Conover is editor of the *Yale Panel*.

Some Editorial Problems

Richard G. Conover, Director of Publicity, Yale & Towne Manufacturing Company, Stamford, Conn.

Two general problems confront plant publication editors. One is how to sell their editorial selves to their employee readers. The other is how to sell their editorial selves to their employers. They stand in a midway of industrial publication accomplishment. They have a strong man's job before them either way they face.

Many will say that the more important of these two general problems is the winning of the employee reader. It will be claimed that the publication is issued just for that one thing. But the deeper analyst of plant publication objects will be likely to maintain that the winning of the employer by the employer's editor is the far more important, as well as the far more difficult problem to solve.

Certainly a plant publication editor has an opportunity to interest, please and benefit the employee reader solely because his employer affords him the chance. It rests with those who pay the publication bills to make this chance a permanent feature of the service. Therefore the worthwhileness of the plant publication must be brought home to the conviction of those who are the powers to say whether the publication shall live or die.

It is the editor's problem, the editor's prime and particular job, to give the employer constant assurance and evidence that the plant publication is performing an indispensable mission. It is likely there are superficially-thinking editors who will say that there is no need for them to feel concerned about the continuance of their publication. Such editors take it as a foregone conclusion that once their plant magazine or paper is launched, it must automatically go on merely because the employer has started it.

They take the view that everybody admits the plant publication is of great benefit to the employer and therefore the employer will subsidize it eternally. That being settled, all there is for them to do is to interest and convince the employee reader through the material they print in their publication columns.

Now and then there comes a bulletin from employers announcing the suspension of the plant publication and it is only the shock of this bulletin that brings full comprehension of the other problem to the superficially-thinking editor.

Employers as well as employees like to have it proved that their judgment is right. Employers like to be reassured that their policies are sound and profitable. When employers decide to publish a plant publication or magazine, they often wonder how much good that publication is going to do their busi-

ness. At best it is somewhat of a guess and a hope. When the red-ink totals appear in the ledger during one or two bad business years, the employer is apt to go over his figures and speculate on whether or not this or that outlay can be stopped without much hurt to the business.

It is possible at such a juncture that the employer may run his finger down the figures of outlay and coming to the plant publication item, begin to waver in his conviction that this expenditure is a paying service benefit. For the most part, whatever results come from the plant publication, they are of an intangible nature and the employer has no way to prove publication advantage except through faith. Is it anything surprising if he should reach out for some new arguments, new reasons, new faith and new hope to justify the continuance of the publication?

Who is the man who should be best able to furnish all of these to the employer? Who is the man who should have at his finger ends the facts and figures—so far as facts and figures are obtainable—to place before his half-doubting employer, and thus prove to him that his plant publication is of such vital and organic necessity that to cut it out would work as dire a result as removing an organ from the human body.

Why, the editor is the man who should be a veritable fortress of facts and well-spring of enthusiastic reassurance.

Sell the Plant Magazine to Your Employer

How many plant publication editors have considered this problem of selling their enthusiastic conviction of the worth of their magazine or newspaper to their possibly pessimistic employers? How many have armed themselves with good arguments, with sound arguments, with honest arguments, so that if called in by the general manager, or the president, or in fact by the whole board of directors, to give good reason why the publication should not be suspended, would be able, because of their study of the subject and their intense conviction after such study, to stiffen the wavering determination of their employers and point out the magnificent results that surely must follow the published word in a plant?

Solving this one general problem is not solving it for the preservation of the editor's job. If that be the sole reason for the editor's enthusiasm and study of the worthwhileness of the plant publication, it will be very transparent to the employer before the middle of the first argument is reached. It is rather by the assembling of all data obtainable, and all proofs of welfare promotion, and all instances of uplift accomplished through the medium of the plant publication that the heart of the employer will be gladdened.

He wants to hear that the plant publication is worth while. He wants to know that the cost of the plant publication is money well spent. It is for the editor to tackle the problem by arraying argument that will foster his employer's faith in the publication as a decided service benefit, and will likewise buck up his drooping confidence in the plant publication enterprise.

Of the two general problems outlined, the writer considers this, of the editor selling the plant publication to the employer, far more important than selling the content of the publication to the employee reader. If an editor cannot solve this first problem, there is always danger that his plant publication, following a year or two of bad business, may be discontinued by the depressed or apprehensive employer.

This has happened in the case of both large and small corporation employers. If it does happen; then there will be no longer an employee reader because there will be nothing more to read. It still may be insisted that the task

of interesting and benefitting employe readers is more important than anything else, because (it may be contended) even though there be no demur as to cost of publication, there will be no use in issuing a magazine or newspaper that does not manifest its power to grip and hold and convince and lead the employee. Granted, but you must build a church before you can worship in one. You must build a boat to cross the river if you wish to address an audience in a grove on the opposite shore. Without the boat and without the church you cannot obtain the object proposed. By the same reasoning the plant publication must be assured of continuance or you necessarily cannot make your appeal to the employee reader.

From the foregoing, it will rightfully be deduced that this article has not for its prime object a suggestion or an argument for the use of certain details and methods whereby the employee reader shall be interested and convinced. Such tasks are very important, but plant publication editors will be wise to take them up in a secondary way as their other general problem.

Some things said here will perhaps help in the solution of this second general problem, but in the main the writer will address himself to points bearing upon the first or more important division of the editor's big task.

First of all cultivate a keen realization that even before you sell your editorial self to your employer, you must sell to yourself the idea of plant publication worthwhileness. Certainly if you are not convinced of the value of the plant publication, you cannot go a dozen editorial steps without revealing that you do not believe yourself in what you are talking about. You must be enthusiastic about this conviction. You must argue it out with yourself. To get the very best results, you must look upon it as a subject on which you have pronounced ideas—just as pronounced as you may have on religion, politics or finance. You must prepare yourself to debate the worthwhileness of the plant publication at the drop of the hat.

The Editor Must Know the Real Value of His Paper

You must have an answer in case somebody should say: "Oh, you're just talking to bolster up your job as a plant publication editor." You must be able to tell such a one all there is to be said in favor of a plant publication, and show him where he gets off if he thinks you cannot have an opinion, and an enthusiastic opinion, unless it be measured in terms of dollars and cents.

As a plant publication editor, who may be called upon to bring a change of belief to his employer, you must learn how to solve the problem of this employer's doubt and how to define clearly your own positive convictions of how enormously valuable a plant publication is.

How to do this best is of course a nice problem. But it is a problem that should be solved and must be solved by you, the plant publication editor, if you expect your magazine or newspaper to continue permanently, and also if you expect to convince your employer that you are the man to direct it as a worthwhile asset in the company's business.

And this brings us to this very pregnant question: Assuming that the employer is willing to meet the cost of a plant publication if it continually manifests its usefulness to him and his purposes, what is the magazine or newspaper really published for? What does the employer hope will be accomplished through it?

Like the mariner taking his reckoning and then starting straight for a definite port, the plant publication editor should first ascertain exactly, and in detail, what he hopes, or what his employer hopes to effect through the publication, and then go forward to carry out his employer's policies and plans.

It is a flamboyant habit of some editors to forget all about the practical side of publication. They are self-deceived into supposing that their gripping English is all that is needed. They consider their fine-languaged arguments irrefutable and their pleas and appeals certain winners. But suppose the employer in a practical way, looks at the cost of the publication and says this to his editor: "Yes, I know your appeals and precepts and other writings are good, but what have you to offer me in the way of evidence, or indication of evidence, that the cost of this publication, measured in dollars and cents, and compared with the practical return, makes it worthwhile to carry it on?" This significant query brings us back again to the prime question:

"What is a plant publication issued for?"

The Paper Must Pay Its Way

The writer confesses to being somewhat of a utilitarian. As such his answer to the query must be that the plant publication is issued to help the employer make money or save money. Every plant publication editor may have received varying instructions or intimations as to why his particular newspaper or magazine is published. Every editor knows whether or not his employer wishes to publish a plant paper regardless of the cost or results of publication.

Perhaps there are employers who have advised their editors that they issue the publication as a sort of good-will gesture and that they never consider the ratio between the cost and the good that may come from publication. Perhaps some employers have told their editors that even if they could trace no benefit at all from publication, they would still publish regardless of cost totals.

The writer believes, however, that there are many others holding the opinion that the real goal and the real mission of the plant publication is to help the employer make money or save money. His employer, if a corporation, came into being for the purpose of making money. The plant publication is merely one of the accessories to this end. It is all very well to feel thrilled over your editorship, and to preach that your magazine or newspaper is lifting your readers to greater heights of mental, moral and physical excellence. But the blunt fact remains—and I think it remains in a majority of plant publication situations—that the flights and heights essayed in your paper are vague and impractical accomplishments unless you can point out that your employer's interests are surely advanced.

It is true that when you print something in your paper that tends to make an employee a better man and a better citizen, that accomplishment—to a degree—is commendable. But your employer is not incorporated to make better men and better citizens as a first desideratum. He is incorporated to make money along particular lines.

As an editor you may print finely written stuff, but it may be but a mass of generalizations that has little if anything to do with the progress of your employer's business. Seek first to make every letter, every syllable, every word have a practical acceleration to our employer's business, and following this editorial route, you will make it clear that you understand what your paper is published for.

It is true that good advice and uplifting appeal printed in your paper may have a modicum of good effect on your employer's business; some good effect although through very remote and indirect interpretation. But why not aim to help improve your employer's business directly? Then if an employee through your written argument is made a better citizen and a

better man generally, that particular result is "all velvet." Do not, however, treat your plant publication, which is issued primarily to help make money for your employer, as you would treat a general newspaper, published with a miscellany of purposes.

If your employee readers are interested in golfing, motor boating, sociology, birth control or divorce, there are numberless publications devoted to these subjects. Discussing them in a plant publication will make no appreciable advance in your employer's prosperity. Dilating on general questions of the day brings no advantage in the way of helping to make money or save money for your employer. A good employee golfer might be a poor workman who needs bucking up. A divorced employee might be a fine, loyal and industrious worker.

In other words, if we concede that our plant publication is issued to aid our employer to make money, then we must stick close to this set purpose. We should not wander off in generalities. We should publish nothing vague of design even if uplifting generally. How can this be done? The writer follows three general lines.

Labor Turnover One of the Biggest Handicaps

First: what can you print, and print, and print, in your publication that will help to lessen labor turnover? Lessen labor turnover and you save money for your employer. Save money for your employer and you make money for your employer. Play on this harp of a thousand strings—lessen labor turnover and again lessen labor turnover.

Second: what can you print that will tend to increase the punctuality, constancy of service, loyalty, efficiency, contentment and ambition of the employee reader? There never has been a completely satisfactory answer to this query. But one thing you can do. You can, with the greatest honesty and sincerity, boom the town where the employee reader works and the plant he works in. You can laud them as being magnificent places to reside in and to toil in.

In scores of ways this can be driven home, and in the end is bound to have weight in influencing the employee reader to remain contentedly, or reasonably content, where he is. This again has a big influence in lessening labor turnover—an advantage to both employer and employee, for if shifting help is a loss to an employer, so it is frequently to an employee who pays for transportation from one point to another and has no assurance that his new job will be congenial.

Third: constant improvement in your plant publication as to quality and quantity of appeal. Constant attempt to economize in its cost. It is this last division of editorship that should make attendance at the annual **Plant Publication Conventions** worthwhile. The plant publication editor should attend these conventions, asking these questions of his fellow editors:

Can I help you, or can you help me—

(A) get out just as good a publication as we are getting out but at less expense?

(B) get out a better looking or a better made up publication typographically?

(C) get out a more forceful publication?

(D) get out a publication more novel or attractive?

If the plant publication editor who attends the annual convention can improve his magazine or newspaper along any of these four lines, he will be helping his

employer make money and save money. He will know that he has gone far toward solving one of his main publication problems.

There are many things of interest to employees that you might write about in your publication that have no value at all in helping a corporation to make money.

It is admitted that a word hidden here and there in what you write, although it has no direct bearing upon helping an employer to make money, nevertheless, may be of very remote benefit. Just where we shall find this benefit, however, will be like trying to find the proverbial needle in the haystack.

If you set out to do something beneficial, do not take to the side paths, but pursue the straight road from your starting point to your goal.

It is a nice thing to observe a plant publication editor getting out his magazine or newspaper the same as if he really owned the plant, and the paper, and was responsible only to himself. It indicates a commendable zeal and enthusiasm. But in our discussions at conventions, and in advocating this or that as good policy in putting forth a plant publication, we must ever bear in mind that we are subordinate to the policies of our employers, and that there are many things which we would prefer to do as editors that we cannot do because the business wisdom and foresight of those who engage us define what the limitations of publication shall be. This should be kept well in mind when we are suggesting that another editor should do so and so, or wondering why he does not do so and so. If we knew his limitations, we might get out exactly the kind of a publication that he is getting out.

Two Points of View on Publishing the Accidents

As an illustration of the restrictions imposed by management policy, in some cases plant publications print a vivid recital and list of accidents in the manufactory. It is supposed that printing this will serve as a beneficial warning to other employees to be more careful.

On the other hand, a management will take the ground that printing reports of such accidents in a publication that goes abroad, and is seen by people who are interested in a corporation in a financial way, may give the impression that there are more accidents than there need be at the plant, and there must be an undue percentage of carelessness or they would not occur.

If a management laid down as its policy that it was unwise to print accounts of accidents at a plant, you can see how futile it would be for a man to arise in a convention of editors and insist that all plant publications would be benefited by printing a list of weekly or monthly accidents, with details.

Let us hope that at these annual conventions we may be able to aid one another in solving these problems by recognizing that plant publications are of many kinds with various policies and various budget totals.

Let us help one another by first ascertaining the policy, the facts and the budget governing or influencing each editor's publication task. Let the papers we read and the addresses we deliver at annual conventions take into consideration all these varieties of publication and editorship, so that we shall not be speaking of things too high on the publication peak to be of value to the smaller editor, nor too crude and simple to be of advantage to the editor associated with the larger corporation.

CHAIRMAN BOSWELL: We wish to thank you, Mr. Conover. You have made interesting deductions here and I am sure it will be worth while to consider with great seriousness some of the things you have propounded.

I am going to ask Mr. Ward, who was appointed yesterday, to give us the report of his committee as to how we may get some sinews of war.

C. A. WARD (Pure Oil Co., Columbus, Ohio): The committee consisting of Mr. Mahaffey, Miss Cade and myself met after the meeting yesterday and we unanimously decided to recommend a fee of five dollars. However, we saw the big bosses this morning and they vetoed that proposition. Mr. Ashe suggested a membership fee of two dollars, in which the committee very readily acquiesced, and we now make that recommendation.

CHAIRMAN BOSWELL: I would like to correct Mr. Ward. The president, Mr. Ashe, did not dictate at all. Mr. Ward was talking to us and we told him that we felt that five dollars was maybe a little too high, because we felt we didn't need that amount of money. Mr. Ward had in mind, and I think the committee also had in mind, that the printing of the News Letter the cost of printing it had to be borne by the chairman of this section, and when I informed him that such was not the case, that the News Letter was being printed at the expense of the National Safety Council, and was being mailed out at their expense, it cast a little different light on the question. So that the real expenses are in seeing that these panels are taken care of and that they are sent to the next Congress; and the resolution which you have adopted, if it is finally carried, is going to preclude the expense of express or freight if the conventions are to be held here in Chicago. We did have it in Detroit last year. That is going to save that transportation, although, while the chairman of this section for the coming year is a resident of Chicago, a subsequent year might find your chairman in some other city and he might want to have those panels sent to him.

Question of the Registration Fee

But there are a few expenses that must necessarily arise and the question is before you. The committee proposes a fee of two dollars as a registration fee for the members of this section, to be imposed in some way or another. What is your pleasure?

S. W. ASHE (General Electric Co., Pittsfield, Mass.): I second the motion with the modification that the membership fee isn't anything of a compulsory nature. There are a number of people present, connected with big companies, that usually aren't faced with the problem of expenses when it is a matter of this sort. I know that in the three years I have been connected with this body I have had no difficulty in getting all the money I needed. That is one of the reasons I felt five dollars was too much, because some of the smaller companies are faced with the necessity of curtailing expenses.

CHAIRMAN BOSWELL: Is it your idea that it should be a voluntary fee rather than a compulsory fee?

MR. ASHE: Yes, there might be some instances where even two dollars would be difficult to put on their expense sheets. We have a strong section here, getting to be one of the biggest and most powerful in the Council, and I don't want to see anything come in that is likely to stunt its growth, even though it is a matter of a few dollars.

CHAIRMAN BOSWELL: Mr. Ward, would your motion or resolution be that an involuntary fee or something along that line be imposed?

MR. WARD: All right; anything to help the organization. What we want is a little money to use in reaching the other 600 or 700 editors who don't get to these meetings.

V. H. KUPFERER (The Studebaker Corporation, South Bend, Indiana): It occurs to me that we would probably be able to reduce that to one dollar if we simply asked every editor who wished to become a member to pay one dollar. In that way we could probably raise two or three hundred dollars.

CHAIRMAN BOSWELL: Do you wish to make that as an amendment?

MR. KUPFERER: These fellows get the News Letter and other things we are trying to do, and if they don't get to the Congress it is unfortunate. I think they would be willing to pay a dollar as a membership fee, which would put the cost where it belonged. I would like to make that as an amendment.

CHAIRMAN BOSWELL: The amendment is that the membership fee be placed at one dollar.

F. L. GREENYA (Fisk Rubber Co., Cudahy, Wis.): I think there are one or two points that should be clarified before going farther. The matter of assessing the sum of one dollar, or any amount, is a good one because there is a certain amount of expense necessary in carrying out projects, but I think this body should decide positively here and now whether or not that is going to be an actual assessment, and whether or not the privilege of receiving the monthly News Letter will be confined to those who pay it. I think the status of the membership in this organization should be determined here and now.

I like the idea of assessing every one a dollar and I think that every one should be sufficiently interested in our projects to contribute that amount. I don't care how small or how large the company, that isn't going to break them, and they can get more than a dollar's worth out of that monthly News Letter. I think that if they don't pay they shouldn't get the News Letter, and I think that should be definitely set forth and it would be an inducement to pay the dollar.

CHAIRMAN BOSWELL: Is that suggestion agreeable to the members assembled? How would it be to word the amendment to this effect—that there be a membership fee of one dollar to the members of this section, which would include the monthly News Letter? Will that be satisfactory?

MR. ASHE: Of course I presume our friend here had in mind that the National Safety Council would pay the expense of that News Letter anyway and that the dollar could be used for other purposes. My thought was that you are agreeing to give service which the National Safety Council is now giving and use your dollar up that way, and then you wouldn't have any money left. I presume that the National Safety Council would still be willing to continue the service they are now giving.

The News Letter Contains Much Valuable Information

CHAIRMAN BOSWELL: They are sending this News Letter out to several hundred editors of plant publications.

MR. GREENYA: My thought was that the matter of who shall receive these particular News Letters was determined more or less by the membership in this particular body. If that is not the case there is no particular need of stressing that point. I think this body should have supervision over who shall and shall not receive that particular News Letter because they can induce membership in this body by that means. It is all right for the National Safety Council to send out the News Letter on their own stationery and on their own time, but if they have a unit in their organization doing definite work in that line that unit should have something to say as to how that work shall be done and controlled. If we have no jurisdiction over who is going to receive this News Letter then my thought was all for nothing.

A. H. RICHARDSON (General Electric Co., Erie, Pa.): The thought was expressed yesterday and has been expressed again today that inasmuch as the plant publications contest is the cause of this expense, that the editors entering the contest be assessed a small fee to take care of the expense of transporting the panels. As I understand it, this News Letter is now sent to these plant publication editors, regardless of whether the editors attend the Congress or not, and I would not like to see that changed; but I think that a fee assessed to the members entering the plant publications contest would be allowable.

E. AUGUSTUS (Mead Pulp & Paper Co., Chillicothe, Ohio): I think if you do

that you are going to get into trouble with the postal authorities. It came up just recently in Washington where some very worthy ladies were trying to raise funds for a certain purpose and they decided upon the idea of staging a contest and charging a fee for anybody entering the contest; and the postal authorities said that it was the same as a lottery, and couldn't be done.

I think the idea of letting each member pay an assessment of a dollar or two and have that entitle him to receive the News Letter is a good one. I think that the members who have been receiving this News Letter were not arbitrarily picked by the National Safety Council, but the National Safety Council sent us a list from which we picked out some 200 or 300 names.

Personally I am in favor of a two dollar assessment. I would make it two dollars with the understanding that that assessment would entitle the giver to the Monthly News Letter.

Council Membership the Determining Factor

S. P. WILD (Armour & Co., Chicago, Ill.): I think before we go any farther we ought to have a little more definite understanding. I think there are others in the same boat, as to what constitutes membership in this Section and what limitations we have over it. It is my understanding that the membership of a company in the National Safety Council in the past has entitled the representatives of the company to membership in the sections *per se*, without any further authority.

I think that the idea of a dollar or two dollar fee is very good, and there wouldn't be any question as far as we are concerned about being able to pay it, and if I were with a small company I would pay it myself.

I don't think we have the authority, however, to limit membership in this Section to the people who pay the dollar if their company is a member of the National Safety Council.

CHAIRMAN BOSWELL: I was going to call attention to that thing.

MR. ASHE: I believe he is right. That was one of the thoughts I had in mind in putting it up as a voluntary contribution.

CHAIRMAN BOSWELL: I think, with that thought in mind, which is a fundamental rule of the National Safety Council, that any member company is permitted to send any of its employees to any of these sections without additional registration fee, the only registration fee is the two dollars which we pay to get our badge; and with that in mind I think we will have to pass that idea up.

This money which we are trying to raise is for incidental expenses that are not borne by the registration fee which the National Safety Council receives, nor the membership fee. Now I think if that is clear to us all we are just asking ourselves to raise some money to carry on some things which we don't feel we should ask the National Safety Council to bear.

The amendment is this, that we charge a membership fee to all the members of this section, and that would of course mean those who attend here from year to year, I should judge. If we need any definition along that line we may have the officers-elect for the coming year lay that down for us. Are you ready for the question?

A. H. RICHARDSON (General Electric Company, Erie, Pa.): I would like to offer a substitute motion in that the chairman present a bill of expenses to the section each year and ask for contributions to meet the expenses. That would take care of it and there would be no discussion as to the membership fee.

(The substitute motion was seconded.)

CHAIRMAN BOSWELL: The substitute motion is that the chairman of the section present a bill of expenses to the section each year and ask for contributions to meet the expenses incurred during the preceding year, or during that present year, which would obviate the necessity for a membership fee. Is that your substitute motion?

MR. RICHARDSON: Yes.

CHAIRMAN BOSWELL: And that substitute motion is supported.

MR. ASHE: I would like to hear a word from the incoming chairman on this subject.

R. H. FERGUSON (Bureau of Safety, Chicago, Ill.): The suggestion was made that if this matter were presented to Council headquarters we probably could get \$200 or \$300 to cover the current year's expenses, but I believe that it would be well to let that matter rest. I feel sure that such expenses as we may have can be taken care of easily, and if they do run high I think we can get that from the National Safety Council.

CHAIRMAN BOSWELL: We have a substitute motion before the house which must be voted on unless there is a motion made that it be laid on the table.

MR. GREENYA: I move that the substitute motion and everything that goes with it, after the words of the incoming chairman, be laid on the table.

(The motion was seconded.)

CHAIRMAN BOSWELL: The motion is that we lay the substitute motion on the table.

(The motion was put to a vote and was carried.)

CHAIRMAN BOSWELL: We now have the amendment before us.

MR. GREENYA: I move that the amendment be laid on the table.

(The motion was seconded, put to a vote and carried.)

CHAIRMAN BOSWELL: The committee appointed yesterday is still operating.

Now we have 20 minutes for our final speaker, Mr. Kupferer. Mr. Kupferer is editor of the *Studebaker Cooperator*, of the Studebaker Corporation, South Bend, Indiana.

Rewards for Contributors to Employees' Magazines

Victor H. Kupferer, Editor—The Studebaker Co-Operator, The Studebaker Corporation, South Bend, Indiana.

This presentation was originally to have been in the form of a debate on the question, "Resolved, That contests for contributors to employees' magazines, with tangible prizes for winners, are a good thing." It has been deemed wise by the program committee to have this matter presented in the form of a paper, which is much more satisfactory to me.

We are all pretty much agreed that it is a good thing for us to accept contributions from our employees, and to encourage them to contribute to our columns. Tom and Dick will enjoy reading something that Harry has written for the plant paper with more avidity than they will those sections of our pages which are marked "Editorial." But certainly no one will contend that we should pay an employee for submitting a news item, or even a poem. I have been in the position sometimes where I would almost pay employees for not submitting "poems."

Where regular reporters, correspondents or associate editors acting as correspondents form a part of the staff of the plant paper, I am of the opinion that they should not be paid for their work. An excellent idea, and one which I believe a number of editors use, is that of having periodical dinners for the group and an occasional social gathering, possibly with the families of the reporters included. At the dinner meetings, problems and ideas could be discussed and the items submitted can be thus maintained at the desired standard, from the standpoints of both quality and quantity.

When a regular artist, cartoonist or photographer is used, it is sometimes desirable to pay such individuals for the work they do inasmuch as it frequently involves spending a great deal of time and effort in connection with the work submitted.

I will now present several reasons why I believe contests with rewards for prize winners are valuable in producing good material for use in the employees' magazine.

In the first place, I think the announcement of a contest stimulates many employees to contribute material along specific lines such as safety, thrift, health, education, loyalty, etc. From our own experience, we found that a prize contest for articles on "How the Employee Can Help Prevent Accidents" produced contributions from many employees who otherwise probably would not have contributed. A first and second prize were offered and the winning articles were published; in the case of the first prize, the photograph of the man was printed with the article. The prizes were \$25 and \$10. At least one employees' magazine reprinted this winning article complete and the employee who submitted it was recognized further by a promotion. Concurrently with this contest was one for foremen and the subject of the article was: "What the Foreman Can Do to Prevent Accidents." This contest not only brought us this material for our paper, but incidentally was the means of getting a lot of employees and executives thinking about this question of safety.

Secondly, the fact that the article is a prize winner, aside from the fact that it was written by one of their colleagues, will tend to make employees read the article from a curiosity standpoint and thus the message is at least read, which is not always true of "tailor-made" editorials.

The Contest Idea Well Established

And then it is not strange that we should adopt the contest idea for our publications. Consider the national advertisers who use this method—Liberty Magazine in their name contest; Sears-Roebuck & Co., with their tire naming contest; other concerns with their slogan contests; even the National Safety Council has run prize contests at various times; and many others, too numerous to mention. Many of our employees' magazines use contests for cartoons, stories, photographs, limericks, etc., and, from those I have followed up, it seems to have worked out very effectively.

That there should be a tangible reward in this type of contest can hardly be questioned. It is a parallel to our employees' suggestion system and we know that the reward held up for valuable suggestions is the incentive to employees to submit them.

In their "Modern Management Trends" series, the Working Spirit Builders of Chicago, make this statement: "In exceptional organizations, well-oiled by high-working spirit the reward of personal pride and satisfaction may outweigh a money prize. But it is doubtful if management convincingly expresses to employees its appreciation of valuable ideas without giving them something of tangible value." Amen! You know Harrington Emerson, in his book on the twelve principles of efficiency, includes the efficiency reward as one of the fundamental principles.

As before intimated, we find that many employees who would not otherwise contribute to our magazines, due to modesty or some other cause, will contribute when a contest is announced and thus we may uncover talent which we can use regularly. Maybe we will find that cartoonist we have been looking for since "Hec" was a pup. Perhaps we will locate a better reporter for that department which has been falling down in the matter of news items. Perhaps we will find a man whose hobby is photography and who can furnish some excellent illustrations for our use. And not infrequently we may find a man who will be more valuable for the company in a different job which will mean a promotion for him, as was true in the case I have mentioned from our experience.

It was said of a certain physician that he charged eight dollars for a house

all, five dollars for an office call, and two dollars for a telephone call. Whereupon some one asked what he charged to say, "Good Morning." There is an all too common tendency these days to consider everything we do in the light of how many dollars and cents it will bring to us. But I do not think it is unduly catering to this tendency to offer tangible prizes for specific contributions when made under the conditions outlined above.

In concluding this paper I would like to make a few suggestions as to contests, which I trust will be enlarged upon and added to in the discussion which is to follow:

First: Choose practical subjects. Among these might be included, safety, health, thrift, education, garden contests, "My vacation," "My hobby," safety slogans, how to build various features making for convenience and beauty of the home and grounds; and for the women, recipes, household hints, dressmaking ideas, etc.

Second: Make the prizes commensurate with the value of the material. Perhaps \$5 is sufficient for a prize snapshot or a recipe for sponge cake, but when a contest calls for hours of work on a subject, \$25 is not too much.

Third: Do not make the contest of too long duration. State a definite date when contributions must be in and state when prizes will be announced. Bulletins about the plant should be used as well as announcements in the magazine. This enables you to keep the contest before your people which is helpful, whereas mere announcements in one or two issues of the publication might not be quite so effective. Run your contest on schedule and award prizes promptly.

Fourth: Select competent, impartial judges. Use prominent people when possible, being sure to use those whom your employees will agree are competent and fair.

J. J. PLZAK (Consolidated Water Power & Paper Company, Wisconsin Rapids, Wisconsin): I wonder if Mr. Mahaffey would say something about time exposures on pictures.

P. L. MAHAFFEY (Pennsylvania Railroad Company, Pittsburgh, Pa.): I cannot tell you how to handle time exposures successfully nor can anybody else. I mean indoors and under conditions where there isn't a general diffusion of light from the sky or other means. We have to use our own judgment.

Time exposure is the hardest thing in the world to judge accurately. There are many little contraptions and devices on the market, but for the ordinary amateur photographer who is working with a \$25 camera I have found the "Harrold Exposure Scale" helpful. It is made by a chemical engineer by the name of Elmer Harrold, of Leetonia, Ohio. It gives you the time of day, any day in the year, any place in the United States and Canada; any speed of lens from an ordinary \$2 Brownie camera to the \$300 Graflex. Supposing you want to take a portrait. It is 22 minutes past twelve. Suppose you are going to take a portrait in shade, using a kodak film. You put the stop at GA with the conditions of lighting outside, which I would call rather dull. Now under these conditions, reading from this chart, about 1/25 of a second will make you a nice portrait.

I have fellows working on our railroad who take pictures with almost a hundred per cent success. If you want to pay ten dollars you can get a machine that makes it absolutely impossible to fail. However, with this chart it is almost positive, and you might miss it once or twice if you misjudge how dull a day it is. This chart is graduated for portraits, buildings, average landscapes, moving objects, light colored objects, semi-distant views, extreme distant views, clouds, snow, and sea.

I might also add—don't use a roll film if you can get away from it. The roll film is only for snap-shots. Use the plate camera or the cut film.

ADJOURNMENT.

Friday, September 30, 1927

The third session was called to order at nine-forty-five o'clock by the chairman, Forrest W. Boswell.

CHAIRMAN BOSWELL: I am glad to see that we have so many who have stayed over for this final session. It shows that the interest certainly deepened among members of this section.

There are many here who have looked forward with a great deal of anticipation for the first part of our program this morning, to get a report of the judges, and Mr. Ashe who has been the chairman of the Judges Committee for some years past, who really launched the idea of the contest in the Plant Publication Section, is here and holds the coveted jewels. I am going to call on Mr. S. W. Ashe of the Central Electric Company to present his report at this time.

Report of the Judges Committee

In presenting the report of your Judges Committee, after three years of service, we are giving you in brief form not only the observation of your present committee but also the cumulative opinion of the judges based on three years of judging. The task of judging 260 plant papers, sent in by 130 companies, covering diversified industries, and attempting to analyze the quality, or real value of these publications, from an employee's as well as a company's standpoint, is a job.

Every magazine must be gone over carefully about four times by each judge before it is possible to make an accurate estimate of its value.

Naturally each judge sets his own standard, and while these standards vary it is interesting, in looking over the judges report to see how uniform, as a general rule, the system of judging is carried out. For instance, Hord might rate as low as 45, Wheelock, 66, and Ashe as high as 71, but the average of these three ratings would be comparable with another group judged on the same basis. The ratings in other words, are comparative, and if one magazine had an average rating of 80, another 60, and a third 40, this would be a measure of the relative value of this particular group. We must bear in mind however that this rating is based on a safety contest. Some magazines might be perfect in all other respects, but have no safety or health material, and the maximum rating that such magazines could possibly receive would be 75. This should be taken into consideration in regard to the judging, and also as an explanation as to why some magazines which, to all appearances are excellent publications, received lower ratings than their editors probably expected, due in a large measure to the absence of safety and health material.

The changes in the ratings this year over last, we felt, were a decided improvement, and the present committee would recommend to the incoming committee that this scale be followed another year, until the new committee's experience warrants further change. We all know in industry how difficult it is to arrive at a standard of quality, and how wise it is once this standard has been adopted to move slowly in making changes.

The system of dividing the magazines into two classes has also been an improvement; naturally with each subdivision further complications arise. There is a possibility that a third subdivision might be made, such as the strictly newspaper classification. Whether, however, there is sufficient of this type of magazine to warrant this third classification is something the incoming committee would have to decide. For instance, there would be little advantage in

having the third classification if there were only five or six types of newspaper magazines that entered the contest, three of which would have to be rated as the prize winners.

In the high standing of certain magazines in the contest, the outstanding result is the very large percentage of magazines in "Class I" group which come from telephone companies, and we suggest to all editors that they secure copies of these magazines, and see what a wonderful job the editors are doing. I know that all three judges this year felt that they could take lessons from some of these editors on the especially fine piece of work they are doing.

Last year the magazines did not come in as rapidly as desired, so we sent out an urgent call, which increased our entries from 50 to 150. This year the total of 130 entries came in after our first announcement. No effort was made to force the entries, and those who entered magazines were, therefore, doing so with the idea of really securing a rating, or of being a true sport, and entering the contest to help the idea along.

We were also pleased to see so many magazines entered by editors in the contest this year who also had magazines entered last year. Some few have dropped out, but still we have as many new entries this year.

Some Editors Plan Unusual Numbers

Suggestions have been made that the judges should arbitrarily during the year select or call for two issues of certain months, which should be the entries. We do not believe this is practical. An editor should have the opportunity of looking over his twelve months issues and picking out what he believes are his best issues. In other words, he should feel free to submit his best efforts rather than have someone pick out the numbers.

It is true that some editors include special safety numbers with this method, but every editor has the same privilege in this respect, and if two special safety and health issues were produced each year by the editor, it would help focus attention to the importance of safety work.

Looking over the best papers critically it is realized that some editors put an enormous amount of thought, and originality into the preparation of their papers. They are constantly alert to news, and also are constantly thinking out ways of humanizing their papers, which in the final analysis is a test of the publication's effectiveness.

Many editors are doing splendid work, which is of incalculable value to their company, but still in some cases it is evident that too little thought and labor is being put into some of the publications to warrant their expense.

While the task of judging the papers these past three years has been a heavy obligation still it has been a privilege to do the work, and we hope the results of the efforts of the judges will prove worth while in your estimation.

Spencer Hord

Ralph Wheelock

Sydney W. Ashe, Chairman.

MR. ASHE: One word more before I give you the information which I know you want to hear. We did one more thing that was interesting. We thought that as the editors, as a rule, were such hard-working individuals and as their papers represented such a fine grade of work, it wouldn't do any harm to let the presidents of their respective companies know about it. We, therefore, selected the three prize winners and seven honorable mentions in each group and wrote the president of each company informing him what splendid papers were produced, who had won first, second or third place, and congratulated his company asking further that a representative be sent to this meeting. I know today that we have a number of representatives from companies who have come as a direct result of the personal

interest of the presidents of these companies. We felt that was something well worth while. One president of a paper down in Washington thought enough of it to call me on the long distance phone to find out where the meeting was to be held, in order to have somebody here.

Our friend Garry from the *Northwestern Bell*, who was the prize winner last year, has come from Omaha in order to be here this morning. That gives you a little idea of the real interest in this thing and it is not only a very important activity but there is a tremendous amount you can do among yourselves in getting acquainted with these meetings.

In the magazines of the Class One division we have the rather interesting result that the person who won the first prize this year is the same individual who won first prize last year. Mr. Sigurd U. Bergh of the *Northwestern Bell Telephone Company* who was undergoing a serious operation last year and couldn't get his award, will now come up and receive his award and tell you how he did it. Mr. Bergh of the *Northwestern Bell*.

The Northwestern Bell Given First Prize

SIGURD U. BERGH (*Northwestern Bell Telephone Co., Omaha, Neb.*): It is a little hard to believe, but here it is, so it must be so. It is more than a surprise, for why should our magazine be selected as being worthy of this high honor.

Since the judges have been so good to us, I want to thank, on behalf of the *Northwestern Bell Telephone Company*, on behalf of our 19 employee correspondents, on behalf of the members of the magazine staff, the judges. I want to say that if the magazine has merit, it is because we get wonderful cooperation and 100 per cent backing from every member of our telephone family—11,000 strong, from the president down to the newest operator. It is a big pleasure to be here today to meet you, and I want to thank you for this opportunity and for the kindness you showed me last year and the flowers you sent me while I lay in the hospital. I want to say that if the *Northwestern Bell Magazine* is doing its bit in furthering the cause of safety and helping the cause of promoting house organ journalism, I am extremely glad.

MR. ASHE: We are going to ask only the three prize winners in each group to say a word and in that way we won't use up too much time.

The second prize winner in Class One is *The Transmitter*, the *Chesapeake & Potomac Telephone Company* publication. Mr. Oliver Martin is the editor but I believe they sent a representative in his place. His president was enough interested to have him come here in order to get this little award.

JOHN VANDEGRIFT (*Chesapeake & Potomac Telephone Co., Washington, D. C.*): I am very keenly interested in this publication of ours, *The Transmitter*, of the *Chesapeake & Potomac Telephone Company* of Washington. We believe that publications of the sort you see here are very important, certainly in an organization such as ours, in tying employees together. In the first place by letting them know something about the policies and problems of the company, in making them keenly alive to the things or the big thing that the company stands for. In our case it is service.

My interest directly in this magazine is to see that it carries a proportionate amount of accident prevention fuel, and you know I have realized for several years that the magazine has been a real influence in the matter of accident prevention. Without it, frankly, I don't know how we could have done the job that we have done in cutting out accidents, cutting them down, I should say, to a minimum; because the magazine, it seems to me, shows the worker that the company is 100 per cent seriously interested in his welfare. It gives authority to accident prevention. This magazine of ours has been a real support to the safety movement in our field.

I know if Mr. Martin were here, he would say a lot more and say it a lot better than I can. We like him. We think he is a keen editor. This proves our suspicion. We employees always thought our magazine was good. Now we know it because it takes a pretty good magazine to run second to the *Northwestern Bell* and to beat the magazine which I have been informed has taken third place, so on behalf of the Chesapeake & Potomac Telephone Company and its employees, its editors and the rest of us, I certainly want to express our appreciation of this great honor.

MR. ASHE: The third prize winner is our old friend Sterling Patterson of the *Western Electric News*. I believe Mr. Patterson has a representative here.

W. A. TITUS (Western Electric Co., New York City): I am speaking for Mr. Patterson. It is unfortunate he can't be here to receive this tribute to his work. We are proud of the *Western Electric News* and we are glad that the committee found it good. The *News* is perhaps somewhat unique as a magazine, in that it must serve as a medium of exchange of information for an organization scattered all over the United States and of immensely diversified interests all the way through research, design, manufacture and marketing of an extremely complex problem.

For that reason its state, from the editorial standpoint, has to be a pretty broad and general interest, and we have found it somewhat insufficient for our needs, for that reason, because it can't by any stretch of the imagination be called a newspaper.

A Magazine Going to 60,000 Readers

Things are happening pretty fast in the telephone industry so we have introduced, quite generally, types of newspapers; and if Mr. Ashe has any doubt about the ability of the section to develop a third group of strictly news sheets, I think I can set his mind at rest from that angle alone. In fact I have already told our local folks to see to it that our local news sheet is in next year. The *News* is 17 years old this year and is now going to 60,000 people who are scattered all over the United States and abroad. It is edited by a very small staff. It is almost wholly an employee contribution effort in the original, as far as editorial standard will permit.

I want to thank the committee on behalf of Mr. Patterson for their generous appreciation.

MR. ASHE: We will not be able in the limited time to hear from the honorable mention except to have them come up and smile and then go back to their seats, otherwise Neubig won't be able to tell them about the job they have done.

CHAIREMAN BOSWELL: If you will permit me, we have a long program and we must expedite things by curtailing on the time.

MR. ASHE: You will notice the telephone companies have made a clean-up in most of the first division.

The first blue ribbon goes to the *Telephone News*, The Bell Telephone Company of Pennsylvania, Mr. Milton B. Herr. The next blue ribbon, which is No. 5, goes to *The Monitor* of the Mountain States Telephone and Telegraph Co., Denver, Colorado, Mr. A. U. Mayfield. The next is the *Southern Telephone News* of the Southern Bell Telephone and Telegraph Company, Atlanta, Georgia, Mr. E. R. Austin. The next is *Telephone Topics*, of the New England Telephone and Telegraph Company, Boston, Massachusetts, Mr. R. C. Farnham.

No. 8 is a railroad magazine, the *Louisville & Nashville Employees Magazine*, Mr. Thos. E. Owen. No. 9 is the *Vacuum Oil News* of 61 Broadway, New York. No. 10 is *The Ohio Bell*, of the Ohio Bell Telephone Company, Cleveland, Ohio, Mr. H. E. Bonar.

In Class 2 the winner of the first prize is *Mead Cooperation* of The Mead Pulp & Paper Company, Chillicothe, Ohio, Mr. Ernest Augustus.

The second prize goes to our old friend Wilkins of the *Schenectady Works News* of the General Electric Company.

The third prize is *Gas & Electric News* of the Rochester Gas & Electric Corporation, Floyd Mason.

No. 4 is the *United News Letter* of the United Electric Light & Power Company, New York City, Mr. F. S. Blodgett.

No. 5 is *The Edison Round Table*, Chicago, Mr. R. W. Liddle.

The next is *The Synchronizer* of the Adirondack Power & Light Co., Schenectady, New York, Mr. A. G. Strickrott.

No. 7 is the *Harrison Radiogram* of the Harrison Radiator Corporation of Lockport, New York. No. 8 is the *Norfolk & Western Magazine*; Holcombe Parkes is the editor.

No. 9 is the *Eric Railroad Magazine*, Mr. William F. Hooker. The tenth is our little magazine, *Tick Talk* of the Western Clock Company, La Salle, Illinois, Mr. B. G. Richards, editor.

Detailed Rating of Some of the Contestants

I won't take the time to give you the whole list of percentage ratings, but I thought I would run five down on each scale.

Northwestern Bell	93.16
The Transmitter	91.16
The Western Electric News.....	90.66
The Telephone News.....	90.00
The Monitor	89.33
Southern Telephone News.....	88.16
Telephone Topics	87.66
Louisville & Nashville Employees Magazine.....	85.33
The Vacuum Oil News.....	83.3
The Ohio Bell.....	82.5
Safety Service Magazine.....	81.66
The Telephone Review.....	81.66
Long Lines	80.83

In Class 2 *Mead Cooperation* started off with 82.6 per cent, *Schenectady Works News*, 78.5; *Gas & Electric News*, 77.3; *The United News Letter*, 77.00; *Edison Round Table*, 76.83; *The Synchronizer*, 76.3; *Harrison Radiogram*, 75.16; *Norfolk & Western Magazine*, 74.83; *Eric Railroad Magazine*, 74.00; *Tick Talk*, 74.00; *C.C.C. Mutual Magazine*, 73.66; *Florida Power & Light Co. Magazine*, 72.83; *Current News* (Philadelphia Electric Company), 72.66; *The Hardwood Bark*, 72.50; *Flash* (Nebraska Power Company), 71.16; *The Commonwealth*, 71.33. I will be glad to let any of you know, after the meeting, what your individual ratings are on the sheets.

CHAIRMAN BOSWELL: I am sure we are deeply indebted to the committee for the prodigious amount of work was necessary for them to go through in order to submit this report. I know last year Mr. Ashe, who was chairman of that committee, reported they put in a good many hours all told in doing this work.

I am going to ask our chairman-elect, Mr. Ferguson, to come up here so that you will get acquainted with him and next year when he is conducting your sessions, you will know who he is. Some of you haven't met him.

I am going to remind you again of the matter of registration. We would appreciate if everyone who has attended here will fill out the cards.

Mr. Ashe suggested that a telegram be sent to Aunt Mary, Margaret Talbot

Stevens, as we know her, because of her inability to be here. They are celebrating the hundredth anniversary of the Baltimore & Ohio and she happens to know something about a part of that anniversary. As editor of their woman's magazine it was necessary for her to be in attendance this week and next. What is your pleasure?

E. T. WILKINS (General Electric Co., Schenectady, N. Y.): I make such a motion.

(The motion was seconded and carried.)

CHAIRMAN BOSWELL: Our next speaker is Mr. Liddle who has already appeared before you as one of the blue ribbon winners. As Mr. Ashe informed you, he is editor of the *Edison Round Table*.

How Money is Wasted on Employees' Magazines

**Ralph W. Liddle, Editor, Edison Round Table,
Commonwealth Edison Company, Chicago**

Tradition and precedent, valuable guides as they are to future action, often become actual obstacles to progress, and to economy. They may become not a reason, but an excuse for doing things a certain way. Having written this entire paper in advance of its introductory note, we now seize upon these two ghosts and say that they are to blame for many of the shortcomings of employees' magazines, as we can find no other reason. If you do not like these inanimate victims we leave you to explain why some employees' magazines are as they are. In a perhaps narrow and certainly nervy fashion, we have tried.

To the extent that money expended on an employees' magazine fails to promote the objects of the paper it tends to become a waste.

Having selected this method of approach to the problem, it is necessary to define the purpose of an employees' magazine. We believe there are two major objectives:

1. To inform, and educate, and broaden the employee. To inform him as to the company's policies and operations; to educate him as to the history and future of his job, his company and the industry; to broaden him and aid him in his individual progress.
2. To promote a feeling of comradeship among all employees, to improve cooperation, loyalty and "morale." To encourage good work and initiative.

We know that the average employee—and this means a good employee—will not read as much so-called "solid" material as might be to his advantage. The first of our objects, which for brevity we may term education, is concerned with this solid type of material. We must agree, then, that our educational matter must be diluted or altered or mixed with more generally interesting copy, to be effective. Up to a certain point this is not waste.

The second objective mentioned for an employees' magazine, which may be generally designated as good-will, could be attained with a minimum of solid matter and an abundance of personal news, cartoons, pictures, etc. Such a course could obviously be wasteful if the company were paying the bill.

How far, then, can we depart from straight educational and company news copy and still "make money" on the investment in our papers? On both sides of this dividing line, wherever it is, there is waste.

In any study of employees' magazines, account must be taken of the individual character of papers and of editors' problems. It has seemed to me, however, that this point, and the necessary variety of method it involves, is over-emphasized, and that it sometimes serves as an excuse rather than an explanation.

In the title of this paper fair warning was given that it would indulge in fault finding; an easy task and one not guaranteed to enhance one's popularity. I think some of us need a good shaking up more than we need idle pats on the back. When this paper gets down to cases, if I fail to dodge well, or choose the wrong exit, I will carry through defeat the conviction that this thankless job needed doing.

It would be both improper and foolish for me to presume authority for the opinions that follow, nor is it necessary. It is enough to point out likely cases of waste and wrong doing, and wax a little vehement perhaps in an effort to penetrate the crust of habit. Revamping a paper on the basis of readers' suggestions is too often a case of locking the barn after the horse is stolen. We must depend mainly on our own alertness and good judgment, and on the compliments and criticisms of fellow editors. It is the criticisms that are difficult to obtain.

With the idea of diving first into the deepest part of the lake and then working out into safer territory, I venture the opinion that the editor is to blame for nearly all the faults, for nearly all the wastes of his paper. This unpleasant theory grows out of a conviction that more can be done with limited funds and facilities than is done, and limited funds and limited facilities are the common lot, and the prize alibis of an editor.

Example of a Small West Texas Publication

I recall a striking example of getting a great deal for almost nothing in an employees' magazine—through good editorship. This was in the monthly publication of a small utility company in West Texas. It was a 5x8 size, four-page paper, one sheet folded once. There was only one size and style of headline, only one size and style of body type, and very seldom did it have any illustration. Here were limited funds and facilities with a vengeance, and yet the paper, as an employees' magazine, was a notable success. It was neat, attractive, and harmonious in appearance. It had no suggestion of economy or stint. If it did not print all the news, it obviously was printing the best of it, with no apology. It stood out among a host of much more elaborate papers. It was extremely well written, and probably pleased the executives as much as the employees. The paper paid big returns on its investment.

The answer to this apparent impossibility is in the editor. He could have judiciously spent four times as much money on his paper, but the money wasn't available to spend. Instead of bewailing the lack of this, that and the other, he proceeded to turn out the best paper possible. This is not a Horatio Alger or an American Magazine story, but our hero is now publicity and advertising manager of a company whose assets run over 100 million dollars.

We should get out of the notion that our papers cannot be improved—very much improved—without more money or better facilities. The crying needs of the average employees' magazine are better writing, better selection of material, better make-up, better harmony as to type, heads and illustration. All these can be secured at the same and perhaps a lower cost than now obtained.

I am aware that it is no use to try to bag elephants with a pea shooter, but my firm conviction is that a flock of our employees' magazines are large enough, and expensive enough, to do their jobs better than they are doing them. This brings us to the conclusion that one of the biggest wastes of money in an employees' magazine can be caused by giving it a poor editor, or giving it one-third as much of a good editor's time as it should have. It costs about as

much from a production standpoint, to publish bum copy bum pictures and a messy appearing job, as it does to publish a first-class paper, and a little more money spent on an editor who has ability, judgment and taste could be literally stolen from the present budget with good results.

The whole purpose of this paper is to stress the need of such a study of individual papers by their editors as will diminish the misuse of funds and energy that seems to be so widespread. It is much easier than it should be to select papers, all of about the same cost, which rank almost from the top to the bottom of the scale in effectiveness.

The Most Common Faults of the Magazine

If I were asked to list the most common faults of employees' magazines (and I have not been) the following would be included in about the order given:

1. Unattractive and inharmonious appearance; poor make-up, bad combination of heads, body type and stock; etc.
2. An inaccurate and uncomplimentary estimate of the mental caliber and reactions of the reader, as evidenced by:
 - (a) The character and quantity of so-called inspirational copy used.
 - (b) The awkward and unwarranted "playing-up" and complimenting of the company, benefit plans, new projects, officials and even regular employees.
3. The injudicious use of illustration and the apparent insistence on some kind of art work.

These faults will be touched upon again, but it is worth while to note here that more money is not a guaranteed cure for any of them, and that better editing would eliminate all of them.

The practice of imitation and duplication belongs in the list of common faults, but it requires some elaboration. Many editors are not satisfied unless, in their company paper, they can enter every field in which any considerable number of employees are interested, and so we have in some employees' magazines women's sections, boys' sections, girls' sections, children's stories, straight out-and-out fiction, budget and household economy sections, fashions, radio sections, instructions for dressmaking, gardening, building furniture and playing the ukulele; crossword puzzles, joke sections, and so on.

How much more than half of the money and space devoted to these special sections is a waste for all concerned, cannot be determined, but I doubt if the proportion is less than half. The company cannot hope to gain any more than some added reader interest and a modicum of heightened living standard and happiness on the part of a small number of employees. The trick is that even the employees directly interested in the special section gain so little. These fields cannot be adequately covered and the quality of material is seldom equal to that easily available and already at hand in newspapers, magazines, and books.

Even if these special sections are not syndicate material, even when they have the rarely combined advantages of authority, local authorship and interest, they must be incomplete. With these factors in mind, and remembering that special sections are off the main line to the goal sought, every one of them should be brought on the carpet and made to justify itself. A special section of any kind has a tendency to take up its quota of space, issue after issue, even when the character of its material declines temporarily in value. In many instances special articles, appearing at regular intervals or only occasionally, will preserve the advantages of variety of material and employee authorship, without the permanent disposal of costly space.

Every new activity, and most fads, draw a following which at once asks for

a special section in the paper. It is not often easy to convince these groups that broader attention will be secured for their copy by straight news treatment. Fast readers, who still feel obliged to scan the news headlines, will positively "duck" a special section unless they are certain it contains something of special interest to them.

Another determining factor in the problem of how far afield an editor may go without wasting money is the matter of competition for readers' time. The railroad magazines, many of which go into small town homes, where magazines and newspapers are fewer, are more justified in running special departments, but even here, except in case of the larger magazines, their usefulness is open to question. I believe the average reader of an employees' magazine has access to more and better specialized information than the paper can hope to supply. It seems obvious that employees' magazines with city circulation should go very slowly indeed in pretending to compete with the special features of metropolitan newspapers. It is worth noting that such devices as the questionnaire are unreliable for determining whether or not a certain section is desired. People will recommend, for social or theoretical reasons, a section which would be of only slight interest to them personally. Such a plan only obscures the responsibility for the bad result.

The One Big Interest for the Employee

Greater consideration should be given the fact that the one permanent and certain basis of interest in the employees' magazine is the company, considered as an operating industrial unit and as a family. In this field the magazine is supreme, it competes with no one, it has a sure source of material that is of interest to readers. If this were not true employees' magazines would not have developed as they have, and if it is true editors may increase reader interest and save money at the same time by "sticking to their lasts" a little closer.

First place in the list of common faults of employees' magazines was given to "unattractive and inharmonious appearances." Appearance involves the general style of a paper, its page make-up, the styles of type used for body and headline, the paper stock and binding, illustrations and art work, and the combination of all these. One need not be an expert to see that in this respect many employees' magazines miss the mark, and carry along a handicap for which good copy, good printing or good policy cannot make amends. It is unfortunate for them that this condition does not give, in most cases, even the advantage of economy. It has not a redeeming feature.

We cannot expect to be a good editor, a talented artist, and a make-up expert rolled into one; but all of us have the opportunity of studying the make-up and style of magazines and newspapers that are prepared by experts. We have the opportunity of making little changes from issue to issue. We can cut and try—experiment—on a moderate scale. There is no excuse for producing, time after time, a messy and hodge-podge paper.

It has been suggested that very often insufficient attention is paid to the attitude of the reader. It is an error to assume that the sun rises and sets on one's own company exclusively, or that employees are wrapped up, heart and soul, in their company. It is entirely unnecessary as well. Paternalism, the bugbear of misguided industrial relations work, sticks out so strongly in some magazines that it seems to an outsider that many employees must be disgusted by it. Such a policy certainly diminishes the influence and effectiveness of the whole magazine. If the interest of employees is the first requirement of a successful paper, their confidence is a close second in importance. I suspect that this second factor is very often undervalued.

Grandiose, enraptured descriptions of personal and company accomplishments eat up a good deal of costly space in employees' magazines. If that were their only fault the situation would be of consequence, but the more serious result is the offense to the intelligence of the reader, who suspects uncalled for enthusiasm in such matters anyway. If he finds it he is disgusted; if he finds, instead, simple and interesting statement of the facts, with the privilege left of drawing his own conclusions, he is pleased. He will believe what we say on some occasion when it is especially important. Distinct from the use of inappropriate superlatives and adjectives, is the danger of plain long-windedness, the giving of a lot of unnecessary detail. Such a practice is not an encouragement to read many items in the paper.

Another alleged waste, which recalls the idea of imitation, is the wide use of so-called art work. The editor who can obtain good art work at a moderate cost, and can afford it, is fortunate. The editor who cannot get it, or cannot afford it, need not weep or wail; and more important, he can leave the common garden variety strictly alone, to his advantage. Much of the art work one sees in employees' magazines actually lowers the effectiveness of the illustrations, and in layouts puts the picture captions so far away from the individual picture that they are never referred to. In all but the more elaborate magazines art work can be eliminated entirely, and simple and effective layouts made by the editor himself when they are necessary.

As an example of the little crimes that cause waste may be cited the practice. in mailing magazines, of folding them several times, or rolling them tightly in a snug-fitting wrapper. This plan is effective only as a guarantee that the marginal reader will never open the magazine at all, and that the interested reader, only annoyed at first, will finally be conquered by the nuisance.

Even if there were time, it might not be necessary to elaborate on all of the points mentioned in this paper. In the interest of controversy, some possible exceptions to the positions taken have not been stated. The purpose has been to provoke a fresh and detailed study of individual papers, and to encourage all of us editors who must turn out an effective paper without unbridled access to the company's cash drawer.

A Change Necessary in the Service Committee

CHAIRMAN BOSWELL: I wish to take a moment of time now. I have just conferred with your new chairman, Mr. Ferguson, with reference to the Service Committee. Mr. Augustus, editor of *Mead Cooperation*, of the Mead Pulp & Paper Company, is absolutely unable to serve as chairman of the Service Committee for the ensuing year and in consultation we thought it would be proper to propose this morning that Mr. McReynolds who was a member of that committee last year, who did some very effective work, in fact got out the September News Letter, and who is also on the new committee, be the chairman of that committee, and a motion to that effect would be in order.

MR. ASHE: I so move.

(The motion was seconded, put to a vote and carried).

CHAIRMAN BOSWELL: It will require another member on that committee to fill the vacancy. With your approval we would appoint Mrs. Betty Short, of Rockford, Ill., of the Barber-Coleman Company, editor of *B-C-A News* as the third member of that committee.

There is another thing that occurred to me. I thought it might be well for Mr. Doeller who was chairman of the Program Committee this last year, to be instructed by this body to write a letter to every speaker who has contributed of his time and money without any compensation whatsoever from the National Safety Council

or from this Section, expressing to them our appreciation, and I thought a motion to that effect would be in order. What is your pleasure?

MR. ASHE: I so move.

CHAIRMAN BOSWELL: Mr. Ashe moves that Mr. Doeller of the Program Committee who arranged this program and arranged for all the speakers, send a letter of appreciation, what is the action of this body?

(The motion was seconded, put to a vote and carried.)

MR. ASHE: I suggest that ~~somebody~~ send Mr. Doeller a letter. You know how much good work Mr. Doeller has done in getting up the program.

CHAIRMAN BOSWELL: I have, before this body, expressed to Mr. Doeller in person our appreciation, and I think perhaps that might be a little more effective than to write him a letter.

MR. ASHE: I said write his president a letter and let him know.

CHAIRMAN BOSWELL: That would be fine, I think. We will take action on this first motion.

(The question was put to a vote and carried.)

Miscellaneous Motions Are Adopted

CHAIRMAN BOSWELL: The motion is that we send a letter to the president of the Dayton Power & Light Company of Dayton, Ohio, expressing appreciation for the services of Mr. Doeller in arranging this splendid program.

(The motion was seconded and carried.)

E. T. WILKINS (General Electric Co., Schenectady): While you are passing motions, I would like to make a motion that we put down on the minutes of our meeting a motion of appreciation for the services of Miss Margaret Stevens for her work in connection with NATIONAL SAFETY NEWS, in conducting that page. I think it was a wonderful proposition, and also to the Judges Committee for their splendid work, to Mr. Ernest Augustus for the News Letter which he sends out, and to all committees who have been actively engaged in the preparation of this wonderful program and the arrangement for its being carried out in good detail.

(The motion was seconded.)

CHAIRMAN BOSWELL: Who is to be delegated with this job, the secretary of the past year or the new secretary? I should think perhaps the secretary of the past year might be instructed to do that.

MR. WILKINS: Mr. Chairman, I would suggest you do it.

CHAIRMAN BOSWELL: I will be glad to do it.

(The question was put to a vote and carried.)

R. G. CONOVER (Yale & Towne Manufacturing Co., Stamford, Conn.): It is moved that the Membership Committee in cooperation with the Service Committee or proper officials, be asked to embrace within its activities the assembling of the following information:

First, the name of every plant publication whose editor has participated in our annual conventions, the name of the editor, the size and number of pages of the publication, how often issued, whether or not it carries paid advertisements, whether the editor works in full or part time as such, how many employees are in the plant, and if the editor does not object, the annual amount of his publication budget.

Second, the zoning or sectionalizing of plant publication cities to the end that groups of editors may be assigned to zones and conveniently attend quarterly or half-yearly meetings with the least expenditure of time and money in such attendance.

I offer that as a motion.

CHAIRMAN BOSWELL: You have heard the motion as presented by Mr. Conover.

MR. WILKINS: I second the motion.

MR. ASHE: I move that Conover get the dope on it.

CHAIRMAN BOSWELL: We will include that in the original motion anyhow. (The question was put to a vote and carried.)

CHAIRMAN BOSWELL: I am going to ask Miss Ruth Cade, your new secretary-treasurer, to stand up.

Miss Cade has been one of the hard workers in this section in the past and has made a very definite contribution to the success of it.

A. H. RICHARDSON (General Electric Co., Erie, Pa.): Is it planned to distribute these proceedings in a separate pamphlet again the coming year as it was done last year?

CHAIRMAN BOSWELL: I think so. I don't think there is to be an exception. We will see that it is done.

I am going to introduce to you now Mr. K. D. Pulcifer, editor of the *Pennsylvania News* at Chicago, who is going to speak on the subject of "A Plan for Using Paid Ads in Employee Publications").

Advertising What the Reader Will Buy

**K. D. Pulcifer, Editor, The Pennsylvania News, Past President,
American Railway Magazine Editors Association**

Several years ago there was founded and successfully promoted an organization now known as the American Railway Magazine Editors Association.

One of the first major accomplishments of the organization was the final formation after more than two years of effort of a group of railway publications into one advertising unit. These publications, numbering eleven, associated themselves by contract with an advertising representative and his organization was incorporated as The Kellogg Group.

The Kellogg Group, then, was created to do two things: to obtain advertising that would be of personal interest to the bulk of our readers and to provide the most convenient way for such advertisers to get big circulation in one lump.

The Kellogg Group is out after national publicity advertising—and is getting it. The October issue of some of our magazines will carry a back page color cover of "Lucky Strikes," the first time any industrial publication that I know of ever carried a piece of national advertising copy of that kind. The Kellogg Group is able to get that kind of advertising because it offers the circulation of 11 publications totalling 654,911, distributed in every state in the union to a class of people who have steady jobs. And most of them receive a copy of one of these publications on the first or the fifteenth of the month, or both, at the same time they get their pay checks.

To the advertiser, the group offers numerous advantages. He deals with one agent, yet receives representation in more than a dozen periodicals. He furnishes one piece of copy, ok's one proof, receives one bill and pays one check. The distribution of plates and proportioning of revenue is all handled by the agency.

The agency maintains its own separate offices, with its own office and sales force, in Chicago. The publications supply the needed data—circulation, with details on the number of men and women readers, classifications of readers, what they prefer and what they buy, whether they own their own homes, have an automobile, radio and whatnot; the publications supply sales arguments in the way of instances of reader interest, what their employees like most about the publication; what are the best potential markets offered by their circulation and all such information that may be of assistance to the solicitors in laying their case before the prospective advertiser.

Now, one of the axioms of successful selling, 'tis said, is to find out what

News in advertising stirs people's curiosity and imagination. It has been proved time and again that certain newspapers can credit a majority of their circulation to their department store sales ads. People will read news, whether in a column of reading matter or a block of paid advertising space. The railway publications in The Kellogg Group are endeavoring to give our railroaders advertising news in which they will be interested. Prospects are bright for the future. We believe that it is one of the most forward steps taken in the industrial publishing world in recent years.

CHAIRMAN BOSWELL: Mr. Pulcifer has no doubt raised a good many questions in your minds and that brings up the matter of discussion which I had forgotten. I am going to offer you an opportunity a little later for the discussion of all the papers that are being presented to you this morning.

I want at this time to have Mr. Charles E. Kane of the Illinois Central Railroad Company, editor of their magazine, stand up. He is chairman of the Program Committee for the ensuing year. Mr. Kane. He no doubt will get in touch with you as editors and ask you for some suggestions for the program for the ensuing year.

At this time I am going to introduce to you Mr. Dempster of the Canada Cement Company, Limited. Mr. Dempster is editor of the magazine of his company. He has given a great deal of thought and time to this subject. He is at the present time a member of the Employees' Mutual Benefit Association, secretary of that body and chairman of their program this past year.

Employees' Publications, Plant Papers, or House Organs?

Jack Dempster, Canada Cement Company, Ltd., Port Colborne,
Ontario, Canada.

Plant papers may, for argument's sake, be divided into two classes. In the one are the publications sponsored and printed by the company, advertising and pointing out the merits of its products, and circulated primarily with that idea in view. The other class contains the publication printed for and to the employees, the rank and file, for their mutual benefit and safety, to act as a conveyance between the office and the plant; to bring the point of view of the men in the ranks to the executive and to carry the wishes of the man higher up to his subordinates.

As this gathering is a Section of the National Safety Council, held under its auspices and working under its name, it follows that the plant publications we represent would be intended mainly to act as the voice of a body devoted to safety and the welfare of humanity. Advertising of goods and advancement of trade are taken care of by associations with their conventions and periodicals for that purpose. That brings us to the question I am going to ask and the answer that I intend to make to it: "Are we, the Plant Publications Section, which, personally, I believe is an unfortunate name—gathered here today seeking to aid in the promotion of the welfare and safety of the readers of our publications, or are we seeking further ways to advertise the product of those for whom we work?"

I claim, first, that the name of our Section should be changed to that of the Employees' Publication Section, and then that our publications, if they are intended to be in the second class I mentioned at the beginning, be devoted solely to the uplifting, welfare and safety of the employee, and I shall base my arguments on that stand alone.

Our publications cannot be compared with, likened to or judged by any other magazine, periodical or newspaper; they are in a distinct class by themselves. The success or failure of the plant publication is not judged by its circulation, for, since the company pays all expenses in connection with it, 100 or 1,000 copies printed, as a number alone, can convey no idea of the return on the investment or the results obtained by the issue. The degree of success is computed from the number of employees who take the interest and trouble to read the publication. If you buy a paper, the chances are that you will read it, but if a paper is wished on you, you won't read it unless you are in sympathy with the policies of that paper and interested in its matter. One hundred copies divided amongst three times that number of employees is doing far more good than 300 copies if a number of them are left lying around, unread and disfigured and just a joke to the men. You see, we are dealing with human nature. On the other hand, the editor must be able to judge his readers and if a copy for each man is advisable he must see that they get it.

The Magazine Must Mark Confidence of the Reader

All this talk seems apart from the issue. I assure you, it was only to lead up to this statement, and I emphasize every word of it. "The success of the employees' publication and of the object with which it is issued, depends upon the degree of confidence you can instill into the mind of the humblest employee, that the paper is printed for his welfare and safety alone, and that absolutely no ulterior motive, in the way of financial profit, defrayed or partly-defrayed cost, enters into it in any way. Once let the employee think that certain statements or advertisements printed in his paper are paid for by the advertisers and you have nullified at one stroke the work of the publication since its inception, and perhaps done irremediable damage to the morale."

I have heard it stated that the cost of each issue of some of our plant publications is so excessive that the management feels that the expense should be met, partly at least, from outside sources. They look on the publication as an investment and, like good business men, they either want to see returns on the investment or have the cost met in some other way. Now is there any editor here who will dare to set a limit on the amount of good his paper accomplishes? You will never know where the four winds of Heaven blow the words you have scattered, and they may come to rest in a spot so far remote that you will be astounded.

Now, is the large expense necessary? I have seen some magnificent specimens of plant magazines, illustrated, ornately embellished, printed on the finest stock and conveying splendid material, turned out by some companies. Of course they cost a lot! I'll claim that some of them cost, per issue, as much as some of our leading periodicals. Of course it is only reasonable for the management to feel that part of this cost, anyhow, should be met, and if a merchant wishes to advertise in the publication and pay for the privilege, that meets the difficulty.

But is the expense always justified? It all depends upon the material carried on the pages. I recently received, through the courtesy of its editor, a 36-page magazine that is absolutely in harmony with the stand I have taken. It is the production of a big company, has a large editorial staff and is issued to employees scattered in small units over half the United States; but every page of it is filled with live news of interest to all its employees. No doubt that publication costs a lot, but I have no hesitation in believing that the mutual interest, benefit, good-will and safety of its readers constitute a great return on that investment.

Don't you think that this expensive magazine has stepped a little out of the class in which it belongs? Don't you think that the employee-reader, being human, is liable to compare it with, say *Collier's* or the *Saturday Evening Post*, and forget the object of its issue? And don't you think there is a possibility that the employee might think that the publication is patronizing and high-hatting him? If you have the right material to convey, if you have the correct spirit in your writings: if you wish to be truly a go-between, between the hardy son of toil and the executive; if you wish to remind him that men can be saved from industrial injury, their standards of living raised and their lives and homes made happier, don't you think you can give it to your fellow-workers on a humble carriage, and let them feel that it is their paper, for them alone? You would be surprised to learn how small the expense of the publication can be, and yet attain its object.

Not the Form, But the Message Is the Thing

Many of us have perhaps received a letter from the mother of our grand-mother, across the sea. I did recently. Was the grandmother's letter insulted if the letter was not written in elegant script on decorated parchment? You did not! You didn't care a thing if a letter came in a torn paper bag. You exclaimed with gladness, "Too a letter from home!" and the only thing that counted was the news it carried.

As some of us sat around the luncheon table, during the meeting of this section at Detroit, last year, the question was raised by one of our fellow-editors, "Should the cost of printing the publication be partly met by accepting 'paid outside advertisements?'" As the time was limited that day, I understand that discussion of that question was to be laid over until this year.

"Paid Ad's," in an employees' publication? I hate to disagree with any of my friends here to-day, but don't let us for a minute lose sight of the motive that prompts the publication. Let us forget the desire for the approbation of art critics and writers, and just try to preach safety and welfare in our humble way and win our readers' confidence.

I'll grant you our lot sometimes is not an enviable one. We sometimes must stand between righteous wrath and stubborn rebellion, and as for sneers and jeers and scorn, why, we must just keep smiling through. But we can at least keep our publications from being a great expense and yet convey the message. "Paid Ad's"! I should hope not! If the boys in our plant ever thought that the Canada Cement Company was trying to meet the expenses of the *Plantate News* by advertising "Sammy Slocums Safe Suspenders," our paper would do more harm than good.

Prefers the Designation "Employees' Publication"

I have given you my reasons for claiming the name "Employees' Publication" for our Section and for our papers, yet I have heard them designated as "House Organs," "Plant Papers," etc. I cannot see where these last two titles are suitable at all. "House Organ!" What a dry-as-dust, unsentimental, heartless, coldblooded business sound that seems to have! Taking it literally, too, it does not describe our efforts. How many employees think of their plant as the "House"? How many of them know what an "Organ" is outside of a musical instrument or a portion of one's body? Remember, our publications are primarily for the rank and file and while it is well to maintain a certain amount of dignity and inspire respect for the paper, we should avoid expressions that mean little or nothing to them. I know how I feel when "Employees' Publication" is mentioned; that's *our* paper; but when some one says "House

For purposes of illustration, I have selected half a dozen magazines to represent the nation's railroads geographically, and these are: The New York Central Lines Magazine, representing the northeast; the Baltimore & Ohio Magazine, the central east; the Louisville & Nashville Employees' Magazine, the southeast; the Illinois Central Magazine, the central west and the Mississippi Valley; the Union Pacific Magazine, the northwest; the Santa Fe Magazine, the southwest.

All but one of these magazines—the Santa Fe—are published in the now popular size of roughly eight by eleven inches. That magazine is still issued in the size in which it was first published, about 6½ by 9¾ inches. All employ supercalendered paper, though coated stock is used on covers. Four of them print their covers in monochrome or duotone, but the Illinois Central has been using covers in 3-color process since March, 1923, and the Baltimore and Ohio, especially during the present, its centennial year, is employing covers in full color. Of the six magazines being considered, only two employ artists on their staff, the Baltimore & Ohio, which has two, and the Illinois Central, which has one. All six of the magazines endeavor to show on their covers spots of scenic or other interest on their lines, though at present, during its centennial year the Baltimore & Ohio is featuring scenes incidental to its early history.

Organization of the Editorial Force

Each of these magazines, except the New York Central, has so organized its staff that each operating division has a magazine representative who edits the news gathered by his correspondents in the shops, stations and offices under his jurisdiction. Semi-annual meetings are held of the home and field staff on the Illinois Central, and most of the others follow some similar plan. Discussions and exchange of ideas at these meetings redound to the general welfare of the publication.

The average number of pages of the New York Central is 112 and cover; the Baltimore & Ohio, 128 and cover; the Louisville & Nashville, 96 and cover; the Illinois Central, 88 and cover; the Union Pacific, 64 and cover; the Santa Fe, in the smaller size, 144 and cover.

The Santa Fe Magazine does not appear to have an editorial department to express the opinions of the staff, although that feature is common to all the rest. The Illinois Central Magazine for several months past has published a page devoted to well-known men on the line, as they were in bygone days and as they are today. That feature is known as "When You and I Were Young," and the inspiration for it came from the Baltimore & Ohio, which carries a similar department. A department devoted to promotions is carried by four out of the six representative magazines, the exceptions being the New York Central and the Santa Fe. "The Roll of Honor," devoted to those employees who have been retired after an honorable service record, is common to all but the Santa Fe. Each magazine, except the Baltimore & Ohio, has a section devoted to sports.

The important subject of safety is represented by regular departments in four of the six publications, the Santa Fe and New York Central being the exceptions. These two publish special articles on safety from time to time. No worthy innovation, no important movement in the interest of safety in general, escapes attention in any of these magazines. The Baltimore & Ohio Magazine, for example, supplements its regular safety department with an additional one devoted to the interest of employees who have achieved meritorious mention in the cause of safety.

The managements of these magazines have always felt that the most substantial type of loyalty is reared in home environment, and for that reason much space

is devoted to the workers' families, their homes and their hobbies. Regular departments cater to home interests. Under subtitles, space is devoted to the children, to fashions and to houseplans. The Baltimore & Ohio has a separate page for boys known as "The Whistling Post." Another department, known as "In the Realm of the Riddle," furnishes amusement for young and old. The New York Central publishes each month a page of pictures of dogs, birds, monkeys etc., for the children. The Illinois Central and Union Pacific each month print single page groups of pictures of children, and the Louisville & Nashville devotes two pages to that purpose.

All but the Baltimore & Ohio have pages devoted to jokes and humorous sayings. The New York Central and the Santa Fe have in common a foreign railway department. The Louisville & Nashville Employees' Magazine and the New York Central Lines Magazine both have department devoted to those employees who have passed into the beyond. The Louisville & Nashville and the Union Pacific both have departments devoted to the solicitation of business, in which those employees who have gone to some trouble in obtaining passenger or freight business for their company are publicly commended.

Minor Incidental Notes Are Important

The Union Pacific Magazine has as a regular feature each month a 3-column department known as "Seen and Heard Along the Way." This is given over generally to miscellaneous railway news, as are two departments in the Santa Fe Magazine known respectively as "Along the Trail" and "General Railroad News."

In concluding the discussion of the departments which these magazines have in common, we come to the notes of the divisions. This department includes pleasant chit chat about employees and their activities and hobbies, and invariably employees will turn to these pages before anything else. That this is a favorite department with the majority of railway folks is also evidence by the number of pages devoted to it. The New York Central Lines Magazine, which represents an extremely large railroad, is the only one of the six that does not have such a department. The average number of pages for a period of four months devoted to that section averages 57 for the Baltimore & Ohio, 17 for the Louisville & Nashville, 26 for the Illinois Central, 22½ for the Union Pacific and 37 for the Santa Fe.

I shall now take up a few of the features by which the various magazines differ from one another.

The New York Central Lines Magazine goes in for fiction, each month running an illustrated story. It also has a separate department devoted to radio. The New York Central also has a department devoted to the traffic on its lines and another given over to agricultural pursuits on its system.

Two outstanding features on the Baltimore & Ohio Magazine are the departments devoted respectively to the maintenance-of-way men and to the spirit of cooperation. The department on cooperation is a big thing on the Baltimore & Ohio, as much of its work, especially in the shops, is done on a co-operative basis. The Baltimore & Ohio Magazine also maintains a department in the interest of books, fiction and otherwise.

The Louisville & Nashville Employees' Magazine is the only one of the six which maintains a distinct department in the interest of homemade poetry. The Louisville & Nashville also carries a regular space for those employees who have rendered meritorious service of some kind.

The Union Pacific Magazine carries as a regular feature an illustrated story

of some town along its line. One illustration in each case is a double-page spread incorporating views from every angle of the town described.

The Santa Fe Magazine has a column each month known as "Communications." This contains letters in which employees express their views, offer suggestions in a constructive way and gossip about their personal exploits.

An outstanding feature of that same magazine is the department known as "Per Diem." A subtitle in one issue explains fully the purpose of the department, which is: "to answer inquiries concerning car service, per diem and reclaim rules and their application." I know of no other railway magazine having such a department.

In the Illinois Central Magazine one finds four departments that have no counterpart in the five other magazines. The "Public Opinion" columns carry reprints of editorials from newspapers along the line. "What Patrons Say of Our Service" is explained in the title itself. The department known as "Waste Avoidance" is a warning to all employees to practice economy in the use of supplies, everywhere, at all times. No other railway magazine devotes regular space to air brake problems, where one finds questions and answers for the benefit and instruction of all those interested in that subject.

I have tried to point out to you the similarities and the differences in these six representative magazines. In conclusion, I shall call attention to the type of material other than departmental which these magazines print.

Types of Stories that Interest the Reader

One of the most popular types of stories with the average reader is that which deals with some hobby or avocation of employees. Some raise fruit or flowers, others have large gardens, some raise bees, some play in orchestras, some collect rare books or coins or stamps, some have political affiliations. The list of avocations is so extensive as to embrace practically all known occupations or hobbies.

Big business interests along the line, which incidentally are big shippers, are frequently featured. Historic places are given space in all the magazines, as are employees' picnics, special birthday or wedding celebrations, dinners and meetings. Well-known institutions of learning in a company's territory are frequently featured, as are hotels. Frequently entire trainload shipments of some particular commodity are given prominent space.

The acquisition of unusually large or powerful motive power or the reconstruction or modernization of old motive power is always given adequate space, as in the construction of shops, stations or hospitals or the modernization of them.

Speeches by officers, lectures on safety, loyalty or patriotism always find preferred space.

Early railway history or old-time photographs of stations, engines, trains or groups of employees are always featured.

Some roads own their own coal mines, and views and descriptions of them find space readily in these publications.

Attractive or otherwise interesting spots along the line are always written up with adequate illustrations, as this will help promote travel to the spots in question.

In short, the contents of these magazines are so diversified as to offer interesting reading to anyone who will peer within their covers.

CHAIRMAN BOSWELL: I received a special delivery letter this morning from Mr. Frank J. Ryan, who is the next five minute speaker. He enclosed a copy of his paper and stated that an emergency prevented his attendance at this meeting. I have

asked Mr. Doeller, the chairman of the Program Committee of the past year, to read it to you.

Report on Public Utility Publications

Frank J. Ryan, Director of Publicity and Editor of "The CEICO Motor," The Cleveland Electric Illuminating Company, Cleveland, O.

The author of this report has reviewed the employee magazines of a number of representative public utility companies. He has compared issues of the past year with those of former years. They are better than they used to be, but not enough better. Too many are still subject, in varying degree, to three common errors.

(1) They don't recognize the full extent of their opportunity to render substantial service to an industry which is built solely on service.

(2) They don't have a well-conceived and pre-determined purpose.

(3) They don't have a clearly defined editorial policy and program.

With the enumeration of these three deficiencies, this report ceases to be statistical, and confines itself to the critical.

In mentioning these deficiencies no primary account is taken of context, illustrations, style, typography, paper or ink. To the degree that these deficiencies exist, to an equal degree will the magazine itself be defective, regardless of the technique of the writers, illustrators and other craftsmen who produce it. Craftsmanship can camouflage a poor publication, but it alone cannot make a good publication.

The value of the employee magazine depends entirely upon ideas.

The prime idea should be the answer to this question; why is this magazine published?

The idea next in importance should answer this question: How is the aim of this publication to be achieved?

All the other ideas incorporated in the magazine—in its reading matter, its illustrations, its style—should be blood-brothers of the Why Idea and the How Idea.

One editor of an employee magazine says this is why his magazine is published:

To inform the employees about the progress of this industry.

To interpret information about the industry in the light of the employee's self-interest.

To inspire a disposition to render the highest possible standard of service.

To instill the importance of efficiency and economy.

To inculcate a spirit of cooperation.

To instruct the employees in regard to health and safety.

To indicate the opportunities for individual advancement.

To impress on the organization the industry's aims and ideals.

To invent ways and means of accomplishing this composite purpose without preachment or uplift.

The editor's idea of how to accomplish his purpose is quite as definite as the purpose itself.

He plans every issue of his magazine far enough in advance, even before a word is written or a picture is made for it, so that every article, each item, editorial and illustration will contribute, in a well-balanced way, to the promotion of the publication's purpose. In his field he broadly includes scientific research, engineering, construction, operation, business promotion, group and individual achievement, welfare, social and sports activities. In an industry like his, he reasons, his problem is not to find material, but to choose it, so rapidly are inter-

esting discoveries, inventions and improvements made in modern public utility service. He does more than tell about these developments; he imparts to the reader their significance, as they relate to the industry, the individuals in it, and the public it serves.

In regard to service, efficiency, economy, cooperation and individual self-interest, he takes the broad attitude that they all are affected by safety. In a fundamental way, he reasons, the safety of our country and its people depends on public utility services. Without modern transportation, communication, light, heating and power services, we could not feed our industrial and commercial centers, we could not safeguard the national health, manufacturing and trade would be prostrate, national defense would be but an empty shell. With the national safety dependent on the public utility industry, it is of paramount importance that the industry should surround its employees with every safeguard. Rules and regulations and safety devices are not enough; every employee must be imbued with safety-consciousness. This becomes a matter of education and inspiration which is properly a prime function of the employee magazine.

The ideal plant publication, call it house organ, employee magazine or what you like, should be a perfect mirror of the institution for which it is published. It should mirror something more than the institution's physical nature; it should show something of the institution's heart, its brain and its soul.

There are such plant publications in the public utility industry. There will be more of them. With the development going forward in the utilities, with organizations multiplying from hundreds of employees to thousands, and even to tens of thousands, the employee publication becomes more and more a reliance of managements in maintaining institutional morale and the spirit of service on a high plane. The public utility industry, it must be remembered, is reared solely for service; in such an industry, the potentiality of the employee magazine to render substantial service is unlimited.

CHAIRMAN BOSWELL: Mr. Earl E. Neubig, editor, *The Hammermill Bond*, Hammermill Paper Company of Erie, Pennsylvania, will present the report on Plant Publications of Manufacturing Companies.

Report on Plant Publications of Manufacturing Companies

Earl E. Neubig, Editor "The Hammermill Bond," Hammermill Paper Company, Erie, Pa.

In making an analysis of manufacturing companies' employee magazines, this particular editor was very much pleased to revert again to the status of a mere reporter, a gatherer of facts and not a director of the destinies of men and institutions, strong on telling them what they should do and weak in telling them how to do it.

Making an analysis these days usually means the chemist is supplied with a sample. This he breaks up into its various components and determines whether the amount of fusel oil makes it fit for consumption or delirium tremens, both serious ailments.

This same technique was used in analyzing 40 representative employee publications issued by manufacturing concerns. They are literally reduced to atoms. That number of such publications could not have been secured but for the kindness of Mary B. Day, librarian of the National Safety Council, and several fellow editors who thought they saw a chance to get their names in the papers.

Supplied with these magazines, a pair of dividers, a pica scale, an 18 inch rule and several reams of Hammermill Bond we went to work. Let me state

right here that had I realized the amount of work involved, I would never have been inveigled into this job. Some one else would be making this report, a much better one likely, and I would be in one of the back rows asleep with the rest of the brothers.

When the last of the 40 plant papers had been completed and consigned to a niche in another land, 42,172 square inches of copy had been investigated and classified under 25 different headings. Some could be included in Emerson's Essays without injuring Emerson's reputation; some could be published in "Whizz Bang" and receive the approbation of the readers of that magazine. The rest could stop off at the way stations in between.

Of the magazines studied, 22 had covers and ten had not. This we give without comment, as this is a report and not an editorial. The size varied all the way from compact little things that could repose with ease and comfort in a lady's vanity case to pretentious affairs like the "Woman's Home Companion" that could not be folded and put in a man's pocket.

This we also relate without comment. The type ranged all the way from nonpareil to 12-point, leaded. This, too, needs no remarks.

To establish a working basis we averaged all these sizes and the 42,172 square inches of copy and found we had a magazine 7x10, containing 1,054 square inches of 25 different kinds of material. That is equivalent to a 16 page magazine. 8½x11, with or without cover, as the editor preferred or his boss decided.

A Composite of Forty Plant Magazines

From here on you would have difficulty in following by ear alone the make up of this composite magazine. Being an average of 40 manufacturing companies' plant papers, it should represent the best thought in that line. To help you to understand just what this publication would contain, a chart has been prepared that shows graphically the amount of space each kind of copy would fill. Please remember this is a composite magazine, made up from an average of the 40 magazines. For one issue to contain everything in the proportion shown would be ridiculous. It does show, however, the exact proportion of the different kinds of material the editors are using and where they might or might not show better judgment. No attempt was made to deal with makeup or layout. Next year's program committee ought to have something left to work on.

As you can see, halftones take up 20 per cent of the space, line cuts 1.4 per cent and cartoons 3.5 per cent. The subject matter of the illustrations was not classified, but a cursory examination showed that it follows closely the same proportions as the printed matter.

Editorials compose 8 per cent of the whole, too much or too little, depending entirely upon the writer. Editorials were restricted carefully to something the editor had to say about his business or shop. The scissors and paste pot variety were relegated to their proper place.

Technical articles are copy written to explain some process or product used or made by the readers of the paper. Economic articles deal with the more general phases of business and commerce and find their principal use in acquainting the workers in the mill with the intricacies of the more important jobs in the office. They are instrumental in bringing about a better understanding between men and management and can be distinguished by their scarcity.

Personals mean just that and nothing more. They are gossip about people in the plant and they take up 23 per cent of the plant paper. This is not

RELATIVE AMOUNTS OF DIFFERENT KINDS OF COPY FROM 40 INDUSTRIAL EMPLOYEES' MAGAZINES

	Per Cent	
PERSONALS _____	23	██
HALFTONES _____	20	██
TECHNICAL ARTICLES _____	8	████████████████
DEPARTMENT NEWS _____	6.7	██████████████
SAFETY NEWS _____	6.5	██████████████
EDITORIALS _____	6	██████████████
ATHLETICS _____	5.7	██████████████
FILLER _____	3.8	██████████
CARTOONS _____	3.5	██████████
HEALTH SERVICE _____	2.75	██████████
JOKES _____	2.4	██████████
ECONOMIC ARTICLES _____	2	██████████
WOMENS PAGE _____	1.5	██████████
POETRY _____	1.5	██████████
LINE CUTS _____	1.4	██████████
MUTUAL BENEFIT NEWS _____	1.2	██████████
COMMUNITY NEWS _____	.9	██████████
EMPLOYEES REPRESENTATION _____	.7	██████████
GROUP INSURANCE _____	.6	██████████
CHILDRENS PAGE _____	.6	██████████
HOME OWNERSHIP _____	.5	██████████
SUGGESTION SYSTEM _____	.4	██████████
AMERICANIZATION _____	.3	██████████
INDEX _____	.03	██████████
ADDS FREE TO EMPLOYEES _____	.02	██████████

too much space. Whatever may be the purpose of the paper, unless it gets itself read, it fails, and we know of no better way to accomplish this first essential than by the use of personals. If you don't believe it, get a job on a country newspaper.

The women's page, jokes, athletics, safety and mutual benefit news needs no explanation. Filler is that material that relates to everything in general and nothing in particular, and could be replaced with something else of the same nature and never be missed. You all know how convenient and necessary it is so why elaborate?

Community news finds a place in those papers whose shop usually represents the sole industrial activity of the town. The much discussed children's page we all recognize. Shop news differs from personals only in the amount of territory covered. It involves a department, group or several groups as the case may be.

Suggestion system reports, articles on Americanization, employee representation, group insurance, ads free to employees, poetry and a health service, all have their share in the make up of this composite magazine. Three of the plant papers had an index. The average would allow this one to use .03 per cent of its available space for that purpose, scarcely enough, as you know, but we are merely trying to show what is being done.

An analysis is important only if conclusions can be drawn from it. Its importance will vary in accordance with the practical applications of those conclusions to the work one is doing. I told you what we did and how we did it. The chart shows you what we found. For any of you to sit there and get all the points and draw a chart like this one with which to compare your own magazine would be impossible.

For that reason we have prepared a little folder. It contains a reproduction of the chart which you may use to see how your paper compares, with sufficient explanation to make the chart clear.

In addition we have prepared the following Employee Magazine Editor's Guide to help you with your work. Our aim is to show you how the job can be done, not to tell you what to do.

Guide for Editing Employee Magazine

To Create Good Will

A. Establish Fellowship Between Workers.

1. News of athletic events.
2. News of picnics and social affairs.
3. Publish list introducing new employees.
4. Show pictures of workmen on the job.
5. Use personals, extending from brief mention to articles.
6. Report department activities.
7. Make judicious use of cartoons.

B. Secure Understanding of the Management.

1. Pictures, news and cartoons of the executives.
2. Publish articles written by department heads and executive officers, telling of the work done under their direction.

To Develop Pride in Job

A. Show Yours to be the Best Shop in the Community.

1. Pictures of men doing very good work.
2. Tell about the library, restaurant, orchestra, etc.
3. Publish list of promotions.
4. Capitalize on athletic victories.

- B. Recognize Continuous Service.
 - 1. Print list of service awards.
 - 2. Use pictures and stories about men old in service.
 - 3. Tell about benefits accruing from steady work.
- C. Write Up Suggestion Awards.
- D. Give Prominence to the Breaking of Production Records.
- E. Relate the Compliments Paid to the Company and its Products by Uninterested People.
- F. Publish the Company's History.
 - 1. Show the company's interests and the employees' interests to be mutual.
 - 2. Tell about new developments and proposed expansion.

To Secure Mental Improvement

- A. Publish Articles on Thrift.
 - 1. Explain budgeting.
 - 2. Tell about banking and investments.
 - 3. Relate advantages of good insurance, all kinds.
- B. Use Inspirational Articles on the Growth of Men in Business.
- C. Acquaint Readers with Principles of Economics.
 - 1. Use short articles on elementary economics.
 - 2. Publish articles by executives on business conditions.
- D. Encourage the Unnaturalized to Become Citizens.
- E. Conduct a Job Education.
 - 1. Have technical articles written by one who knows.
 - 2. Tell about the other fellow's job.
 - 3. Explain the importance of all jobs and their relation to the whole scheme of things.
 - 4. Impress upon readers the dignity and necessity of all work.

To Interest Employees' Families in Plant Paper

- A. Publish Attractive Page of Baby Pictures Occasionally or Use Pictures Singly as Preferred.
- B. Announce the New Arrivals.
- C. Report Illness of Employees and Their Families.
- D. Report Home Affairs, Vacations, New Cars, etc.
- E. Encourage Home Ownership.
- F. Publish the Vacation Lists.
- G. Supply Space for Employees' Ads Free.
- H. Have a Woman's Page Regularly or Occasionally as Warranted.
- I. Explain the Relation of Home Conditions to the Job.
 - 1. Proper diet necessary to good health.
 - 2. Home worries are carried to the job, distracting attention from work, causing work to suffer and often endangering worker.
 - 3. Tell discreetly how man works for no company or organization but to supply his family with the necessities and some of the luxuries of life.
- J. Congratulate the Newlyweds.

To Help Reduce Accidents

- A. Use Entire Page or Even Section of Magazine at Times.
 - 1. Have it highly dramatized with local action both in picture and printed matter.
- B. Turn Accidents Into News.
 - 1. Use of the victim's name.
 - 2. Impress the cause for the accident.
 - 3. Play up the suffering involved.

4. **Emphasize** the loss of time, pay, suffering involved and possible serious results.
5. **Tell clearly** and show how such accidents can be avoided.
6. **Avoid placing the blame.** That's the Safety Director's job. Avoid anything that will allow paper to be criticized.
- C. **Have Employees Act for Photos.**
 1. This interests the actor and teaches him a lesson.
 2. Fellow workers are likewise interested.
- D. **Publish Health Articles by Plant Physician or Other Reliable Authority.**
 1. Tell the employees about common ailments, their cause, treatment and effects.
 2. Stress the importance of prompt first aid treatment.

CHAIRMAN BOSWELL: Before we devote any time to discussion, we have 15 minutes left and I am going to ask the new chairman, Mr. R. H. Ferguson, of the Bureau of Safety, Chicago, to give you some idea perhaps of what he has in mind for the coming year. I am sure we are going to pledge to him our wholehearted, 100 per cent cooperation.

R. H. FERGUSON (Bureau of Safety, Chicago): The few remarks that I would like to make are not going to be in the nature of an address. They are merely spontaneous ideas, as I have collected them from time to time during the meetings this week.

Full Cooperation Asked for the Coming Year

I am sure that the incoming officers realize the responsibility that has been placed upon them. We ask that you members of the section give us your cooperation. If you have ideas which will help us improve the service of this section, let us have those in writing. We will appreciate it. We need all the help we can get.

One idea that I would like to have expressed from those present is that matter concerning regional meetings. It has been the custom during the past several years to hold those meetings between the congresses. You no doubt will recall that we had one meeting here in Chicago. Mr. Ashe has had several in Pittsfield. I was glad to hear Mr. Conover make the resolution this morning concerning the zoning and placement of the various editors who are members of the section.

With this particular work, we will be able to know just where we can hold regional meetings with the greatest success. I have in mind at this time possibly a regional meeting in the central portion of the United States and probably one on the East Coast. I would be very glad to have your ideas on that and any other questions which will enable us to further the work of the Publications Section.

CHAIRMAN BOSWELL: To repeat, I am sure we will all be glad to cooperate with Mr. Ferguson and the officers and the committees of the section as we are called upon.

I wish to take this opportunity to express my appreciation to the chairmen of the various committees and to the committeemen themselves for the very splendid work which has been rendered during this past year. I have done very little myself, but you can see with such an array of talent a lot of work has been done. Mr. Doeller has done a tremendous amount of work himself and Mr. Devendorf, the secretary-treasurer, who has been here at every meeting, has been on the job throughout the year and has done a prodigious amount of work. The same may be said of Mr. Augustus in getting out the News Letter, and the Publicity Committee did some work. Mr. Wilkins is chairman of it, and so on through, and I wish to emphasize what I said the other day, that I personally appreciate all that has been done.

F. L. GREENYA (Fisk Rubber Co., Federal Division): I would like to ask a

question about the division in this contest. I have heard the question asked back here half a dozen times and I think it would clarify the matters in the minds of several of the members. Just how did the judges make the division in Classes A and B? Some said they thought it was left to the discretion of the editors to choose the particular group in which they cared to enter. That is my impression. I don't think that is quite the way to do it. I think that the judges should be in a position from the magazines they have at hand, to determine whether or not it is eligible to enter Class A or Class B and be governed accordingly, rather than have an editor say he prefers to compete in the A or B group. It is the fairest way, after all is said and done.

CHAIRMAN BOSWELL: I will have to call on Mr. Ashe.

MR. ASHE: The judges left it to the members to say which class they wanted. When the magazines came in, the judges looked them over and if they didn't feel the editors had shown good discretion, they changed it.

I will say honestly, though, that only a small proportion of them were changed. There were a few that we were in doubt about whether we shouldn't move them into the first class, but in those cases, as the editors had asked to be included in the second class, we thought we would leave them.

The Judges Will Classify Magazines in Future

MR. GREENYA: I think it should be definitely settled rather than have the editor say. I think the results of the work should speak for itself rather than the editor.

CHAIRMAN BOSWELL: You would leave it up to the judges?

MR. GREENYA: Yes.

CHAIRMAN BOSWELL: Does this body wish to so decree? Do you make that as a motion?

MR. GREENYA: I will, to get it on the floor.

CHAIRMAN BOSWELL: The motion has been made that the judges have the discretion to determine to which class any magazines that may be submitted in the contest shall be placed. Is that supported?

(The motion was seconded.)

R. W. LIDDLE (Commonwealth Edison Co., Chicago): As I understood Mr. Ashe's remarks, practically that situation exists now. It is probably a time-saver for the judges to have the editors say which class it should go into. I favor leaving that situation as it is.

CHAIRMAN BOSWELL: This won't exclude any editor saying which class it goes into. I understand that is the motion.

(The question was put to a vote and carried.)

MR. ASHE: Could I ask one question? While I have talked a lot, there is one thing I should like to get a little advice on.

There has been a good deal of discussion here, a splendid paper by one of the representatives, where so much stress has been laid on photographs and the use of photographs. I was wondering why in so many cases the inferior grade of paper was used in the magazines; whether some of us overestimated the value of the paper in the presentation of the picture or whether those photographers who use those pictures on that type of paper were perfectly satisfied from a shop standpoint so long as that picture was shown?

S. P. WILD (Armour & Company, Chicago): As far as Mr. Ashe's question is concerned, the same problem has come up in our company, between the two magazines or papers which we get out. One of them is intended for our sales and executive force throughout the country and the other is issued locally at each of eight plants. The largest circulation of the plant papers is about 8,000 at the Chicago plant. Both of the publications, no matter where issued, are intended to be full of cuts, which, if they are to be of any use at all, have to show up properly.

but we have arrived at the conclusion that there is no use spending good money on papers any better than you have to. We have been using recently for the magazine forty-pound stock and for the *Armour Oval* somewhat lighter, which is super calender paper that with proper care taken by the engraver in making the cuts, and particularly with proper press work, turns out a job good enough for our purposes. Frankly, we could use a better grade of paper and have our cuts show up better, but they wouldn't show up enough better to pay for the difference in price.

We found that this stock, if we watch the pressman, is plenty good enough to turn out a good looking half tone. The big point of the whole business is in getting the printer who knows his business, because we have had printers who think they know the job and tell you all about it, and the first thing they slap the ink all over the place and let it run.

MR. ASHE: From the employees' standpoint, do you think it makes any difference?

MR. WILD: If it shows up good enough to illustrate what you want it to, it is all right. You can make it look like a newspaper cut or like an illustration. If the newspaper cut style shows the points of the picture, I don't think it makes a lot of difference. My experience is that if the picture is worth anything at all, it must have a point. If the paper and illustrations are good enough to illustrate that point, the extra money you put into a super value half tone isn't worthwhile.

R. W. LIDDLE (Commonwealth Edison Co., Chicago): I was just going to ask what in this questionnaire if it isn't too much trouble, I think it would be interesting to a good many to know whether the papers are magazine or newspaper in style. I know most of them are magazine, but those of us who work on newspapers would be interested to know what the proportion is.

CHAIRMAN BOSWELL: Mr. Ferguson, as we adjourn, we turn the thing over to you for the new year and wish you Godspeed and hope you have as good a meeting next year as we did this year.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Employees' Publication and Benefit Associations Luncheon

Tuesday, September 27, 1927

An Important Function of the Plant Magazine

Whiting Williams, Cleveland, O.

What I have to say today can best be tied up with the story of two friends who went a-hunting.

One of them, a stutterer, failed to pull the trigger quickly enough and, therefore, missed his squirrel. The other suffered from St. Vitus' dance. After drawing an extremely wavering and uncertain bead upon the squirrel, he pulled the trigger. To the general surprise the poor thing fell dead.

The hunter's look of triumph got poor consolation from his stuttering companion.

"W-W-W-Why shouldn't you?" he retorted. "W-W-W-Why shouldn't you hit it? Y-Y-Y-You aimed all over the w-w-whole d-d-d-damned tree!"

As I look over the many employees' or plant publications which come to my desk, it seems to me that too many of their editors are plainly trying, like the hunter, to cover the whole tree without, however, putting their eyes upon the center of their target.

I have no objection whatever to the attention paid by the average editor to such matters as safety, health, thrift, hobbies, humor, athletics, etc. All these have a legitimate part in the employees' magazine—as does also, generally, the mention of the wedding or the new baby, or even the fact that, according to the correspondent from the Steelville Plant, "Everybody's asking Joe Spivis in the accounting department about the roadster noticed outside a certain house on West 14th Street last Thursday night. Perhaps Gertie, the popular new member of the filing force, can answer! Ha, ha!"

If all these help the readers to look forward to the next issue, they are to that extent good. But all these represent little short of an industrial crime if they indicate the editor's entire aim. For these activities, these interests, compose only the fringe of what is, after all, the magnet which draws all these readers together. I mean the employing organization, the work in which they are united—in short, the common job.

To assume that people today are interested in the personal relationships and associations which the job permits but not at all in the job itself—this, I say, is little short of wicked. When an editor talks constantly about all these secondary activities and then keeps silent about the work itself, the omission follows, I believe, from a complete misunderstanding of the attitude of the worker himself. It is a hang-over from that day when it was supposed by everybody that the only reason men

or women do any work in the world is because they need the money—that the moment the desired dollars are earned they want instantly to get away from the hateful thing that pays them—and that they can be lured into thinking about the job itself only by means of sugar-coated allusions to their companions, their families, and their after-hours' recreations.

The primary function of the plant magazine is, in my opinion, to help the worker to know his work, and so, by knowing his work, to know himself.

It is supposed, of course, that his foreman will tell him all he needs to know about his job—that these steel sheets must be put through those rolls, or this sand into that oiled mold. But I contend that the foreman cannot tell him fully about this job simply because the foreman himself really does not know; it may be years since this foreman went across the yard into the galvanizing department or the foundry to learn exactly why the steel is put through those rolls or exactly why the sand must go into those molds in this or that particular way. Even the superintendent of the department—yes, even the manager of the plant itself—may be little better equipped to tell the worker fully what his job is, properly explaining what his work means in terms of usefulness and service to other human beings. Perhaps in the whole history of the company, this particular "super" or plant manager has never sat down beside either a salesman or a customer. In that case, he can't tell his workers fully about their work for the simple reason that he himself has never taken the time to learn exactly what that work is *for*.

Well then, who is equipped to help everybody in the plant to know the part he plays in the world as the result of, and by means, of his work?

If you'll listen carefully, I'll tell you.

The Editor Must Fight Off Plant Pessimism

It's the plant editor!

The editor, he's the chap equipped to fight off the pessimism which has been created by the modern subdivision of work and its resultant tendency to monotony!

The trouble today in our great factories is not so much that a man gives his whole time to tightening bolt number 8006. The larger difficulty arises from the fact that it is enormously harder for the tightener of that bolt to get the proper picture of his job's contribution and, therefore, of his own contribution to other human beings, than in the days when three or four men built a wagon. For in those days those builders probably knew the man who was going to use it. They expected to keep permanently in contact with both their handiwork and its new owner. As they tightened each bolt, they carried always the picture of that particular operation's meaning and value to that particular friend and neighbor.

Today, it is not so much the change in the nature of the mechanical operation as in the nature of the market—the wideness of the gap between maker and user—that makes men discouraged; they find it hard, unaided, to think highly of their work because they are not properly helped to know the men and women customers whom they are serving. These, instead of neighbors, may be far beyond the Seven Seas.

But these Seven Seas can be bridged—these distant users can be made neighbors of the makers—if only the editor will conjure properly with his pen and paper!

Thus the steel plant where we ran 20 to 30 tons of steel sheets through the cold-rolls every day, we generally had the satisfaction of knowing we were making "automobile iron." Every car we saw made us wonder whether *we* had happened, a few weeks or months before, to handle the sheets that now were doing their bit as sides or fenders.

But there were certain days in the plant when all of us were excited.

"On your marks there, Charley!" my buddy would say, "today it's 'electric iron'!"

What is "electric iron"? What were we making?

Well, I never learned—at least not there in the plant. The best answer I could get was:

"Nope, you can search me—except that it's blamed important. If you make the lightest mistake with it, they sure raise hell with you!"

When I asked a foreman, "Where does this stuff go to?", he looked surprised and answered, "W'y, over to the inspection department. Can't you see?"

It was years before I really learned what I had done in that steel plant. Visiting a factory at Pittsfield—where, by the way, my friend Mr. Ashe of this group wields his pen—I was shown a great warehouse full of thin steel sheets, with the explanation that "All the good motors must use these: electricity doesn't work properly on solid steel blocks."

It was a thrilling instant.

"Wait a moment," I asked my guide, Mr. Chesney, the manager. "Do you mean to tell me that this is 'electric iron'?"

When he assured me that it was, I felt as if a long delayed reunion had finally been staged.

Every Man Wants to Know the Reason Why

"Show me to it!" I exclaimed in my delight. "I've been looking for this for years. Me, I'm the father of this stuff!"

Incidentally, it is worth mentioning that the particular plant where I helped make good motors by helping make "electric iron," has no employees' publication. I can't help wondering whether one reason for this lack may not be that so many plant magazines fail to consider the meaning—and hence the joy—of the job as the veritable "bull's eye" of their aim.

It was an inefficient foreman who directed a group of illiterate foreign-born laborers to "Dig a hole six feet deep here," and then a half-hour later ordered them to close it up and "Dig another there!"—with, still later, a further order to "Close up that second hole and dig a third one over here!"

With that, these lowliest of workers, men who we think are interested in the money and nothing else, showed their mettle. Taking their shovels calmly and leaning them against the wall, they retorted:

"No! alla time deeg here—deeg dere—for not'ing—like dam' fool! We quit!"

Then the foreman did what he should have done in the first place—explained that blueprints had been lost and that until the pipe could be discovered and the obstruction removed, their sweating friends in the hot sheet-mill inside would get no cool water at their work. With that the men took up their shovels.

"Oh, sure," they said; "we help find-'em damn-fool pipe!"

Today, entirely too many thousands of men are unhappy because they do not know their job—do not know what they are doing—simply because they have, for instance, never seen the completed machine for which they have been making parts for years. I say it is impossible for such men to think properly of their work unless they know how it "cogs in" with the wheels of other operations throughout the plant, the industry, or the country for the rendering of a worth-while human service.

In all the world there is nothing which for a moment compares with a man's job for helping him to understand his importance to other people and other people's importance to him.

Along, therefore, with the personals, the safety hints, the thrift suggestions, the athletic notes, and all the others, there should go on a constant explanation of the work to the worker, constant effort by the editor and his reporters to interpret to the individual his connection with the processes of his own hands, then of these processes with those of his department, and those with the whole plant, and the whole company—its history, ideals, past tribulations, present objectives, past and

present leaders, etc. After that, the whole great industry, and the whole great industry's contribution to the country and the world.

Mind you, I do not say that such interpretation is easy, for unless it really "gets over" it does not interpret. But I do say that without constant effort at such interpretation the plant magazine fails to live up to its complete possibilities.

Without taking time to speak fully of the "how" of all this, I want to mention the best method of helping workers to see the human service and hence the human nobility, hidden in their ordinary, everyday jobs. I mean the editorial policy of mentioning every exceptional happening in connection with the actual work of the man, the department, the plant, or the company—every meeting of such an emergency as arises when, for instance, floods wash away a telephone central and hence call upon production and shipping departments to work long extra hours to supply a new one.

Such crises—and the loyal meeting of them—are common throughout industry. Everywhere, too, the big boss boasts to his companions at the club of his ability to handle them. But in too many places, the workers, who have shared in the crucial effort, wonder why they are not given more chance to share the common thrill. Surely, every one of these employees has upheld the reputation of the company in just as notable a way as if he had helped to win a pennant on the diamond. Yet scarcely an issue but carries the pictures of the company's crack athletes?

All this holds true when the company makes, for instance, its first shipment of goods to India, Australia or Borneo. The shame is that, too often, the workers—perhaps even the foremen outside the shipping department—are given no opportunity to stick out their chests as far as does their chief. I tell you they are just as anxious to enjoy their work as he is!

His Magazine Tells Him About His Company

Such notice of these exploits is worth while in itself, but it serves also to help the worker to understand the achievements which are constantly contained in the limits of his daily stint of effort. Within the covers of his magazine, thus, the man can find not only a chance to know his work by knowing all those who use his product or his service. He can also find there a grandstand filled with the other members of the company—assembled associates before whom he can feel himself a performer—a performer whose meeting of every daily requirement or critical emergency will by no means fail to be observed.

It is almost impossible, I believe, to over-state the truly spiritual value of the editor's usefulness in all this. From my close-up view of the minds and hearts of this country's and Europe's workers, both as a laborer and as a consultant, I would say that today vast unhappiness and heart-break are caused not only among the workers but also among the officers of American industry, because so many of their executive leaders have asked from them not more but less than they would like to give! Too often an executive assumes that everybody will be happy if only he asks a minimum of service from them! That's bad for the company, but it's worse for the persons concerned. To all these a minimum service means minimum self-respect—minimum satisfaction in the feeling of their meaning and value to their fellows and themselves.

One reason so many young men and women today indulge in crime is because we are not properly developing these exploit possibilities of the daily job. So the thrill—the indispensable thrill—is sought for in the gardens of forbidden fruit. This error, I claim, comes from the willingness of most of us to believe that while our own job possesses these possibilities of achievement, the other fellow, of course, need not even dream of finding them in his!

I should feel, therefore, that I had not lived in vain if I could persuade the plant editors of this country—and their bosses—to engage in a forward movement at

exactly this point. Today, literally millions of our fellows are praying for the chance to enjoy, somehow or other, a measure of that thrill which we know must have been Lindbergh's. With close to 100 per cent of all these millions, however, virtually the only chance for this exists, if anywhere, within the limits of their work. If my studies among laborers mean anything at all, they mean that these workers know all this much better than do we. With all their hearts they themselves want to find these possibilities in their jobs. But they cannot do this today without just such help as the magazine can give.

How can more companies and more editors be persuaded of this truth that men genuinely wish to find spiritual assurance and re-assurance in their work?

The other night at Albany I went forward to talk with the engineer. I found him oiling up his magnificent black beast and keen to discuss with me the probabilities of its continuing its run from Harmon to Buffalo without "heating up." He soon told me that he would shortly celebrate his seventieth birthday!—after looking after engines for forty years—and railways fifty-nine!

St. Peter, Too, Will be Interested in a Man's Job

Now, according to some of the plant magazines, this man would be expected to go up to St. Peter and present his credentials by telling all about his children, his garden, his new car, his savings, his last vacation, etc.—everything except his job. It is to laugh!

Why, it's as certain as anything can be that when that man comes to the Golden Gates, he'll knock on the door and with his chest out, look St. Peter right in the eye and say:

"Pleased to meet you, sir! My name is Jones—Jones of Utica, sir. For the last ten years I've been taking Number 19 from Albany west and Number 29 east. That's the Lake Shore Limited, you know, sir. For 30 years before that, I fired or drove the best 'power' on the same road."

That's all! With that, I tell you, he'll rest his case! Furthermore, he'll be perfectly sure that St. Peter will be man enough not only to let him in but to introduce him to a few of the Twelve Apostles so they can pass the time arguing about the solid satisfaction of running engines in comparison with fishing-boats!

No, we don't take men's jobs seriously enough. It is perfectly proper to say that today the great powers and principalities of this world are the United States, Great Britain, Germany, France, Italy—and U. S. Steel, General Electric, General Motors, Baltimore and Ohio, Swift's, United Fruit, etc. It is not too much to say that the heads of these great organizations touch today the life of their times more deeply and effectively than does, for instance, the King of Spain. The reason is that everywhere men's lives—and, yes, their very souls—are being determined by the hopes, the fears, the hungers, the satisfactions, the thrills—or the disappointments—engendered in the hours not of their leisure but of their labor!

For myself, I want no better calling than the job of helping to make better the conditions of American life by helping to make better the conditions of American work. And just this can be the job—and the joy—of the plant magazine's editor—to help men everywhere to think better of themselves by helping them to think better of the product of their hands.

All this was in the mind of the writer of Ecclesiasticus when he wrote of the smith, the potter and other workers:

"All these put their trust in their hands,
And each becometh wise in his own works.
Yea, though they be not sought for in the council of the people,
Nor be exalted in the assembly;
Though they sit not on the seat of the judge,

Nor understand the covenant of judgment,
And be not found among them that utter dark sayings;
Yet without these shall not a city be inhabited,
Nor shall men sojourn or walk up and down therein.
For these maintain the fabric of the world
And in the handiwork of their craft is their prayer."

In conclusion I can do no better than to quote my old friend, Evan Pugh. It was after the meeting of the "Bolshies" in the Welsh coal mine that he related:

"Yusterday, the under-manager do sye to me, 'Pugh, thot been a good job.' And I do sye to 'em, 'In 43 years in this pit, in 43 years, thot been the first time that any company man do sye to me, 'Pugh, thot been a good job.'"

Then one of his companions took it up.

"Aye," he said, "Aye, thot been it! Every man do know that for a kindly word he'll work 'is bloody 'ead off. But every man do know that no dog be've well for a man with a w'ip. And every man of feelin' and sensibility do know that for 'im, the w'ip o' the tongue and the lash o' the lip be worse nor any w'ip on any dog. Every man *moost* 'ave a chance 'ere *on the job* to show 'imself the man, now moosn't he?"

With all my heart, I say he must. But I say, also, that I know no group of men in better position to help him get the joy of playing the man there in his work than this group of plant magazine editors here today.

The utmost of power, then, to all your editorial elbows!

ADJOURNMENT

SIXTEENTH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Food Section

New Section Officers

Chairman, F. A. HASSE, Corn Products Refining Company, Chicago, Ill.
Vice-Chairman, H. T. EGGERT, National Biscuit Company, New York City.
Secretary and News-Letter Editor, W. P. PENTY, Kellogg Company, Battle Creek, Mich.
Poster, Lantern Slide and Safety Kinks Committee Chairman, J. T. DOOLIN, Casualty Reciprocal Exchange, Kansas City, Mo.
Membership Committee Chairman, W. H. CUNNINGHAM, Pillsbury Flour Mills Company, Minneapolis, Minn.
Engineering Representative and Publicity Committee Chairman, THOMAS S. STROBHAR, Wagner-Taylor Company, Philadelphia, Pa.
Program Committee Chairman, FRANK T. COLEMAN, Continental Bakeries, New York City.
Statistics Committee Chairman, R. E. PROUTY, Aetna Life Insurance Company, New York City.
Executive Committee, THE OFFICERS AND—
G. A. NOXON, Ralston Purina Company, St. Louis, Mo.
R. B. ROBINSON, Washburn Crosby Company, Buffalo, N. Y.

Retiring Officers

Chairman, VERN D. SUTTON, Postum Cereal Co., Inc., Battle Creek, Mich.; *Vice Chairman*, F. A. HASSE, Corn Products Refining Co., Chicago, Ill.; *Secretary and Chairman Membership Committee*, A. H. WEIDENMANN, Casualty Reciprocal Exchange, Kansas City, Mo. *Committee Chairmen: Program*, F. A. HASSE, Corn Products Refining Co., Chicago, Ill.; *Statistics*, RALPH E. PROUTY, Aetna Life Ins. Co., New York City; *Poster*, A. C. SELMON, M. D., Kellogg Company, Battle Creek, Mich.; *Engineering Representative*, THOS. S. STROBHAR, Wagner-Taylor Co., Philadelphia, Pa.; *Executive Committee*, THE OFFICERS and H. T. EGGERT, National Biscuit Co., New York City; ALEXANDER DIENST, National Sugar Refining Co. of N. J., Long Island City, N. Y.; STANLEY H. KERSHAW, National Safety Council, Chicago.

Tuesday, September 27, 1927

VERN D. SUTTON, Chairman

Safety Engineer, Postum Company, Inc., Battle Creek, Mich.

The first session of the Food Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, Vern D. Sutton, safety engineer, Postum Company, Inc., Battle Creek, Mich.

CHAIRMAN SUTTON: I think one of the chief benefits to be gotten out of a conference is in becoming acquainted with the other people who are in attendance, so in order that we may all know each other, I wish you would each rise and give, in turn, your name and your connection.

(Automatic roll call).

CHAIRMAN SUTTON: The National Safety Council wishes our attention called to the posters, not only those in this room, but throughout the hotel. There are about a thousand on display and it is desired that you look them over carefully and if there are any you could use, write down the numbers and headquarters will furnish you with the copies to use in your plant.

Perhaps the first order of business is the appointment of a Nominating Committee, so tomorrow we may hold our election of officers for the coming year. I will appoint as members of that committee, Mr. S. H. Kershaw, Mr. H. T. Eggert, and Mr. F. T. Coleman. They will report tomorrow morning.

Unfortunately, the next thing on the program is some remarks by the chairman, but since I have already made a few remarks, I shall simply continue.

What the Food Section Has Accomplished

Vern D. Sutton, Postum Cereal Company, Inc., Battle Creek, Mich.

It is seldom, I believe, that a year-old baby is asked, unless in playful spirit, "What have you accomplished?" and, impliedly, "What excuse have you for continuing existence?" Yet that question is being asked, and justifiedly, of the year-old Food Section.

Well, we have learned to walk and we've learned to talk, and, with the parental supervision, provision, training and assistance of the National Safety Council, the Food Section can feed itself. This is a metaphor rather than a pun. In other words, it's a healthy child and will probably live.

In reviewing what we have accomplished, giving reason for our existence, and justifying our hope of continuing existence, let us consider what we were supposed to accomplish.

In the first place we were supposed to discover and create, and then improve, every possible opportunity to be mutually helpful to each other as members of the Food Section, to be helpful to other members of the National Safety Council, and to be helpful to the safety movement in general. This the Section has earnestly striven to do with some visible success and we hope also with some success which only the records of Eternity will reveal.

Let us determine if we have met the standards specified in the outline of organization and activities of industrial sections.

We have maintained a staff of competent officers. I presume to say, competent, even though I have been one of them. What I have lacked in qualification I hope to have made up in intense interest and willingness. The vice-chairman, Mr. Hasse, has given me invaluable assistance and wise council. We were so unfortunate during the year as to lose by tragic death our exceptionally capable secretary, membership chairman, and News Letter editor, Mr. Allen Wiedenmann. And here I want to pay tribute to one whose insistence and argument did much to make clear the wisdom of a Food Section, who served energetically on the Steering Committee during its twelve months of operation, and who a year ago willingly accepted three positions in the Section, one of which is about as discouraging and difficult as can be imagined. In his shocking death we lost one of our most interested, energetic, and valuable members and co-workers.

Among the specified desired accomplishments to be attained by committees,

cooperation with the headquarters staff in producing posters especially applicable to the hazards of industries in our Section. There have appeared our specifically food posters during the year and photographs for others are waiting appearance. There have been several general posters as the result of suggestions by Food Section members. Perhaps to some of you this seems exceedingly small, yet I refer to it with some pride, at the same time regretting that more members have not developed a responsibility-assuming, productive interest in the matter. The headquarters staff are earnestly desirous of producing safety posters effective in each of the various kinds of industry represented in the membership of the National Safety Council, but how can they provide those which will be specifically applicable to hazards inherent to our operations unless we aid them?

Another important committee to a section is its Program Committee. "The most important," I hear you say. Yes, if a section exists to provide programs at the Annual Congress, this committee is the all important, but there are so many possibilities for a section that it is difficult to say which is the most important committee.

As to the functioning of our Program Committee, just consult your memory and the proceedings of our meetings held in Detroit last fall and await the delightful experience which is to be yours during the next three forenoons. Our Program Committee has justified the existence of a Food Section.

Membership Committee Activities

The Membership Committee has, I believe, done most of its work individually. Many members of the Section have also, I understand, cooperated in an effort to increase the membership not only of our Section but of the Council at large. Two years ago when interested safety men met in committee at the Cleveland Congress, to discuss the proposed formation of this Section, there were 17 present. A year ago the Section was accredited with 121 members. Today we have 125. That does not mean only four have been added; thirteen have come into the fold during the year, but during the same time nine have failed to make their membership valuable to themselves and therefore cancelled. I wish there were some way to cause members to avail themselves of the benefits of membership, instead of dropping their certificate into a desk drawer and forgetting all about its attendant privileges until receipt of invoice for renewal of membership, to which they respond with a cancellation. There ought never to be a cancellation of membership in the National Safety Council, but while the Council can furnish safety nutriment it cannot make members eat it.

One of the most vital forces to continue the program of activity of our Section throughout the year is the Food Section News Letter. 'Tis true that for the scheduled session of our Section we designate whom we wish to speak and assign a topic, while in the News Letter we call for open discussion. It is wished, however, that you would feel the same constraint to contribute to it as you would to respond to an invitation to speak in our sessions, and the same interest you manifest in participating in our verbal discussions here. The News Letter will never accomplish its real purpose until you all feel it a duty and a privilege to help make it.

During the organization stages of the Section we got out four News Letters. During the past year, or since the last Annual Congress, we have gotten out ten. We are sorry they have not been monthly, but feel some little pride that it was possible to get out as many as we did, containing material which we

feel a portion of our membership read before consigning to the wastebasket, without the aid of more numerous contributions from said membership.

What the News Letter is to the Section, the National Safety News is to the parent organization, the National Safety Council. We have not done what we aspired to do in the way of contributing to the National Safety News. You have no doubt observed the portion of our monthly safety journal devoted to the Plant Publication Section. It is my understanding each and every section in the Council is entitled and urged to avail themselves of this same privilege. Due to the newness of our organization and the disturbance from uncontrollable causes of such organization as we have been able to effect, we have not taken advantage of this opportunity.

One of our members, Mr. C. J. Alger, of the Corn Products Refining Company, contributed a splendid article on "Control of Explosive Dusts," which appeared in the August, 1927, issue. We wish other members would contribute to the National Safety News either direct to the staff or through the officers of the Section.

Cooperation Necessary on Statistics

Our Statistics Committee has done splendid work and would have done even better had they had better cooperation from members. Statistics is our best weapon in fighting accidents.

Our engineering representative has also functioned creditably.

Cooperation with trade associations is another ideal for Sections really wishing to achieve. To just what extent we have been able to do this I am not prepared to state. I do know that the Michigan branch of the Association of Operative Millers have invited our members to speak on safety at their conferences, and as a result of such speeches, safety was for the first time one of the topics discussed in their last national meeting, held at Dallas, Texas, in June of this year. I assume there has been other similar work.

Another ideal is to hold regional meetings of our Section. This, I trust, will come later, but probably not until we are a little older and a little stronger in our organization. However, that is an objective and we have our eyes upon it.

We hope also to some day arrive at that stage of maturity where we shall be one of the Sections employing a field secretary, the benefits of which are immediately apparent to you.

As a Section we are asked to do everything in our power to insure a large attendance of members of our Section and representatives of other industries, at the Annual Safety Congresses. I trust you all respond to that irresistible impulse to talk up the Congress in your community and secure as large a delegation as possible, not only from your plant but from your city or town.

At our Food Section sessions last year we had an attendance of 39 different delegates, many of whom attended both meetings. I trust our three sessions this year will show a large increase in the number to express their interest by meeting with us. While I expectantly anticipate this, if it should not be realized, I am confident that at all events we shall maintain the same splendid interest and receive the same enjoyment and benefit.

CHAIRMAN SUTTON: I am going to throw the meeting open now to general discussion on what the Food Section has accomplished; I am sure that many of you have come here with ideas that you want to express.

F. A. HASSE (Corn Products Refining Co., Chicago, Ill.): There isn't much of a discussion that I believe I can start. However, there is one thing that I wish could be brought out, and that is in regard to the News Letters. Will some of those now here get up and tell us what they really think of the News Letter?

It was discouraging not to have, at times, the cooperation we needed—we published only ten issues—and I hope some of you will give us your opinion of it.

CHAIRMAN SUTTON: Mr. Wiedenmann accepted the editorship of the News Letter, and to the time of his death it was the work of his hands, with what contributions could secure from the members. Upon Mr. Wiedenmann's death I endeavored to carry on that part of the work. But I want you to speak critically, for I feel the News Letter has not been what it should have been. You are at entire liberty to say anything you have in mind.

H. P. WARREN (Minute Tapioca Co., Inc., Orange, Mass.): I noticed you said there are about 125 members in the Food Section, and I am wondering if it would be possible to have a reporting of the accidents, hospital cases, time off for various reasons—each member making a report—and then a summary of these circulated among the members so that the Food Section might have the benefit of it. To me, it doesn't do much good to know there is a certain amount of lost time and accidents when I know that the figures came from industries that have no relation to food. I am wondering if such a thing could be developed in this section.

CHAIRMAN SUTTON: What do the rest of you think of that? It seems to me to have great possibilities. The chairman of the Statistics Committee is earnestly desirous of receiving reports from each one of you, and Mr. Prouty and the News Letter editor could cooperate so you would get those reports monthly in the News Letter. I think Mr. Warren's suggestion—at least in part—could be carried out this year. I think that was about what Mr. Keefer had in mind. He spoke of the possibility of sending out a blank with the News Letter to get this report. Of course, it can be confidential as you desire, so far as names are concerned; you may call your companies, A. B. C. D, and so forth, and still give us the benefit of your experience in exchange for ours.

Interests Duplicated in Other Sections

FRANK T. COLEMAN (Continental Bakeries, New York City): It seems to me that this section is composed of people who are also interested in the Taxicab and Fleet-Owners Section, and, as I wrote you, we seem to have a conflict between the sections; so I have to keep running back and forth in order to get the benefit of both. I am wondering how many of the others here have the same problem, and if they think it would be of interest to cooperate with the Taxicab and Fleet-Owners Section more closely.

H. T. EGGERT (National Biscuit Company, New York City): I think that is a very good suggestion. We have the same problem, for we have a fleet of some 1,200 motor trucks, involving a tremendous expense each year—in fact we run probably 1,500 motor accidents each year. Besides this fleet, we have employees who use their own cars on company business, probably about 1,000 to 1,500 of these cars are in use. I think it a good idea to have some cooperation between the two sections.

FRANK T. COLEMAN (Continental Bakeries, New York City): I wonder how many members there are in the same predicament?

CHAIRMAN SUTTON: I can't tell that; we would have to make a canvass and inquire. If it meets with your pleasure, I think it would be well to appoint a committee to correspond with all members of this section to find out to what extent this is a problem with them. I think we will find that almost all problems of safety are inherent in the Food Section as well as the Taxicab and Fleet-Owners Section, and there are principal ones to which we might give attention later on through cooperation with the other sections. How many of you here have fleets of motor vehicles—say of twenty or more? (Eight).

How many have six or more in a fleet? (One).

MR. EGGERT: How about those concerns that have employees who use cars of their

own for company business? In cases of accident the company is vitally interested in these cars from a legal point of view.

CHAIRMAN SUTTON: How many present have employees who use their cars for company business? (Eight)

C. J. ALGER (Corn Products Refining Co., Chicago, Ill.): It seems to me as though cooperation could be reached by the arrangement of meetings rather than by trying to coordinate the activities of both sections. I would say the Food Section should arrange its meetings so as not to conflict with the Taxicab and Fleet-Owners Section, and those who had an interest in both could attend all sessions without any trouble.

CHAIRMAN SUTTON: That might be, and should be, worked out, but there are problems that are going to come up in the same way with the other sections. I don't know how many of you have plant publications, but we sometimes find that we can't attend both the sessions of the Food Section and those of the Employees' Publication. However, it is to be hoped that some arrangement can be made to enable us to attend the various meetings in which we are interested.

Is it your opinion that perhaps the program committee can make such arrangements as not to interfere with the Taxicab and Fleet-Owners Section meetings in the matter of time, and will that cover the situation, or should there be other efforts toward cooperation? What do you think, Mr. Coleman?

Program Plans Made to Coordinate

FRANK T. COLEMAN (Continental Bakeries, New York City): I think there should be subjects of interest to both sections, but if the membership were split fifty-fifty you would have half the members not interested in one problem while the other half are.

CHAIRMAN SUTTON: I think it is the desire of headquarters that no section place on its program subjects that are natural problems of some other section. For instance, "The Hazards of Motor Vehicles" is a subject that should be discussed in the Taxicab and Fleet-Owners Section. They probably would be very willing to have us attend a session where such a subject, perhaps very vital to us, would be discussed, but it hardly belongs on the program of the Food Section.

I think we should simply try to arrange our meetings so that our members can go also to the Taxicab and Fleet-Owners Section if they wish to get the discussions there and participate in them.

Do the members present who have fleets believe we should appoint a committee to learn what other members of the Section also have fleets, and then recommend whatever method of cooperation they think we should adopt.

MR. COLEMAN: I think it would be better to leave it with the program committee to work out.

CHARLES J. STROBEL (Wagner-Taylor Co., Philadelphia, Pa.): Why not send out a questionnaire and then arrange the replies of the members, similar to the form the American Rating Company used on delivery?

F. A. HASSE (Corn Products Refining Co., Chicago, Ill.): I would suggest that it would be advisable to appoint a committee; we already know how many here have fleet operations, and I would suggest that the committee appointed be asked to determine just how many of the entire membership would actually be interested in cooperating with the Taxicab and Fleet-Owners Section, the membership varies—many of them are ice cream manufacturers, and some might not have the same kind of problems.

C. J. ALGER (Corn Products Refining Co., Chicago, Ill.): It would seem to me that we are all in the same boat, we are all manufacturing food products and dealing with the retail trade, and we all have the same interest in accident prevention. I think it is a question we can settle right here. I venture to say that 90 per cent of us

interested in the problems of the two sections; no matter how small we are, have the same problem of getting orders and of delivering them.

CHAIRMAN SUTTON: Unless someone wants to make a motion that we appoint committee for this work, the program committee will feel it their duty to take this matter up when they prepare their program. Will you express your pleasure in matter of appointing a committee or remain silent?

MR. EGGERT: I make a motion that we appoint a committee.

MR. COLEMAN: I second that motion.

CHAIRMAN SUTTON: It has been moved and seconded that we appoint a committee to determine the methods of cooperation between the Food Section and the Taxicab and Fleet-Owners Section, for the benefit of that section and ours.

Cooperation with the Taxicab and Fleet Owners Section

MR. EGGERT: I would suggest that Mr. Coleman be placed in charge of that committee.

CHAIRMAN SUTTON: I wonder if Mr. Coleman will serve.

MR. COLEMAN: I should like to see the motion voted upon.

MR. EGGERT: I think that committee could work with the program committee, because that committee would be very much more vitally interested than the program committee, so far as the fleet situation is concerned.

CHAIRMAN SUTTON: All those in favor, say aye; opposed, no.

(The result was a tie.)

CHAIRMAN SUTTON: Let's vote the other way; all those in favor raise their right hands.

(The motion was carried.)

CHAIRMAN SUTTON: How will you have that committee chosen?

MR. HASSE: I make the suggestion that the committee be appointed by the chairman.

CHAIRMAN SUTTON: Is there any other suggestion?

Then I shall appoint Mr. H. T. Eggert as chairman, and Mr. C. J. Strobel as a member of that committee. I would appoint Mr. Coleman, but he is opposed to the committee.

MR. EGGERT: I suggest that Mr. Coleman be made a member of the committee because he is located in New York where I am, and we can get together easily. I think he is perfectly willing.

CHAIRMAN SUTTON: Mr. Strobel is located in Philadelphia which is not far from you, so he should be able to meet with you. If there is no other discussion on this subject, we will go on with our program.

C. J. ALGER (Corn Products Refining Co., Chicago, Ill.): I should like to say that, having attended the meetings of the National Safety Congress in the past when anyone in the food manufacturing line seemed to be out of step, I think the officers of this section are to be commended, particularly our worthy chairman, for the progress they have made.

CHAIRMAN SUTTON: I am exceedingly grateful for your kind words. It is my impression, too, that we were out of step in the Food Section; we had no place to go, for one thing, so the improvement has made me very enthusiastic.

The next subject we are to consider is one that may well be considered in any and every section of the Congress, the matter of plant publications. We are very fortunate in having it presented to us by the editor of the best plant publication in the food industry. In saying that I want to remind you that my own company as a plant publication, but it takes its hat off to *The Staley Journal*. We are going to hear from Miss Ruth Cade, editor, *The Staley Journal*, A. E. Staley Company, Decatur, Illinois.

The Employees' Publication Safety Value to Food Workers

Ruth E. Cade, Editor, The Staley Journal, A. E. Staley Manufacturing Company, Decatur, Ill.

While the employees' magazine is not a new institution, it is only in the last few years that its number has increased to any great extent. Also it has been only within a comparatively few years that such publications have taken on the aspects of a real magazine.

Until a few years ago the editor of such a magazine was more likely than not the factory handy man. He helped in the employment office, the personnel, safety and insurance departments, and edited the magazine between times. Everyone, including himself, wondered why the company wasted money having such a thing printed, for it was, quite naturally, a jumble of odds and ends.

Then, a few foresighted employers began to see the good which was buried in these publications and decided to dig for it. First one company and then another turned the editing over to one man whose major duty it was to edit. Some companies were even so possessed of the pioneering spirit that they hired trained editors for the job. But it was several years before that departure was regarded as anything but rank foolishness.

With the management just waking up to the possibilities of an employees' magazine, then, it is not at all surprising that the employees do not yet realize how fully they can use such a publication. In some cases they never will, for there are always cases where things do not work out as they should. But we are considering the more ideal conditions.

There are generally two reasons which are responsible for the publication of an employees' magazine. As a rule such a magazine is published to promote better fellowship among the workers, or to promote safety among them. I believe firmly that the better magazines are not overbalanced either way but devote the proper attention to each. In fact they are so closely interwoven that it seems hard to separate them.

Of course, speaking as an editor, I would say that no magazine can be its best and do its best if it is ruled by a higher-up blue pencil. If a magazine is to do the most good its editor must have as his motto that timeworn bit—"of, for and by the people." I am not a radical in any sense, but observation has shown me that employees' magazines edited to please some one man or group, are missing fire.

We here are all concerned especially with factories which manufacture food products but I cannot see wherein our problems differ greatly from those of an editor in a plant where freight cars or linen sheets are made. We are all working with and for human beings.

And it is just here where you laymen, if I may so call you, have your part. The editor may have all kinds of freedom of tongue and pen, but unless the people whom he serves work with him, his efforts will be so much waste motion.

As has been said before, the magazines which more nearly approach the ideal, seek to promote good fellowship and safety work. Those two things cover a wide field of endeavor. But it is for you as well as the other fellow for whom this work is being carried on, remember, and each one of you must do his part. And this is how—

Primarily a magazine must be read if it accomplishes its purpose. It will be read if it is attractive. To be attractive it must be well printed, well illustrated, well written and newsy. You will say—that's the editor's job—and it is, partly. The editor must see that the type is easy to read and attractive to look at, that the paper is good, that the halftones are clear, that the cartoons are well drawn and really funny, that the articles are well and interestingly written. He must also see that

is newsy, holds the reader's interest and leaves him eager for the next issue. If he can't do all of these things and more, he is a poor editor and should seek other work.

But an editor cannot sit at his desk nor even spend hours each day with the plant people and just absorb interesting news. He, if he is anything of a newspaper man, will get a lot of copy, but the finished product will be just him. It is only when very one concerned gets interested to the point where he comes in with contributions, that an employees' magazine is really "of, for and by the people."

Your magazine is your mouthpiece, and if you have a worthwhile scheme you want to put across, talk it over with your editor and see if he can't help you. For instance, nothing helps along the general good feeling among a group of workers more than organized athletics. And how better can such activities be fostered than through the press? If your town is not too large the local papers will give you some publicity, but your best bet is your own factory publication.

Go to your editor, tell him about your team, help him to get the score after each game, help him to get the players together for a picture. Tell him, above all, little incidents which come up at the games and practice. Everyone likes the feature stories as well as the straight news. Remember how, just before the recent pugilistic battle at Soldiers' Field you read the feature stories in the newspapers? Westbrook Pegler, among others, wrote columns every day of straight feature stuff for one of our big Chicago dailies and I'll wager it was read as eagerly as the straight news stories on the same event.

Practically every factory nowadays has a fellowship organization of some kind, which gives parties or other entertainments during the year. If your work is that of taking charge of those affairs, learn to use your magazine for all it is worth in giving them publicity. Give your editor advance stories on each party and then give him good follow-ups after it is over. You and the editor together should make these parties such a grand success that by the end of the season no hall in town will be big enough to hold your crowd.

Everybody Likes to See His Name in Print

Human beings like to see their names and their pictures in print. Keep this in mind when you are talking to your editor, and tell him bits of news of the people in the plant with whom you come in contact.

If you are the safety director at your plant I hardly know how you can carry on your work unless you use the magazine for all it is worth. Bulletins may be posted about the plant, meetings called and foremen instructed to talk, but the families will not know of this unless they read about it in the magazine. Then it will become generally discussed in the homes and the men will feel that safety is something which carries over after the whistle blows.

There are a great many ways in which safety material can be used in magazines. The best thing for you to do is to get together with your editor and map out your publicity plan for a year in advance. Some editors devote certain pages to safety each month, while others scatter safety material through the magazine. It is a much argued question which is the better, and I am inclined to think it is a purely local matter. Like spats and monacles, what will do for one community will not do in another.

Whether your safety material is used in concentrated or scattered form, however, it must be carefully selected and written. I may bring a storm of protest down upon me when I say it, but I believe safety articles written about local cases, cartoons and pictures which have a local interest, are much more effective than those furnished by a clipping service.

Factory workers are not, as a rule, great readers. Being human, too, they will slide over stuff which they think is put in there for their good, unless there is some

way to catch their attention. If they catch nothing familiar at first glance, probably they will go on to the next feature. But if, on the other hand, you can intrigue their interest by using local names and incidents, they will read the whole thing.

I know the argument put up is that the people publishing the clip sheets are specialists in safety and have a better knowledge and better ideas on the subject than the average editor. I grant that, but while I think these services are excellent, I am convinced that as a regular diet, unmixed with local color, they soon lose their power.

Subscribe to your clipping sheets, read them and see that your editor reads them, but use only those parts which apply to your needs. Mix these well with local stories. This means more work for the editor and the local safety man, but the results, I feel, will be worth it.

In the plant with which I am connected, products from corn are manufactured and two of our greatest hazards are dust explosions and infections. Of course, dust explosions will occur even when workers do not carry matches, but we keep up a war on match carrying just the same. We do this by story, picture and cartoon. And we do the same with our war on nails. Grain doors left carelessly lying on the ground with nails pointing up are a special peeve of ours, and we bring this subject up occasionally in picture and story.

One of our problems has always been to get the man with a small cut or scratch to report to the first aid hospital at once. We have used, in the *Journal*, a great deal of publicity about our hospital, and I believe that has helped greatly in reducing our number of infections and increasing our number of first aid treatments.

I could go on and on telling you my ideas, but I think I have suggested one of the important ones—that your plant magazine should be yours to use, and you owe it to your company and your job to use it. If you are not well acquainted with your editor, make it a point to get to know him. Learn that, although their life work is publicity, newspaper people can keep secrets better than anyone else. To help you best your editor must fully understand your proposition, so do not hesitate to make him your confidant. I am sure he will, in return, work with you for the betterment of your plans for your work.

All of this time I have been going on the assumption that in each of the plants you represent a magazine is published. If you come from a company which has no such publication, suppose you take upon yourself the task of starting one, or seeing that one is started. It need not be elaborate nor expensive at first—just a publication appearing regularly and being “of, for and by the people.” If you do make the effort it will be only a short time, I am sure, until both employer and employee will thank you.

Most Plants Are Interested in an Employee Publication

CHAIRMAN SUTTON: How many here are representatives of companies who have their own plant publications or employees' publications? Will you raise your hands?

Whether you have a plant publication, I know you are interested in this paper and this subject, so we should like some discussion on employees' publications.

Miss Cade, you mentioned something about the handy man sometimes being the editor of the employees' publication. Is it feasible in an ordinary plant to have one person devote his entire time to such a publication?

MISS CADE: Of course that depends entirely upon the plant. My idea was that the best magazine is the one that accomplishes its purpose best, that has for its editor one person whose major duty is the editing of it. Only in the smaller plants is the magazine handled by one whose editing work is a side line.

Our magazine was started about ten years ago by a man who was safety director.

His idea was all right, but he would just throw together a few ideas and his ideas were much better than his results.

MR. ALGER: I think we should call on Mr. Hennessy for the reasons why our publication at Argo fell through. They had a lot of experience.

M. M. HENNESSY (Corn Products Refining Co., Argo, Ill.): I think the reason our publication fell by the wayside was due to the fact that I started it, I being a new editor of the kind that Miss Cade just mentioned. It went along very nicely for a year or two and then we finally discontinued it altogether.

I think Miss Cade's magazine is the best in the starch industry and contains a lot of information for the people.

CHAIRMAN SUTTON: To revert to my question again, as I understand it, the distinction is that a handy man edits the paper in his spare time or just when he gets to it or when his major duties do not interfere, and an editor can devote himself chiefly to the paper, even though he devotes some time to other things?

MISS CADE: Yes. Quite often among our plant publications we find editors whose major duty is editorial work, although they usually have some other work to do also; they are the editors who recognize their responsibility for their publications.

CHAIRMAN SUTTON: In your opinion, can an employees' publication succeed where the editor has other duties, even another occupation which he holds on a par with his magazine work?

MISS CADE: That depends, of course, upon the editor. Like mixing golf with business.

An Excellent Paper in the Home Safety Division

ALBERT H. RICHARDSON (General Electric Co., Erie, Pa.): I don't have any questions to ask Miss Cade, but I should like to supplement a few of her remarks, and possibly at the same time answer your question.

I am very much interested in plant publications. The majority of editors of employees' publications (and I have met over a hundred), edit their publications only on part time. I don't think there are over a half dozen who devote full time to their publication work. In my experience, it is a part time job, yet I am responsible for getting out the paper each month; so for that reason you might classify it as a major job as it must get out on time if it is to be of value.

What Miss Cade said about making it interesting is, of course, fundamental; it has to have a lot of safety items in it, local color, to be of particular interest. If you will fill it up with boiler plate or clip sheet material, it will soon lose its appeal.

I wish that every person here who is interested in plant publications (and even if you are not), would get a copy of the proceedings of the Home Safety Section and read the talk by Mrs. Bertha Winter Mahoney, "As the Home Keeper Sees It," given in that section on Monday afternoon.

She told about safety in the home, and I think you will all agree that a big factor of safety in the plant is the mental attitude which the man brings to work with him, and that attitude is directly related to home conditions. If there are accidents in the home before he leaves for work, he is more or less upset and there is likely to be an accident in the plant; or if there are people at home who are fearful of his getting hurt at the plant, that has a direct relation to his work. There is value in having safety articles in your publications, addressed to the folks at home, if you give those articles interest and local color.

MR. ALGER: I should like to inquire about the method of distribution and whether a fee is charged; if there is a fee, of what particular advantage is it?

MISS CADE: We give ours away, but some companies do charge for them. They say they charge for them so their employees will realize they are getting something worth while for their money and will read them and take them home, but we never have found our employees undervaluing our publication. We do have a price on the

front of it, but that is because two or three news stands have asked for our magazine; they put it on the stands every month and sell perhaps a dozen copies. That is the only reason we put any price on it. The distribution is accomplished through the foremen every month and some are sent by mail.

CHAIRMAN SUTTON: All of this discussion is very interesting. If you find time, I think you would enjoy the meetings of the Employees' Publication Section. The matter of distribution, for instance, has been thoroughly discussed in that section; some insist one way is better while others think another way is better.

C. J. STROBEL (Wagner-Taylor Co., Philadelphia, Pa.): I think when we read in national magazines such articles as "Every Woman Her Own Electrician," "Every Woman Her Own Gas Fitter," and subjects of that kind, and advertisements illustrating a woman washing dresses in gasoline or looking for the gas jet with a match, we should do something toward censorship of those things.

CHAIRMAN SUTTON: Just what do you mean by censorship?

MR. STROBEL: I think they should be gone over by people who know about them before they are sent out for publication.

CHAIRMAN SUTTON: I think we all agree that there is a great deal of danger from that source, but how could we do anything in regard to it?

MR. STROBEL: In connection with one advertisement I remember I wrote to the advertiser and got a nice reply and it was corrected.

CHAIRMAN SUTTON: About the only censorship I know that we could effect is for someone to regulate this through the editors; someone who sees those articles in a popular magazine write a nice little spiel for your plant publication, pointing out the dangers, and in that way protect your own employees. I hope that some time the National Safety Council and other agencies in the safety movement will effect legislation that will place a censorship on just that sort of thing. Returning to the subject of plant publications, Kellogg's have a magazine now, haven't they, Mr. Smoke?

FRANK SMOKE (Kellogg Co., Battle Creek, Mich.): About a year ago we started the idea of a plant publication, then we got in an efficiency man. But we are rid of him now and we hope to get back into it again.

CHAIRMAN SUTTON: In other words, watch our Smoke.

MR. SMOKE: Our plans are all laid and I think it is going through this time.

CHAIRMAN SUTTON: If there is no further discussion, we will pass on to our next subject, an exceedingly interesting one that concerns us all, by Mr. M. M. Hennessy who is safety and employment manager of the Corn Products Refining Company at Argo, Illinois.

Keeping Safety Alive in the World's Largest Starch Plant

M. M. Hennessy, Safety and Employment Manager, Corn Products Refining Company, Argo, Ill.

As Mr. Sutton said, "Keeping Safety Alive in the World's Largest Starch Plant," or the world's smallest pickle factory—it makes no difference—is my subject. We are all out for the one purpose, the saving of life and limb, and I am just going to try to hit the high spots of what we are endeavoring to do at Argo, which happens to be the largest starch plant in the country.

If you will permit, I will just run back a few years to 1911 when we first started. At that time if we had an accident we found out what caused it and then put a guard there. Our only thought at that time was guards; we never thought about personal contact, at least we didn't do much about it. A lot of you fellows were ten years ahead of us. But we finally got our plant well guarded, but with no first aid, no nurses, no examinations—we hired our men at the gate, the foreman

assing on them. There was plenty of labor, immigration was heavy, so all we had to do was to go to the gate for one man or 15 men.

But we soon got away from that condition in 1919 and 1920, years that we all know. The first thing we got into was the shortage of labor; they took all our young men into service and then they cut down on immigration. We didn't pay much attention to safety even then; we got busy on production—"get the men and get out the stuff"—we were not even so particular about the quality in those days. But we had accidents and we had plenty of them. It was not an uncommon occurrence to see ambulances about every day, sometimes a man lost a leg and sometimes one was killed outright. No doubt it was the same in your plant.

Labor turnover was tremendous, and we all know that is a big cause of accidents.

After the war, conditions changed and we all began to take inventory to find out where we were, not only on production, cost and quantity, but on labor. Labor had become pretty scarce in 1921, although there was slight depression in our company and probably in yours.

Checking Up the Causes of the Accidents

And then in the interest of safety we began to check up and find out what were the causes of accidents. Our plants, we found, were well guarded, we had our different insurance inspectors and engineers making monthly inspections, and still we had accidents. We decided then and there that we had to get to the men themselves. It was a big job. How were we going to do it?

We started off by making a few changes. I might say that at that time in our organization we had a good many foreigners, some of them straw bosses, and each of those fellows would bring in his own particular clansmen—forming a separate tribe in each department, a clique of itself, a separate company, you might call it. Of course, we soon decided that was bad, so when the young men returned from the service, we began putting them in positions, wet starch and dry starch, where we never thought we could let young people work, where we had always used foreign labor. These young people soon broke up the Greek and Polish combinations and now we have what we call an American combination. We even have a sprinkling of colored help.

I might mention that colored help has proved of value to us: colored boys work also in our restaurants, our locker rooms, and prove very efficient. I know a little group on the outside of Chicago who say they prefer Mexican help, while others wouldn't have colored help at all; but so far as we are concerned, colored help has been very satisfactory. I might add that they have helped us reduce accidents, too; we can talk to them, while our foreign labor couldn't understand us; we had to talk to them, and print our signs in a foreign language.

As I said, in 1921 we abolished the employment of so much foreign labor, saying, "You speak English, understand us, or we don't want you." I think that change from foreign to American foremen has been a great help to us; they take an interest in their men, get their confidence in many ways that they couldn't in the old days. Now we handle most of our so-called welfare problems by putting them right up to the foremen. If he runs up against a problem too big for him, he takes it up with our legal department, but anything of that nature must come through the foremen.

I might just say a word about the employment department, which is strictly 100 per cent service; we are there to give service to the employees no matter what it might be. We are the first contact with the new employee when he comes in and we give him a physical examination, not a heavy one, only taking about three minutes, just long enough for us to look for such conditions as hernia, bad eyesight, and such things; then we give him a safety talk, telling him what kind of plant he is going into, describe the hazards, warn him against smoking and tell him to be care-

ful around the machines. We give him a short form letter and then send him down to the foreman.

We handle safety matters in the employment department; we have about 200 houses that we sell to our employees; we have a lunch room and a store, and we have a stock selling plan and group insurance. We try to handle everything that we can in the interest of our employees—we even go so far as to make up wills for them sometimes, and we have occasionally arranged with the local undertaker to take care of any trouble of that kind. All those things help us in the safety work, because when we help our men in those things, we get their confidence, and when we go to them with suggestions and hold meetings, they respond readily, and let us know all that we want to know. I believe that personal contact has more to do with the elimination of accidents than anything else we can do.

In our first-aid room we have had doctors and we have had nurses, in time past, who weren't of any great help to us in safety work; for you might have a doctor who is a little uppish or who becomes too disgruntled when a fellow comes in perhaps a little too often for a minor injury. That sort of thing doesn't help, for when we have people like that there, the men won't come in. So we brought the first-aid room right up to the minute, with good doctors, and it is a very satisfactory arrangement. When a man seeks first-aid for any kind of serious injury, we of course follow that up; we send him to one of the best hospitals in Chicago, and we have skilled medical men do all the major work. We have a special list of these doctors.

How the Safety Organization Works

Our safety organization works something like this: We have a committee, composed of a man from each department, which meets monthly, and it works out fairly well—not so well as we should like to see it, however, for we don't seem to have success in getting our men to offer suggestions; but occasionally one of our fellows develops into a real live one and becomes a real worker. At these meetings the investigation of accidents is gone into very thoroughly; we question the foreman on the job and our safety department recommends changes in order to eliminate any possible recurrence of an accident.

We write up every accident on a special form; that is, the form is filled in to show the name of the injured person, his department, the time, how it happened, on what machine, whose fault it was, his, ours, or the company's fault. We of course have to be the judges, so we consult all interested before we make our decision. It is a very satisfactory way. In case of a lost-time accident we hold a meeting in the particular department in which it occurred. We go down and tell them that Tom Jones got hurt, how he got hurt, and then we show the gang how they could eliminate that sort of accident. I think it is a very good thing because everyone is present, and because we run three shifts and try to make all three shifts with our talk, that accident is advertised thoroughly in the department in which it happened. We occasionally hold mass meetings; we take a whole division and have the boys there from the Chicago office and our own manager gives a short talk or brings in some interesting outsider; I think bringing in outsiders has a whole lot of weight.

Not so long ago, Isaiah Hale, of the Santa Fe, talked to a group of our foremen and did more to stimulate them than any speaker we ever had; he had a real message, and talked for a solid hour. You have got to sell your foremen, of course, on your program; you have to put it across to your foremen first.

We have the usual run of National Safety Council posters and we put all those up; we also have a clock at the gate which shows the number of hospital and lost-time accidents, just as all of your probably have a race track or something else. Having the accidents posted means a lot, where you don't have too many, for a lot of the men will know the man who got hurt and will be interested in how it happened.

We have three or four other plants and we have competition between them for the best record from year to year. Last year the Pekin plant made a very good record. That has helped us a whole lot in reducing our accidents, and we have gone into it vigorously this year.

I know we have all had good records in the last year or two; I know our company has reduced its hazards due to our organization work. There is no question about it; if you have good organization you can put it over. Just the general conditions since the war have certainly helped us to put over our good record, which before was cut down because of our labor turnover. When we have brought it down to the very minimum, we can throw out our chests and say we are sitting on top of the moon. But we have to cut down the accidents per month, and I am just going to give you our record because I think it is a fairly good one in spite of general conditions, and while I don't say our safety organization is perfect, it functions better every day, and if you have any suggestions, I certainly will be glad to have them.

In 1919 (of course that was a bad year), we all had bad records: we had 272 lost-time accidents, an average of 22 accidents per month during the year. 12.6 accidents per hundred employees.

In 1920 it ran somewhat better, and in 1921 it was reduced because we slowed up a little. In 1922 we started improving, until in 1926 we made a big reduction—only 32 lost-time accidents during that year, against 272 in 1919. Our average lost-time accidents per month for 1926 was 3.2 per 100 employees and our average lost-time accidents per month was 5. This year we have had 23 lost-time accidents up to September first, against 128 in 1920, 92 in 1921, 95 in 1922, and 89 in 1923, for the same period. We have had some minor lost-time accidents, but we started out this year with a determination to improve, to make a 50 per cent reduction over the year 1919. We went to our departments, talked with the gang, started off right.

I don't think there is any question that your plants are well guarded; these days they all are; so we are working with all our force to get to the man. Our manager has department is accessible at all times, so I think we are working it out successfully.

Getting Out Clever Home Made Posters

CHAIRMAN SUTTON: I might say in connection with the 50 per cent reduction, they are getting out some clever posters, home-made posters.

Miss Cade spoke about the plant publication referring to local injuries, having items on local injuries instead of your clip sheet stuff; and I think that is true of your posters, for notwithstanding the splendid ones the National Safety Council furnishes, you can get out better ones, more effective ones because they apply to your own employees, your individual problems. So keep your eyes open for those opportunities and get out home-made posters. They are wonderful things with which to get results, and those posters you people have been producing are exceedingly impressive, the ones you used in your 50 per cent reduction campaign.

Now let's indulge in some discussion on what Mr. Hennessy has said, or anything that occurs to you in regard to safety.

H. P. WARREN (Minute Tapioca Co., Inc., Orange, Mass.): I should like to ask Mr. Hennessy who is the man who is responsible for safety.

MR. HENNESSY: The general manager is responsible.

MR. WARREN: To whom does the doctor report?

MR. HENNESSY: To me. I think it should be that way, the general manager is a pretty busy man, and anyway the general manager doesn't know a thing about any of the fellows and we should know about every individual, his home life and so forth.

F. T. COLEMAN (Continental Bakeries, New York City): I should like to know, Mr. Hennessy, how you operate your competition; if you have four plants, what reward you make.

MR. HENNESSY: Will you explain it, Mr. Algers?

C. J. ALGER (Corn Products Refining Co., Chicago, Ill.): In all accident competition between plants, the first thing to stay away from is handing each individual a premium, if you want to keep up enthusiasm. We have over a period of 11 years handled accident competitions, and we don't give premiums unless a man saves another man's life, and then we hand him a gold watch.

For this accident competition between the plants, a trophy was selected last year, designed to carry a safety message. For recording the progress we had a clock. Incidentally the trophy cost about \$200. The competition was so keen between Argo and Pekin that we didn't know until the last week who would win. This year we have a similar trophy which will be presented to the plant that has the best accident record based on severity and frequency, and while Hennessy at Argo is in the lead, they haven't won yet. I think we shall make further progress.

MR. COLEMAN: We have a little different proposition, for we have 100 small units all through the country, each in charge of a manager, and I can't see how we could run a competition where there are different hazards in different groups of men; I should have to take the managers' word for the records.

MR. ALGER: I think if we were in that position, we would pick out the larger plants and confine our efforts to the ones having the larger number of employees. You will find two or three of the insurance companies willing to cooperate in accident campaigns. In our plant at Edgewater there are two banners to be awarded.

H. P. WARREN (Minute Tapioca Co., Inc., Orange, Mass.): Let me ask whether you have your costs figured. One concern may spend a great deal for safety and another not so much. Is that taken into consideration?

Few Safety Recommendations Possible Today

MR. ALGER: When we started in on the safety work, it was my job to go around and recommend safety measures, and they were made uniform in all plants. Today I could go through the Argo plant and make less than 10 recommendations whereas once I could have made 300. It required spending in 13 years about \$114,000 on safeguards. We spent a lot of money usefully and perhaps we wasted a little, but today our problem is much easier for it.

H. T. EGGERT (National Biscuit Company, New York City): Can you tell us how most of your accidents occur; that is, are they the result of the operation of machinery or the result of carelessness?

MR. ALGER: Carelessness. A lot of supervision is required. I am speaking of manufacturing accidents; for example, in our plant at Argo, where we handle quantities of dried feed and have a steam dryer, a welding operation was being conducted, causing a flash. That is the fault of the safety department; we should have known the danger of such a condition with dried feed. It is not always the carelessness of the worker. We have had one man go around the shaft in a couple of years, and that accident was our fault. Most of our accidents decrease under careful supervision. Train your foremen and safety man.

MR. EGGERT: What percentage of your total accidents are machine accidents?

F. A. HASSE (Corn Products Refining Co., Chicago, Ill.): They are under 5 per cent, aren't they, Mr. Alger?

MR. ALGER: Yes, from 3 to 5 per cent.

MR. EGGERT: Our experience would about correspond with yours?

MR. HASSE: As I recall it, we had a total of four actual machine accidents in 1926.

MR. ALGER: We have at least 300 punch press operators in all of our plants, punching tin plate.

MR. EGGERT: Do you have many hand trucks in use in your plants?

MR. ALGER: Yes, quite a number.

MR. EGGERT: Do you have many toe accidents? Principally where a man pulls truck, resulting in a fractured toe or some bad foot injury.

MR. ALGER: We do at all our plants, but we have some accidents that are worse in toe injuries; for instance, when a man is caught between a truck and a car door.

MR. EGGERT: We have had some bad experiences with hand trucks.

MR. ALGER: The thing is to keep them in condition and load them properly.

MR. EGGERT: They are supposed to be in splendid condition, and are supposed to be loaded properly, but it seems that our men will continually pull these trucks over their feet, chiefly over the toes. We probably have 30 toe injuries per month. Of course they are not all lost-time accidents; maybe there are five or ten lost-time accidents per month.

MR. ALGER: How much of a load do they carry?

MR. EGGERT: It varies from 500 to 1,500 pounds. We have two types of trucks, one of them with four wheels, one on each corner, and the other has four wheels arranged in a diamond shape which tips when moved and something lands on the man's foot. We have had an idea of moving the wheels back, but that won't work out. I have been working on safety shoes and am interested now in a shoe that is put out by a certain manufacturer, and we have about 15 pairs with which we are experimenting.

Bread Racks a Source of Minor Injuries

F. T. COLEMAN (Continental Bakeries): We have the same proposition as the National Biscuit Company. We have many bread racks and the men jam their fingers and run over their toes. I have tried to get the men to push the trucks rather than pull them on account of this and also get away from back injuries, but I can't get them to do it. Consequently they get their hands jammed against the post or other racks and their toes run over, but I am going to keep at it.

MR. ALGER: You have your poorest class of labor on that, don't you? You start your men on truck jobs?

MR. EGGERT: Yes, our lowest grade of labor.

C. J. STROBEL (Wagner-Taylor Co., Philadelphia): In trucking in the warehouse, our men push all their trucks and the truck handles are extended out.

MR. EGGERT: That is all very well in most cases where there is a man in the front and a man in the back, but when you start pushing, you get those back injuries, the kind that don't get better.

CHAIRMAN SUTTON: You spoke of handles on your trucks. Maybe Mr. Coleman has a problem there.

MR. COLEMAN: If you put handles on them, you can't get so many on the rack. The operating department objects to handles.

MR. STROBEL: Why can't they put handles on the inside of the stays, the same as trolley car handle.

CHAIRMAN SUTTON: It seems to me that such a handle would interfere with the amount of room.

MR. STROBEL: You must have support for the stays; why not put them on the inside?

MR. COLEMAN: There are shelves on these racks.

MR. STROBEL: How wide is the support?

MR. COLEMAN: You couldn't get a substantial handle on it.

MR. C. J. STROBEL (Wagner-Taylor Co., Philadelphia, Pa.): I mean the width of your upright; have your handle there.

MR. COLEMAN: You have the same proposition. They will just reach around the outside and not use the handles.

MR. EGGERT: They slide pans on ours and inside there is no room for a handle.

We have several bread plants, but fortunately we experience very few injuries in our bread plants; most occur in our cracker plants and carton plant.

MR. COLEMAN: In regard to competition, I just had a contest for no accidents, based on the boxing idea, having bantam weights, middleweights, heavyweights: bakeries up to 40 inside employees in the first group, and so on. Lost-time accidents would count as knockout blows, but there were so many bakeries that had no knock-out blows in the six months I can't decide which won, and there is only one prize. Being so widely scattered makes it such a difficult problem.

MR. ALGER: You will have to go through with them; after what they accomplished that ought to be worth the money.

ALEXANDER DIENST (National Sugar Refining Co. of New Jersey, Long Island City, N. Y.): We have electric trucks and all kinds of trucks and very little room, pretty close quarters, but I must say we have very few accidents of this nature. The worst thing is scraping of the hands, and we attribute the solution to education, which is the only thing I believe will overcome it.

MR. COLEMAN: That takes us back to the same problem—personal contact; put it up to the foreman and hold him responsible.

The Foreman Should Be Held Responsible

R. G. STRATTON (Travelers Insurance Co., Philadelphia, Pa): This gentleman has touched upon one of the most important things, the holding of the foreman absolutely responsible for accidents in his department.

Some years ago I had quite a liberal education in Battle Creek, so I feel qualified to speak. I think you are unfortunate in this, because you produce a product having so low a unit value; in other words, the purchase price to the retail trade is in the minority of trade value, and this is all the more reason why it is so important to your work to remember the incidental cost of accidents and all the more reason why the foreman in his department must be held directly responsible for the accidents.

Executive participation is essential. Many times this will be put off because it is thought a foreman will resent being held responsible for accidents although he really is, and he should be shown that an accident is a breach of economy.

If any of you have read the recent brochures put out by the National Safety Council, you will realize how important that is. Just multiply the cost of your accidents by four or more and put that amount directly out of your pocket as loss.

The condition here is one of supervision, for this reason: Any accident that happens in a department of a plant, with the exception of one in a million, is not the first time the condition which caused it has existed. In other words, the bruised hands, the bruised feet, and other accidents are typical of what results from the same condition persisting without correction. A man in charge of a department where such injuries occur frequently, has seen day after day this condition promoting the accidents and probably has done nothing to stop it, and that is why, if he is held responsible, he will, through eagerness for advancement or perhaps through hope of monetary gain or retirement at a later period in his employment, do all he can to promote the interest of safety.

There are a few excuses a foreman will give that he should never give when there is an accident. If you insist that a foreman investigate each and every accident and report on it to the safety man or the general manager or the head of the department, and let him decide in his own mind what the incidental cost of that accident is, it will set him thinking.

Establish an accident court of inquiry and hold periodic meetings in regard to an injured employee, and then you will produce a condition in your plant that will make the foremen realize their responsibility. As soon as they realize that they have a

responsibility not only to the company but to the other employees, particularly those near them, you will have fewer accidents. I have seen the thing happen when every accident absolutely ceased.

M. HENNESSY (Corn Products Refining Co., Argo, Ill.): We once a year send an itemized list of all the accidents occurring in our plant; and we apply the cost of each accident to that?

R. STRATTON: Perhaps I didn't make myself clear, for in speaking of the incidental cost of accidents I meant the incidental cost to the concerns as compared with medical, the cost in loss of production, loss of time in taking him to first-aid station, the time lost by other employees in running to the scene of the accident and talking about it afterwards. Accumulating those facts together gives us the total cost to the manufacturer, of the accident.

CHAIRMAN SUTTON: That brochure you spoke of was gotten out by your company, was it not? How can we as individuals obtain copies of it?

R. STRATTON: Anyone is privileged to write our home office, the engineering department, and it will be glad to furnish any number of them.

RANK SMOKE (Kellogg Co., Battle Creek, Mich.): Referring to Mr. Stratton's remarks about his experience in Battle Creek, I should like to add that the Kellogg Company as a whole has had a lot of experience with Mr. Stratton. Years ago he worked on us monthly and I want to say he is very capable.

T. EGGERT (National Biscuit Co., New York City): You say the ratio runs at four times the expense for compensation; but I suppose, however, that that is determined chiefly by the state in which the accident occurs because the rate for compensation varies and also according to the amount of remuneration received—trained mechanics, for instance, receive more per hour than unskilled labor. Under these circumstances don't you think it is rather difficult to arrive at an average for all injuries?

The Incidental Cost Four to One

R. STRATTON: In making our study of this, we took into consideration all of the factors by which the cost would be affected and averaged them, and that average is four or more, so it really matters little what states are concerned, whether the state has a compulsory code—such as Ohio and six other states—or not, whether the minimum and maximum limit. It makes no difference whether it is a high wage earner or a low wage earner, because it is an incidental cost; in other words, a highly paid man is connected with or in a group with other highly paid men, and the comparison is made with his associates. Perhaps in that case we have proved the ratio quite low in estimate, but the original study of some 15,000 accidents led us to the ratio of four or more with no classification.

CHAIRMAN SUTTON: I want to say that you will find that brochure not only of great interest, but of value in selling safety to the higher-ups.

J. STROBEL (Wagner-Taylor Co., Philadelphia, Pa.): I submitted a question a short time ago to the Travelers on a proposition that came up in regard to the manufacturing costs of accidents—why not charge it up to the injured or to the foreman? The reply came back that that would be a poor policy, but I understand it was put through.

MR. ALGER: I should like to know how some of you go about the inspection of elevators.

MR. EGGERT: We have all our elevators inspected by the Otis Elevator Company, and in addition we have our own inspections.

MR. ALGER: Just what kind of a test do they make?

MR. EGGERT: They thoroughly test everything, in general.

MR. ALGER: Does anyone else inspect that way?

MR. COLEMAN: We are doing the same as Mr. Eggert's company.

MR. ALGER: I am going to tell about an accident we had, for I am wondering whether your experience has been the same. We have had a very serious experience, we had an elevator fall, and it opened our eyes. Now we check up the inspector regardless of who it is.

MR. COLEMAN: That would be a pretty big job for us, with 100 plants. You would need a pretty good man who is technically trained.

MR. ALGER: He could spend a day at each plant.

MR. SMOKE: Regarding your checking, we have a system by which a regular safety inspector goes through the plants regularly, then the Otis Elevator people inspect them, and finally along comes our good friend, the Travelers, checking monthly, so we have a three-way check.

I wonder if you have in mind some careless tricks of employees between inspections. We have an elevator in our corn mill which gets rough usage and lots of it, and the men will get careless in making repairs on it so that in one case it went to the basement, but that was a case where repairs were made temporarily and there was no chance for an official inspection of it.

MR. ALGER: It requires two men from an hour and a half to two hours to properly inspect elevators.

MR. SMOKE: That is true. We also have a millwright in our department who is supposed to have charge of all the elevators, and that millwright goes around with the inspector, so with him, we really have four men to inspect our elevators.

MR. ALGER: Do they trip the safety dogs?

MR. SMOKE: Everything is tried out as to load capacity.

MR. STRATTON: I want to introduce myself in another capacity, as a member of the National Safety Council A. S. M. E. safety code committee on elevators, and I want to say that, frankly, you are treading on dangerous ground when you consider inspection of elevators from the layman's point of view, particularly in the inspection of safeties, unless you are positive you have in mind sound principles and rules of safeties and can trip them without serious injury to the safety cable; but I will guarantee right now they can't be taken out and put back in the proper condition unless it is done correctly.

I can take you to places where brand new installations have dropped out and where old type installations are still giving excellent service, and you wonder how the heck they are doing it; so you have to take a grain of salt perhaps along with it, and trust to the insurance inspector that he is doing his best with the equipment you have under your control.

At present we are conducting in Washington a test through the Bureau of Standards and the A. S. M. E. Committee that will probably prove a revelation in connection with the 210-story building to be constructed in New York for which we have to revise everything.

So what I want to bring home to you is that you have got to trust to men who are active in the elevator inspection game; they are doing their best, and no one can tell when cables will part, when mechanical defects will crop out before a later day inspection is made.

There are sad occurrences after inspection; I had one which concerned one of the men under my supervision. It was not my fault, and he did his duty, and neither of us could foretell that that thing would happen. If you make as careful an examination as you can, then you have to feel you have done your duty to that extent.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session was called to order at nine-thirty o'clock by the chairman, D. Sutton.

CHAIRMAN SUTTON: The first thing is the election of officers: I shall ask the man of the Nominating Committee, Mr. H. T. Eggert, National Biscuit Co., New York, to give his report.

Report of the Nominating Committee

Chairman. F. A. Haase, Corn Products Refining Company, Chicago, Ill.
Vice-Chairman. H. T. Eggert, National Biscuit Company, New York City.
Secretary and News-Letter Editor, W. P. Penty, Kellogg Company, Battle Creek, Mich.
Chairman Poster, Lantern Slide and Safety Kinks Committee, J. T. Doolin, Casualty Reciprocal Exchange, Kansas City, Mo.
Chairman Membership Committee, W. H. Cunningham, Pillsbury Flour Mills Company, Minneapolis, Minn.
Chairman Program Committee, Frank T. Coleman, Continental Bakeries, New York City.
Chairman Engineering and Publicity Committees, Thomas S. Strobhar, Wagner Electric Company, Philadelphia, Pa.
Chairman Statistics Committee, R. E. Prouty, Aetna Life Insurance Company, New York City.

CHAIRMAN SUTTON: You have heard the report of the Nominating Committee. What is your wish?

J. ALGER (Corn Products Refining Co., Chicago, Ill.): I move the nomination be closed.

(The motion was seconded and carried.)

CHAIRMAN SUTTON: I might add that the chairman of the Poster Committee, Doolin, is also to take on work in connection with posters, lantern slides, safety kinks, and so forth. You will hear more about that through the News Letter during the year. Furthermore, you can learn more about what is meant by safety kinks by consulting the Safety Exchange pages of the NATIONAL SAFETY NEWS.
FRANK SMOKE (Kellogg Co., Battle Creek, Mich.): Are we going to vote on this separately or collectively?

CHAIRMAN SUTTON: That will be determined later.

FRANK SMOKE: I want to say this in regard to Mr. Penty and the News Letter. Mr. Penty doesn't feel that he has time to carry on this work and therefore to the service we should put someone else in his place.

CHAIRMAN SUTTON: I talked with Mr. Penty and told him that if he didn't do his work effectively he would lose his job with the Kellogg Company. What shall we do, then, gentlemen, with the nominations?

It was moved and seconded and carried that the nominations be accepted as presented.

CHAIRMAN SUTTON: Although we are asked to follow as nearly as possible the printed program, this morning we have to deviate a little on account of the presence of Mr. Hubbel, who was to give us a paper on dust explosions. In place of that paper, I am going to take the liberty of putting the last speaker

on first so that we may have it to consider and discuss during the remainder of the morning which we shall devote to more or less informal discussion.

We shall hear now from Mr. Ralph C. Prouty, Aetna Life Insurance Company, New York City.

Statistics—An Aid to Accident Prevention

Ralph C. Prouty, Aetna Life Insurance Company, New York City

The value of accident statistics and records is potential rather than intrinsic. They are but a means to an end and not an end in themselves. They are worth while only when the preventionist carefully studies and analyzes them and applies the results in his efforts to promote safety. Then they become valuable working tools for the safety engineer and the time and expense involved in their compilation is justified.

Inasmuch as accident statistics are based upon accident records, it is thought advisable to consider the records necessary for accident prevention purposes. It is very easy, if one is not careful, to become so engrossed in building up an elaborate set of records, that sight is lost of the purpose for which the records are being prepared. The safety engineer should be constantly on his guard to avoid falling into this error, ever remembering that he must make practical deductions from his statistics and apply such remedial measures as the deductions suggest.

A careful survey should be made by every industrial concern to determine what records are needed for accident prevention purposes. When a system has been established, no additions should be made to it unless it can be shown that the additional data will enhance the value of the records and statistics as accident prevention aids. The records suggested represent the requirements of an average concern.

Foreman's Accident Report

The first report of an injury should originate with the immediate superior of the injured person and it should be prepared immediately after the occurrence of an accident and sent to the plant safety engineer or other person in active charge of the safety work. This report should serve a double purpose. It should give prompt notice to the proper person of the occurrence and bring out vividly the conditions responsible for the accident. Moreover, the requirement that each foreman submit a written report will have a salutary effect on the accident situation as no foreman will care to admit in writing that he has permitted unsafe conditions and practices to exist in his department.

It is believed that the following items should appear in the foreman's report:

1. Department.
2. Date of injury.
3. Time of injury.
4. Name of injured.
5. Duties of injured.
6. Extent of injured's experience.
7. Cause and nature of the accident.
8. Condition of machinery or equipment involved.
9. Where the injured was sent for treatment.
10. Foreman's recommendation for prevention of similar accidents.

When the foreman's report is received by the one in charge of the accident prevention work, its accuracy should be checked by an investigation and the data can then be utilized in preparing a permanent card record of the accident.

the card should provide spaces to show the following items in addition to those given on the foreman's report:

- A. Diagnosis of attending physician.
- B. Probable disability.
- C. Date injured returned to work.
- D. Description of any permanent disability.

It will be noted that several items have been suggested for the permanent record card which are of a medical nature. Undoubtedly, such information can be secured readily in most instances from the first aid room, as the nurse or first aid attendant will naturally keep a record of all injuries treated. No attempt will be made in this paper to specify what medical records should be kept. The requirements will be determined by local conditions such as the size of the plant, the nature of the first aid arrangements, whether the workmen's compensation is insured or carried by the employer and various other considerations. It should be remembered, however, that those primarily interested in accident prevention can often secure much helpful information from the first aid department and from the medical records.

Monthly Accident Analysis

Once each month the permanent card records should be subjected to a thorough study and analysis. This should be done, preferably, at the beginning of each calendar month so that the safety engineer will have the results at hand for the regular meeting of the general safety committee, which is customarily held during the first week of each month. A sheet should be prepared with a list of standard accident causes at the extreme left. The names or numbers of the departments of the plant should then be written horizontally across the top of the sheet. The record cards are now sorted by department and under each departmental heading the number of accidents from each cause is placed opposite the appropriate cause designation. By adding the figures horizontally, the total number of accidents from each cause will be secured. Adding the departmental columns will give the total number of accidents in each department.

Some concerns analyse only the tabulatable accidents, that is, those causing loss of time beyond the day, turn, or trick on which they occurred. Others choose to include in their analyses all accidents reported, on the theory that what caused a minor accident might have caused a more serious one. I should refer to make two separate analyses—one of the minor cases and one of the tabulatable accidents. A careful check of each and of one against the other should show the analyst pretty clearly what has transpired during the period under consideration. The value of the analysis sheet will be greatly increased if the amount of lost time in days is shown by causes and departments also.

If card records containing the information suggested are maintained, it will be possible to make special studies from time to time which will probably throw light on many accident prevention problems. For instance, one can easily determine by analysing the data the percentage of accidents that occur during each working hour of the day, the day or days of the week on which accidents occur with the greatest frequency, and the month of the year during which the accident toll is the heaviest. Studies along these lines have shown in some instances that accident peak was reached between 3 o'clock and 4 o'clock in the afternoon. The fatigue element was suspected of being responsible in a measure, at least, and the flattening out of the peak after the inauguration of rest periods apparently confirmed the correctness of the deductions. Again, such studies have shown that accidents occurred more frequently during periods when artificial lighting was necessary and have led

to improvements in illumination, which not only reduced accident frequency, but also contributed toward better production records.

Just how the results of the analyses should be presented to the official staff and to the rank and file is a problem for each safety man to solve. In any event, he should remember that he is essentially a salesman—selling safety. A good salesman, we are told, recognizes three distinct steps in the sales process. The first is securing attention; the second creating a desire for what he has to sell; the third, intensifying that desire to a point where the prospect is ready to act. What better material can you desire to assist you in selling safety to the management and men than the bulletins, charts, graphs, tables and reports you can prepare from the results of your accident analyses?

Accident Rates

Accident frequency and accident severity rates are the yardsticks used by safety engineers to measure the success or failure of their efforts. It does not do one much good to know that fewer accidents occurred or that less lost time was occasioned by accidents during a given period of time than during a like period of time in the past. Many factors such as temporary shut-downs, holidays, increases, or decreases in the working force, and overtime employment may be responsible for apparent changes in the trend of the accidents and lost time. In order to make fair comparisons, the number of accidents and the lost time must be related to an exposure factor. The best exposure factor generally available is the man-hour-exposure.

The statistical plan used by the National Safety Council contemplates accident frequency rates based on the number of tabulatable accidents per one millions hours worked and accident frequency rates based on the lost time in days per one thousand hours worked. For temporary disabilities, the actual days lost are used in the computation. The amount of time to be charged for a death or a permanent disability is determined by reference to a table printed on the back of the Council form. It has been said that the scale of time charges for deaths and permanent injuries is of doubtful value because complete actuarial justification for the amounts is lacking. A committee is now making a study of the subject and probably will have some helpful recommendations to make when its work is completed. In the meanwhile, it is earnestly suggested that members of the Food Section compute rates according to the present plan so as to be able to make periodical comparisons of their own records and to furnish the National Safety Council with comparable records to be utilized in figuring average rates for the entire Section.

The Section is to be congratulated on the showing it has made in submitting statistical data to the Council. The records of 63 plants representing 20,928 employees were available for the staff engineer in computing rates. The grand total and averages for entire Section for 1926 were as follows:

Average number of employees.....	20,928
Total hours worked.....	36,405,803
Deaths	4
Permanent disabilities	48
Temporary disabilities	1,279
Total accidents	1,331
Days lost—deaths	24,000
Days lost—permanent disabilities	36,337
Days lost—temporary disabilities	18,700
Total days lost	79,037
Frequency rate	23.
Severity rate	1.4

The 63 plants reporting were divided for analytical purposes into six groups. The designation and rates of the several groups are:

1. Confectionery manufacturing—			
Frequency rate	21.11	Severity rate	.32
2. Dairies and dairy products—			
Frequency rate	8.62	Severity rate	.85
3. Milling—			
Frequency rate	22.65	Severity rate	.27
4. Food products manufacturing—			
Frequency rate	20.56	Severity rate	2.48
5. Sugar manufacturing—			
Frequency rate	34.41	Severity rate	.81
6. Food miscellaneous—			
Frequency rate	20.83	Severity rate	2.61

Considering the Section as a whole, it shares with the Automotive Section the honor of having the fourth lowest frequency rate of the sixteen Sections as reported to the Council for 1926. The Cement, Chemical and Textile Sections were the only ones to develop better frequency rates. From the standpoint of accident severity, the Food Section ranked fifth among the sixteen reporting. The Automotive, Power Press, Textile and Rubber Sections had lower severity rates. Surely, this is a commendable record.

Deaths and Permanent Disabilities

A study of the grand total figures brings out some interesting facts. Of the total days lost from all causes 76.3 per cent were due to deaths and permanent disabilities. Deaths were responsible for 30.3 per cent of the lost time—permanent disabilities caused 46 per cent. The Sectional frequency rate may be considered favorable and the data seem to indicate that the present severity rate is at its present level, not because of a multiplicity of accidents involving normal time losses, but because a comparatively small percentage of all the accidents resulted fatally or caused permanent injuries.

All of this points to the desirability of focusing the attention of the Food Section members on their serious accidents. It is suggested that each permanent disability and fatal case be reviewed again by the concerns that experienced them and that careful checks be made to learn if their causes have been entirely eliminated. Possibly some of us have taken too seriously the oft repeated statement that not more than one-third of all industrial accidents are due to mechanical conditions. Perhaps we have depended too much on the educational side of accident prevention and have not given enough attention to mechanical safeguarding and engineering revision. A well balanced program includes a place for each of these phases of safety engineering and it is not difficult to believe that well organized accident prevention work of an educational nature, coupled with intensified efforts along engineering lines, will make it possible for the members of the Food Section to review with pride next year a record that is even better than the one just considered.

(Mr. F. A. Hasse, Corn Products Refining Co., Chicago, Ill., incoming Chairman, took the chair.).

CHAIRMAN HASSE: All of you have listened with interest to the paper just submitted regarding statistics as an aid to accident prevention, and perhaps some of you have a few points you would like to bring out.

FRANK T. COLEMAN (Continental Bakeries, New York City): I should like to ask Mr. Prouty why the insurance companies do not furnish data when you ask for it. I find that any time I try to put an extra burden on them, I run into

all sorts of objections on their part. It seems they are reluctant to give the information which they have in their files.

MR. PROUTY: The question is just a little from the point of the paper.

I want to make this clear, the severity rates and the frequency rates have nothing whatever to do with insurance. I am not familiar with insurance arrangements of the members of the Food Section, but I believe a good many of you are self-insured. The National Safety Council asks for us to arrange with all the members the basic data from which these rates can be figured, with the idea of enabling the members to cooperate with each other.

I presume most of you know this, that when those figures are sent through the National Safety Council, the source is not made known to anyone; no one knows where these permanent disabilities occurred except the National Safety Council staff.

To answer more directly your question (I can't speak for any other company but my own). I assure you my company would be glad to furnish you or anyone else who is a policy-holder a list of accidents, lost-time, man hours, etc.

Make the Records and Statistics Simple

VERN D. SUTTON (Postum Company, Inc., Battle Creek, Mich.): I should like especially to emphasize Mr. Prouty's assertion that records and statistics should be as simple as possible, just so far as they contribute as an accident prevention measure or enable you to do your accident prevention work.

Speaking of the reports to be made by foremen to the accident prevention department or safety engineer, he recommended that the foreman report among other things the condition of the machinery or the equipment involved, and that he recommend a means for prevention of similar accidents.

I should like to ask not only Mr. Prouty but other members what their experience has been when the foreman in charge of the equipment involved in the accident asserts that it is all right and upon investigation it is shown that it is not—that is, have you found any tendency on his part to lie to protect his reputation or to keep his job or for any other reason?

CHAIRMAN HASSE: From the Corn Products Company's standpoint, as soon as an accident happens in our plant, we see that the injured man is taken to the first-aid room and given proper attention; then the foreman investigates just how the accident occurred, and just as soon as his report comes in it is checked up and we soon find out if the foreman is telling the truth. So far, I do not recall where the foreman ever stated the machinery was guarded when it wasn't, or that it was in good condition when it wasn't. I think our equipment is guarded as well as it can be. Sometimes an inspection is made and we find things that we didn't know about; but when brought to our attention, we immediately take care of them.

MR. PROUTY: I happened to find in my file a couple of reports prepared by two different concerns, one a member of this section and the other a manufacturer of artificial leather. You might be interested in how those questions are phrased. One on machinery accidents was, "Was machine properly guarded? Were guards in use at the time of the accident?" Then in small letters, "Answer yes or no. If questions 13 or 14 are answered 'No,' describe fully at the bottom. What recommendation can you make to prevent similar accidents?" There is a space for the name of the machine on which accident occurred.

"Was the accident preventable; if so, what caused it?"

Try to get the information from the foreman, have him tell all he knows for after all he is the key man in your plant.

CHAIRMAN HASSE: As your program will show, and as Mr. Sutton already announced, we have deviated because I am sorry to state Mr. Hubbel will not

able to be with us. We have decided to allow an open discussion on matters relating to the problem of preventing dust explosions.

To begin it, I am going to take the liberty of calling on Mr. Alger, of the Corn Products Company, who has been associated with Mr. Price in the Bureau of Agriculture in Washington on the Committee to Prevent Dust Explosions.

C. J. ALGER (Corn Products Refining Company, Chicago, Ill.): I haven't a whole lot to say, but to begin with, being well acquainted with Mr. Hubbel, I want to say that we have a real loss in not having him with us this morning. There is no doubt that his experience and ability in handling and attacking this problem is about as great as any that I know outside of that of Mr. Price's in Washington.

In our industry about three years ago we experienced a decided catastrophe. It was a dust explosion, but the cause is not definitely known. After that trouble in Pekin, we started shaking ourselves up in order to enforce a new standard of housekeeping conditions, the first problem to be attacked being to make things dust-tight.

We were behind the procession at that time, but our engineering department started out to do the job and without any definite data to guide them as to friction losses and that sort of thing, they accomplished considerable. Then after we made our equipment dust-tight, and established a new standard of housekeeping conditions, it was a question of seeing everything was properly enforced. Fortunately our company has always enjoyed the greatest cooperation with insurance carriers, and so we have not only our own inspectors, but the inspectors of the insurance carriers call any time of day or night, to see that housekeeping rules are enforced. Of course, the cleaning and sweeping costs have amounted to considerable.

Circumstances of a Near Accident

We had a flash at Argo about a year ago. That morning we had a breakdown, and one of our representatives found conditions pretty dusty. He didn't waste any time, but went right to the foreman and saw that he cleaned up.

The flash was caused by a trunnion roll dropping out of place, permitting a drum revolving very slowly to heat up by friction, but the workmen escaped. The overhead transmission was thoroughly cleaned; there was some dust, but there wasn't sufficient dust so that the flame propagated to the floor. It started around the ceiling, and the force of it was enough to force outward steel constructed windows five or ten inches. It caused little damage, but nevertheless it proved that the enforcement of good housekeeping conditions is a necessity. Occasionally we may have little flashes here and there, but the extent of their damage is limited.

I don't want to take up a lot of your time, for I know you have had experiences of this kind. We came here to get information about what the other fellow is doing, and I should be glad to answer any questions you might care to ask me.

CHAIRMAN HASSE: So long as Mr. Alger has indicated his willingness to answer questions, I suggest you ask him some.

Many of you handle grain from which we all know dust originates and causes a hazard, so kindly proceed to ask him questions.

W. H. SEWARD (National Carbon Co., Inc., Cleveland, Ohio): Have you ever had any experience with fire starting from dust accumulated on electric light bulbs?

MR. ALGER: We have not, but that could happen, at least so I have been told. We use a vapor-proof globe, a double globe, and have had no trouble.

Getting into the cause of dust explosions, you have a discussion there that will last a hundred years. It can be attacked from almost any angle, but people are correcting the condition today; they have their shoulders to the wheel, and

next week at Boston tests will be made of dust, starch dust and aluminum dust particularly.

C. J. STROBEL (Wagner-Taylor Co., Philadelphia, Pa.): Do you use a vacuum system?

MR. ALGER: In our sweeping and cleaning, we have at times used a vacuum system which I believe in time will be made efficient, although you must admit that a man climbing up a ladder, with a lot of hose, to sweep the ceiling beams, is a difficult task. We use lamb's wool brushes, anything that will get the dust.

MR. STROBEL: I might say the structural members of the buildings sometimes deflect 60 or 75 degrees.

MR. ALGER: Yes, and we have sometimes gone to the extent of filling in all I-beams and making them flush, and our newly designed windows at Pekin have no sills.

FRANK SMOKE (Kellogg Company, Battle Creek, Mich.): At your unloading docks where you unload your cars, what arrangement have you for dust collection, with reference to the health of your men?

Respirators Used in Unloading Corn

MR. ALGER: In unloading corn, we furnish the men with respirators, and we have had no great trouble. The respirators are wetted down before they are used. As you know, kiln-dried corn gives off a lot of dust, so of course, you have a dust hazard where that is being unloaded.

In the plant at Argo, we are finishing a very extensive dust-collecting system; it has been in operation only ten days, but we can already see an improvement.

MR. SMOKE: No oscillating fans to catch your dust and carry it away from your car doors?

MR. ALGER: By all means; we have a duct system over the belt which carries the dust off by suction.

MR. SMOKE: Does it carry the dust off above level, above ground?

MR. ALGER: As we unload, it goes through a steel grating. Of course, with the wind blowing, that is difficult in an outside operation; but as soon as we can we get it down underneath we start picking up the dust.

MR. SMOKE: We have that same arrangement in our new grain elevator tanks. We have over the track under the grain shed, something to take care of that dust, for sometimes we can't see a man for it.

MR. ALGER: Underneath. We don't allow any locomotives to go over that corn; now and then they will drop a spark or two. We have gone after the railroads and we always have received their full cooperation. They put something under the boiler to prevent this escape of hot cinders.

Starch dust would probably ignite at a temperature of 1,200 degrees Fahrenheit.

CHAIRMAN HASSE: I might mention that the locomotives when switching are all equipped with what we call a screen, over the smoke stack; it catches any sparks, and underneath the furnace we have an additional pan which is to catch all hot coals falling from the boiler.

I see we have with us several insurance men who no doubt go through some of these plants, especially where there is a dust hazard, and we should be glad to hear from them.

H. L. BURRILL (Maryland Casualty Co., St. Louis, Mo.): I make the surveys at the Corn Products Company's plant at Pekin, and I will say that that firm is doing all it possibly can to keep down the dust. It looks to me as though the secret of the whole thing is: no dust, no hazard.

I have another plant where we make surveys. They have called upon the safety department to make a weekly test of every single belt in the dust area. This includes not only starch but grain, and a report has to be sent in showing

what is the status of the humidity in that building on every single belt. I keep in that way a very close check on things, and copies are sent in to insurance company, and the inspector goes with the man who makes the test; even though that man has made a test but three or four days before, the insurance inspector has the equipment to make a test of his own.

Do you see a very rigid test and check is kept on everything, so I don't believe there is a possible chance of sparks from smoke stacks causing damage.

W. CHAPIN (Chapin & Company, Chicago, Ill.): We have a feed plant at Almond, and use an explosion valve. We have something like the hotel doors are used in winter, so at no time is there a continuous movement, and that if a tank starts an explosion it won't follow through. That runs vertical instead of horizontal, like a hotel door.

We grind a lot of cotton seed cake which contains a lot of metal; so we run through magnets, but even then a lot of the stuff gets through.

Besides that, we erected a special building for grinding, with corrugated iron sides, we have dust drawn off into a cyclone. Since we have taken those precautions, no accidents have occurred.

MR. ALGER: I should like to ask how many wings there are on those valves?

MR. CHAPIN: Four

MR. ALGER: I wouldn't place too much value on those. We have used the butterfly valves and have had flashes through them.

MR. CHAPIN: I will add to that we don't run a continuous conveyor, only about 30 or 40 feet, and then drop it into a tank, so it doesn't run all the way across; if the conveyor is outside, it is covered.

Experiments on the Value of Explosion Dampers

I. L. BURRILL (Maryland Casualty Co., St. Louis, Mo.): What do you think the value of explosion dampers on elevators, extending through the elevators to the roof, with the dampers so arranged that the explosion will take the line of least resistance?

MR. ALGER: We have been trying to run such an experiment. Opinions are divided on that, however. A damper might offer some relief, but the dust committee is divided as to its value. There might be enough force and violence to tear the elevator to pieces before it went through the vent. There have been cases where vents to the outside where just a piece of paper over the vent was not damaged in an explosion when everything else was torn to pieces.

CHAIRMAN HASSE: This topic is of much interest. In looking over the registration cards, I notice there are several men representing the flour industry. As we have heard several times, the flour industry is well up in the prevention of dust explosions by various means and methods. I am sure, then, we should like to hear from the gentlemen.

Do you have anything to say about it, Mr. Cunningham?

W. H. CUNNINGHAM (Pillsbury Flour Mills Co., Minneapolis, Minn.): I really don't think I have a thing to offer, but I should like to ask if you have had any experience where your corn is heated, giving off carbon dioxide?

MR. ALGER: We have had corn heat, but not to the extent of really firing. It will do that once in a while.

MR. CHAPIN: It is very dangerous to go into bins where there is a high moisture content. We have rigid instructions not to go alone without a life belt and a man above.

MR. ALGER: Two men are the thing to have; tie a rope around one with some one above.

CHAIRMAN HASSE: At our Edgewater plant when it was shut down for a period of months, some of our men went into a tank, an open steep water tank which

was partially filled with water and had been standing there for months. They wanted to drain this water out, and one of the foremen went in there and tried to take out a plug and was overcome by an existing gas. The other foreman pulled him out immediately, fortunately, and then that foreman who rescued the first one tried to pull out the plug and was also overcome. When we received the reports we took it up with our laboratory. We had used chlorinated lime, which has some effect on steep water, and we thought it might be that which caused it; but it was found that the gas was due to the stagnant water in the tank. When the men went in there they stirred up the gas which, being heavier than air, overcame them.

That is the first experience we had, and we issued warnings that no men are to go into any tank unless another man is with him, so that if he is overcome the other man can help him out. The same rule applies to our men who go into feed hoppers, and so forth.

ALEXANDER DIENST (National Sugar Refining Company of New Jersey, Long Island City, N. Y.): In your experience; are dust explosions always caused by a spark, or sometimes spontaneously?

MR. ALGER: I have never heard of a dust explosion being caused by spontaneous combustion.

The Department of Agriculture is checking up on spontaneous combustion, but at present no one seems to know whether it is a germ, some chemical action or what. I was told a short time ago the farm fires throughout the country are caused in this way and that the fires occur more often in cow barns than in places where horses are kept.

Dust Hazards in the Handling of Coal

H. P. REID (Universal Portland Cement Co., Chicago, Ill.): We are interested in this dust hazard from the standpoint of pulverized coal and coal dust. Answering the question of the gentleman here, it has been our experience where we have pulverized coal and the coal has gone off and the dust collected in a vent, that with moisture present at a certain temperature the dust will collect on the duct walls, due to the condensation in your vent. This dust, after it has once been dried and then re-moistened is extremely dangerous from the standpoint of spontaneous combustion.

We can take our coal and dry it to four per cent moisture, let it lay, take the same coal and dry it to zero moisture; but take that coal and let it collect on the inside of a hopper, or on the shell of the ducts where condensation has taken place, and you have moisture, and it is hazardous; it is sometimes so moist that you could wring it out by hand, and if a little of that coal is put on the floor, it is glowing. When a collection of coal dust has come to a glow, if a little breeze strikes it, it will burst into flame.

The question I wished to ask was whether any of you have had any experience with an explosive mixture; we can get a mixture too rich to explode and too lean to propagate. Have you had in your experience where you first started with a dusty condition and collected 85 per cent of the dust and then left 15 per cent of it, a greater hazard than if you had left too rich a mix?

MR. ALGER: There is a whole lot to that. Every time you shut down your machine you have a dust explosion hazard, confined to the equipment under cover; but back that up with good housekeeping and if you do have a flash in your room it won't amount to anything.

If you have an explosion it will go through the ducts and tear them to pieces, but if your room is dust-free, there is no fuel.

There is something to what you say in regard to the explosive mixture. I understand eight ounces of starch dust per thousand feet of air is an explosive

ure, and—I can't speak with authority—maybe three times that amount you ignite at all.

ost of our explosions have occurred during shutdowns, when the men were to lunch. The fire at Pekin occurred right after the lunch period when equipment was not carrying a load. Don't operate your equipment, if you help it, without carrying a full load; running the conveyors and bucket ator empty is extremely dangerous, because you have an ideal condition there an explosion.

ESTER S. JOHNSON (Quaker Oats Co., Cedar Rapids, Iowa): What is your ion of this method of experimenting with the use of inert gases to prevent explosions?

R. ALGER: I think it is the coming thing. As to whether this gas has any : on food products is something else. We are studying it some; a few concerns : tried it, and I understand it works fine in pulverizing sulphur, for there is trouble at all. Of course, an important thing in such an operation is to be you are maintaining a proper oxygen content.

think this is to be demonstrated in the tests at Boston next week, and I under- d the Quaker Oats people are putting equipment of this kind in their plant Cedar Rapids.

The Massachusetts Mutual Conducting Tests

MR. JOHNSON: That of course is in an experimental stage. The Massachusetts tual is conducting tests of these explosions. Mr. Hoxie was at our plant for a siderable time. In their experiments with explosions chambers outside of Boston, r found they could absolutely prevent any explosion by the introduction of inary flue gas. Their experiments showed also that the perecentage of this in air need not be to the extent of inconveniencing any of the men.

his gentleman suggested a damper to prevent the carrying of the explosion ig. We equipped all of our elevator heads with dust preventive, percussion heads. They operate by percussion and are absolutely foolproof. When the ussion reaches that chamber it turns the quartz.

at Cedar Rapids we have just started a big grain house and we believe that it has very finest equipment to take care of this dust disposal and dust explosion ard there is. The windows are of the explosion type; for an explosion at ntreal in a big elevator there, it was shown that the section of the factory ipped with ordinary window lights and regular sashes was damaged a great l and the fire damage was quite bad; on the other hand, the newer installations, ipped with explosion-proof windows, were undamaged for the windows simply ned with the percussion, and it was found that while the fire had its origin that section, the windows opened and let the explosion go outside. Even the inary window glass withstood considerable of a horizontal thrust.

ERN D. SUTTON (Postum Co., Battle Creek, Mich.): I wonder what the policy he safety engineers present is in regard to securing good housekeeping conditions the dusty departments. Do you simply have an order that they must keep departments clean or do you attempt to impress on the men the importance doing so for their own protection?

MR. ALGER: After the flash occurred at the Pekin plant, we came back to Argo l showed moving pictures of it. They said we were crazy, that we would ghten the men to death, but there is convincing evidence that we were right. e don't have any trouble with our foremen, although occasionally one comes ck with a statement that he doesn't have enough help. We impress them that an housekeeping must prevail, and there is no limit to it. The foreman is held ictly responsible.

CHAIRMAN HASSE: There is another thing, gentlemen, that I should like to add, and that is that sometimes you will find that a workman who is delegated the task of sweeping down the overhead will miss places, and we have had to discharge men for that reason and get men that we have trained so that they do sweep down all beams and overhead equipment so they will be clean.

There is an inspection made regularly to see that the overhead is kept clean; the foreman should take that responsibility and see that his men are trained properly in cleaning.

A. J. T. BROWN (Union Carbide Company, Sault Ste. Marie, Mich.): We are active in pulverizing coal, but the gentlemen here from the cement company said something in regard to the moisture coming back into coal after it was once dried. We have a practice of wetting down our floors. You couldn't do that, though, in a starch factory. I am wondering if you have had any trouble from wetting down, mixtures getting back into your ventilating flues.

Perhaps I should have asked what is the advantage or disadvantage resultant from wetting down, we will say, pulverized coal? Perhaps you have had some experience that will enable you to answer.

Essential to Keep the Housing Tight

H. P. REID (Universal Portland Cement Co., Chicago, Ill.): I believe that wetting down is only adding to your trouble in housekeeping. I think we can eliminate this hazard considerably by keeping the housings tight so that the dust doesn't get out.

In the first place, I am a great adherent to the rule not to make dust rather than to clean it up; but of course on certain conveyances and machines I don't think we can stop it. I don't think we can get spontaneous combustion from wetting down that way, but it could apply to other dusts beside coal. The fine particles of dust separating as they are and getting into the vents become impregnated in such a way that they have a chemical action and you get an evolution due to gases more than from moisture, which is extremely dangerous to that vent.

The trouble we have in the collecting of dust from our housings, machines, elevators, conveyors, and so forth, is that the moisture content in this material has pulverized and the further condensation of moisture due to the heat condenses on the ducts, which seems to have developed a condition that is extremely sensitive to spontaneous combustion.

We have overcome that by buying heavy vents for the collectors. We find heavy insulations necessary to protect against condensation.

Answering directly, I don't think you can get anything worse by wetting down except a muddy condition.

FRANK T. COLEMAN (Continental Bakeries, New York City): I started a discussion on two different propositions in this section here, the Fleet and the Food Section conflict, and I wanted to say that I have just been upstairs at the Taxicab and Fleet session and asked for cooperation in the matter of arranging a program to take care of our common problems.

Another thing. I should like to ask if any one has had much experience with foreign substances in the safety field. We have some trouble that way, and I shall never feel I have done my work successfully until I eliminate any chance of contamination of our product by foreign substances. I thought it might be interesting to see how many here would be interested in that problem of foreign substances to the extent of guarding open electric light bulbs, watching our nails, splinters, and so forth, and watching our outside containers. I know one of our flour companies sent us some whole wheat flour not long ago, and we found two big pieces of steel in it. If that had gone through it would have wrecked the

ler, an expensive proposition, and if it had gone through into the bread and found by a consumer, it would have meant a lawsuit perhaps.

should like to know what you people are doing in connection with guarding against the entrance of foreign substances. In the East, it seems to be right at the peak, especially where we have many newly graduated lawyers with nothing to do but file claims, a lot of them alleged, a lot of them real. It is a serious position. Maybe you fellows out in the West don't get the claims and are so much interested, but you fellows who distribute in the East should consider it.

Do you think it would be advisable for us next year to have a session on this subject?

BANK SMOKE (Kellogg Company, Battle Creek, Mich.): That is getting to be a strictly a manufacturing proposition, which all manufacturers are fighting to get away from. We have had those things happen. One particular instance I recall of a girl who found a diamond ring in a package of corn flakes; she wrote to ask if we were giving one in each package. The inside of your factory should be kept in order.

Foreign Substances in the Foods

ALPH C. PROUTY (Aetna Life Insurance Co., New York City): A good many of these things that cause you to have damage also may cause you to have personal injury, and it would seem to be entirely proper for us to consider some of the ways of eliminating the introduction of foreign substances into food products, with thought in mind of saving human life.

J. ALGER (Corn Products Refining Co., Chicago, Ill.): I think it is a subject we can all well afford to spend considerable time upon. We sell corn syrup to the candy manufacturers, so we have to watch out.

CHAIRMAN HASSE: Mr. Coleman, that proposition you brought up was discussed last year's Congress, Mr. Strohbar delivering at that time a very fine paper that I am sure you would be interested in reading. The subject seems to warrant the permanent committee's consideration for our next Congress.

R. COLEMAN: I should like to get a list of members so we will know how many are actual members. It seems to me there is a small representation here; for instance, so far as I can see, there is no one here from our competing lines, and now the Purity is doing safety work. It seems to me that the Corn Products Refining Company have an extra large representation.

CHAIRMAN HASSE: You are right, Mr. Coleman. We were talking about that yesterday. We are going to try to get a 50 per cent representation next year.

R. ALGER: It seems to me you could pick out certain sections of the country, and delegate one individual to call upon the members or prospective members in each section. Have that delegate make a personal call, it wouldn't take over an hour or two, and then you will get these additional representations.

BERN D. SUTTON (Postum Co., Battle Creek, Mich.): This matter of attendance at this Congress was done almost exclusively through the News Letter, so far as I know. It doesn't seem to be sufficient. I wonder if it wouldn't be well to have an especially appointed committee to endeavor to work on it throughout the year, intensifying their efforts next fall as the Seventeenth Annual Congress approaches, to secure a larger delegation of the Food members.

The way to determine the number of members in the Food Section is to take all members of the National Safety Council engaged in a business pertaining to food, human consumption and classify them as members of the Food Section. It is the list you will receive on request from the N. S. C. headquarters. We distribute News Letter on that basis, and we urge representatives from that list to consider themselves members of our Section and to attend our sessions.

But I think we ought to urge everyone to help enlarge the attendance.

CHAIRMAN HASSE: I believe that committee would be a very good proposition, Mr. Sutton, and I believe it would be in order to have a motion to appoint such a committee.

FRANK SNOKE (Kellogg Company, Battle Creek, Mich.): I move we appoint such a committee.

(The motion was seconded and carried.)

CHAIRMAN HASSE: I take pleasure in appointing you, Mr. Sutton, as a member of that committee, and Mr. Eggert and Mr. Coleman.

MR. COLEMAN: I think you should have someone from the West; I am in New York.

CHAIRMAN HASSE: The appointment has already been made.

MR. FRANK T. COLEMAN: I think our members are widely scattered, from coast to coast; can't we get someone around Kansas City or in the Middle West?

H. T. EGGERT (National Biscuit Company, New York City): I suggest we further the idea of Mr. Alger's by having everyone here a member of this committee. Each person can call on two or three concerns requesting them to be represented at the next Congress, rather than have two or three persons attend to all of this. It is also better to call personally.

CHAIRMAN HASSE: There is not enough money to spend for travel.

MR. EGGERT: We could reach isolated places by mail.

MR. COLEMAN: Mr. Eggert is in the East, Mr. Sutton is in the Middle West; why couldn't you get someone from the Far West? Make each one a sort of regional head.

MR. SNOKE: Just like we are in a factory—we have to place the responsibility somewhere.

MR. EGGERT: That responsibility can be with the chairman.

CHAIRMAN HASSE: I am willing to accept that responsibility, and do my share.

MR. EGGERT: I suggest then that with Mr. Hasse it be a committee of four.

C. J. ALGER (Corn Products Refining Co., Chicago, Ill.): And give each man a list in his district.

MR. COLEMAN (Continental Bakeries, New York City): I make a motion that it be a sectional committee of five, and follow out Mr. Alger's idea, each man being given a list of members and non-members in his section with which to do his best to bring in more members and a bigger attendance next year, each one reporting to the Food Section their progress.

CHAIRMAN HASSE: In order that we may handle this proposition right, I am going to postpone the appointments at this time, until we get a list of members so we can get the proper representation. You will be advised later, if that meets with your approval.

ADJOURNMENT.

Thursday, September 29, 1927

**F. A. HASSE, Chairman,
Corn Products Refining Company, Chicago, Ill.**

The third session was called to order at nine-thirty o'clock by the chairman, F. A. Hasse.

AIRMAN HASSE: It looks as though we are going to have a very interesting evening. The first subject, I believe, we are all vitally interested in. No doubt one of the members of this section has the machinery hazard to contend with, whether or not we actually have it properly guarded we will be able to tell Mr. Rice gives us his viewpoint.

It gives me great pleasure to introduce Mr. Leslie M. Rice, district chief engineer, Liberty Mutual Insurance Company, Chicago, Illinois.

Machine Hazards in the Food Industry

**Mr. M. Rice, District Chief Engineer, Liberty Mutual Insurance Company,
Chicago, Ill.**

The growing and preparing of food and food products covers a wide and varied range of operations, nearly every phase of processing being done with some sort of machine-driven machinery.

The improving standards of living are making continuous demands upon our machine designers for equipment that will eliminate more labor and for processes that can be operated automatically. The first stage of this development often increases the hazards while the hazard decreases as we become more automatic.

In 1790, at the time of our first census, the work of several rural families was required to supply one townsman. At the present time seven rural families supply one person. In 1820 it required 60 hours of man labor to bring an acre of corn through the crop cycle. Today we carry the crop cycle through in five hours. Our Agricultural Department tells us that we are harvesting our wheat crop this year with some 80,000 or 90,000 less laborers than we did a few years ago. Some of our agricultural research experts have gone so far as to demonstrate that egg production can be increased with the aid of electricity, likewise they have shown us that yields can be multiplied with electric energy and so again increase our machine hazards. However, they have not commercialized it to such an extent that they are of our safety engineer much concern.

Obviously, as a Food Section, we are not directly concerned with the machine hazards arising out of the manufacture of mechanical equipment used in planting, raising, harvesting or processing food and food products or even equipment to manufacture food containers, although many food product plants manufacture their own containers.

Generally speaking we may split our raw food some six or seven ways, as follows: Grains, Meats, Dairy Products, Vegetables, Fruits and Nuts, Salt and Water.

After several years of experience our Workmen's Compensation Casualty Bureaus, according to product and processing operations, divided our food product manufactures into some 50 odd classifications and they have been able to go a step further to show us which of the food products plants have been and still are causing us the most accident concern for our human equipment.

The average cost of our losses, using Illinois figures for comparison, are the highest in the cereal division and lowest in the fruit and nut group, the latter being about 75 per cent of that of the cereal group. Practically all of the groups have farm machinery operation, some more than others, and because the losses are heavy in this operation the average loss cost is raised in the basic groups.

This talk was intended to pave the way for discussion on machine hazards and for your convenience the groups and the group classifications producing the greatest accident losses are given in their order. The most serious coming first.

Group Classifications in Relation to Accidents

Cereals

Cereals and cereal products are divided roughly into eighteen classifications. In their order we have:

- Cotton Seed Oil Mfg.
- Macaroni Mfg.
- Operation of Farm Machinery
- Corn Products Mfg., Glucose and Starch Mfg.
- Carbonic Acid Gas Mfg.
- Cotton Seed Oil Refining
- Milling Grains
- Grain Elevators
- Extracts Mfg.
- Alcohol Mfg.
- Malt Houses
- Baking Powder Mfg.
- Essential Oils
- Bakeries—Bread, Cake and Crackers
- Confectionery

Vegetables

- Eight groups.
- Operation of Farm Machinery
- Beet Sugar Mfg.
- Extracts
- Pickle Mfg.
- Alcohol Mfg.
- Sugar and Molasses
- Canneries

Meat and Meat Products

- Seven groups.
- Operation of Farm Machinery
- Butchering
- Fish Curing
- Cold Storage
- Packers
- Lard and Sausage Mfg.

Milk Products

- Seven groups.
- Operation of Farm Machinery
- Ice Cream Mfg.
- Cold Storage
- Creamery Operations and Milk Depots
- Milk Products
- Dairy Farms

's and Nuts

Nine groups.

Operation of Farm Machinery

Manufacturing of Fruit Juices

Canneries, Fruit Preserving and Fruit Evaporation

Oils

Cocoanut Shredding, Spice Mills, Coffee Grinding and Roasting

or Works Operation

we use the bakery as the basis for comparison, since bakeries are familiar to all of us, we find the accident losses in the manufacture of cotton seed oil are times as serious as those of the ordinary bakery. This is due chiefly to the fact the bakery usually has a better average class of employees; in addition, there has been greater safety revision on the mechanical equipment and perhaps a little of what Casualty Underwriters choose to call "sweetening," giving the advantage to the baker. At any rate, the oil refinery has plenty of room for improvement. The operation of farm machinery is some three and one-half times as hazardous as that of the bakery. In this instance we are up against a weakened supervision over the industry is seasonal and there are such widely scattered operations. With the advent of the more automatic machinery such as the combining of one machine to harvest, thresh and bag grain our hazard to that extent is lessened and the next step is to help further improve the equipment and further educate the operators.

Making Macaroni Also a Dangerous Process

Macaroni manufacturing does not look serious, but this industry contributes a considerable number of saw accidents and dough mixer cases; and to help make matters worse, we lose an occasional hand on the noodle machines. Only a short time ago a noodle machine operator lost a hand at the wrist when the dough held him long enough to trap him before he could get away.

In bakeries we always fear the hazards of the dough mixer because it is likely to produce the most serious injuries. Many dough mixer accidents are due to the lack of safety devices, while others are due to a shortage of what the "hard boiled" master calls "pep" to snap into form at the right time. A short time ago we had a case where a man had an arm broken between the elbow and shoulder on a dough mixer. This is an ordinary dough mixer five feet in length, three feet deep and about three feet wide, of the tilting type. Blades are staggered and pass within an inch of an inch of the sides and bottom of the shell. The shaft was geared to a pulley which in turn was driven by a belt from the line shaft. The movement was slow but positive. It appears that the man was short of dough and went over to the mixer for a new supply. The mixer man was filling the second tub and it was necessary to apply power to eject the dough and before applying power the operator had noticed that his customer had his hand on the upper edge of the mixer and he told this fellow to park his hand elsewhere, but after the second warning he applied the power and the blade caught the cotton glove which the fellow was wearing and pulled him into the mixer, breaking his arm before the operator could stop the machine. This simply indicates that "hard boiled" supervision is as necessary as good guards.

Another case somewhat similar so far as supervision goes was on an icing mixer used to grind oranges in a cake plant. The custom is to cut oranges in three or four pieces then to drop them in the machine which has a long built up throat to make it convenient to reach in; and finally to drop a special weight on the product and push it to the machine to grind the oranges. In this case the operator chose to use

his hands and when his fingers slipped it nipped off the tips of two fingers. Again we come back to supervision.

The nougat cutter in the candy factory is a common source of finger amputations just as it is on the meat slicers. The difficulty of cleaning the nougat cutter tempts the operator to remove the guard so that he can clean easier and oftener. He usually does this until he cuts off a finger, then the boss gets "hard boiled" and every one uses the guard until the boss' memory fades again.

A very considerable portion of our troubles in the bakery arise out of cleaning the machines while in motion. Where we have a "hard boiled" safety superintendent they seem to get along just as well on production and have very few cleaning accidents. Eventually we arrive at cleaning machines when quiet—why not before an accident?

Trouble With the Circular Saw

CHAIRMAN HASSE: Are there any questions you would like to ask? Undoubtedly, the machine hazard is quite extensive and perhaps some of the rest of you have something you would like to ask Mr. Rice.

FRANK T. COLEMAN (Continental Bakeries, New York City): I should like to mention some trouble I have with circular saws. We have to pass requirements of the board, but the Surety and others do not prescribe the kind that are of practical use for a plant carpenter, as in end-grooving he has to take the whole guard off. Just let him have one loop-hole and he will take the whole guard off. Then the inspector comes around and gives us no credit; we waste that money and do not protect the man after all. Do you know of a good device of this kind?

MR. RICE: I think the Surety has one that it has developed.

MR. COLEMAN: That is the one that follows the board around, isn't it? It doesn't pass the Rating Boards. We could save a lot of money if we could find a guard that would meet requirements.

MR. RICE: I am not so sure you can get a guard to fit an odd table.

MR. COLEMAN: Well, we don't want to make any new installations.

MR. RICE: The ordinary bakery doesn't use it enough to warrant it.

MR. COLEMAN: Does anyone else have any ideas? How about you, Mr. Sutton? Don't you have saws in your plant?

VERN D. SUTTON (Postum Co., Battle Creek, Michigan): We have saws, yes, but we haven't solved your problem. We have guards and they take them off and hang them up, just the same as they do in the other plants.

FRANK SMOKE (Kellogg Company, Battle Creek, Mich.): Did you ever try to hang a man for three days for the first offense and then lay him off entirely for the second offense?

MR. COLEMAN: I would have a tough job to sell that idea, for I have about 100 managers to deal with.

MR. SMOKE: Well then, you will have to sell your 100 men.

Sell the Men Thoroughly on the Idea

MR. RICE: It usually resolves itself back to the matter of selling your men; if they know they must use it, they will use it.

MR. COLEMAN: But I think it would be better to put on a guard that they would have to use.

CHAIRMAN HASSE: We will pass on to the next subject, "The Value of Physical Examinations in the Food Industry," by Dr. A. C. Selmon, Kellogg Co., Battle Creek, Michigan. Dr. Selmon has had considerable experience in this respect, having been associated in the food industry for a number of years and no doubt his paper will give us valuable information.

The Value of Physical Examinations in the Food Industries

L. Selmon, M. D., Medical Director, Kellogg Company, Battle Creek, Mich.

Manufacturing industries are in the grip of such keen competition that bringing down production costs is an ever present problem. An increasing amount of attention is being given to the elimination of waste. The inventive genius of the best minds is constantly making improvements in machinery manufacturing processes. The result is that the efficiency of the mechanical side of the industries is far ahead of that of the "human machines," the power side.

It would seem to be the logical thing, therefore, that more attention be given to the quality and upkeep of the "human machine." The average manufacturing plant in a year expends for wages a sum nearly equivalent to one-third of the total invested in buildings, machinery and equipment; in other words, in three and one-third years the wages paid are equal to the value of the entire plant. The human machinery therefore represents the largest part of the business, and it should have care and oversight somewhat in proportion to the value of the investment.

Well made, well adjusted, well cared for machinery does good work over a long period of time. This applies as well to the human body as to an electric motor or an automobile.

Physical examinations when properly done should be and are of great value to both employer and employee. Most employers today are keenly interested in everything that concerns the welfare of their employees, and are not sparing their efforts to make working conditions as healthful as possible.

Men are hired to do certain kinds of work, and to do that work properly requires that they possess certain physical abilities. It is much better to find out by a physical examination at the time an employee is taken on whether or not he is physically fitted for the job, than to take the first applicant that comes along and run the risk of getting some one who may have defective sight, an inguinal hernia, or pulmonary tuberculosis.

Much Responsibility Rests Upon the Employer

Under the present regime of the state compensation laws a large measure of responsibility is laid upon the employer for the welfare of those in his employ. Analysis of the commonest industrial accidents reveals the fact that a large percentage, both of those who met with accidents and of those who are off for protracted periods of sickness, were workers who already had some physical impairment. The plant whose employees are in A-1 condition physically and mentally will easily lead all others in low accident and low sickness records.

Physical examinations make possible the placement of workers in the jobs in which they are best fitted; whereas without the physical examination it is more or less a matter of cut and try. When it comes to transferring a man from one kind of work to another his physical examination record will show whether this can be successfully done or not.

Physical examinations will keep the physically unfit and those with contagious diseases out of the plant. In the food industries this is a matter of greater importance than it is in most other industries. An applicant for employment may seem to the employment manager to be a good specimen, yet he may have one or more of the following impairments:

He may have a mouth full of pyorrhea. He may be a typhoid carrier; or

a diphtheria carrier; or have syphilis or gonorrhea. He may have itch or some other loathsome skin disease. He may have a mild grade of pulmonary tuberculosis. He may be an epileptic, or have severe anemia. He may have a severe grade of flat feet, or have varicose veins with large varicose ulcers, or have a large hernia (rupture). He may have defective vision that cannot be corrected by glasses. He may have a flail joint (the result of a broken arm bone that failed to unite.) He may have a leaky heart, hard arteries, or high blood pressure, or a toxic goitre. This list is taken from the experience of a large food manufacturing company and represents the various conditions found by physical examination and for which applicants were rejected.

Physical examinations bring to light a large number of physical defects in the ordinary factory worker. Fortunately many of these are remediable, and some are of a nature that is not necessarily disabling, but calls for instructions to the employment department as to certain kinds of work and certain environments that should be avoided.

Taking the applicants as they come, it is found that only five to eight per cent are rejected on account of physical disabilities. This is really a very small number, and the fact that so few must be rejected speaks very highly for the good working conditions that exist in most of our up to date manufacturing plants. It means that a considerable number of physically handicapped are able to make good in the plant that is equipped with effective, well guarded machinery, and is well lighted, heated and ventilated.

Physical Examination for the New Employee

Preliminary physical examinations are a part of the program in so many of the industrial concerns throughout the country that it is coming to be looked upon as a matter of course. The examiner must have consideration for the feelings of the one he is examining. The examination must be done with sufficient thoroughness to command the man's respect. Those conditions revealed by the examination which require attention should be reported to the applicant. If the man is employed, he should be given the benefit of a recheck from time to time. By following some such procedure as this the physical examinations given by the physicians connected with the industries will have for the employee all the value of the periodic health examination. Now that the life insurance companies are beginning to show the results actually attributable to the periodic health examinations in the way of decreased sickness and lengthened life, we have further weighty evidence of the value of the physical examination in the industries.

CHAIRMAN HASSE: This subject is of great importance to those in the food industry, so I know we shall have some discussion on it.

J. R. CLAIR (Liberty Mutual Life Insurance Co., Boston, Mass.): I should like to ask the Doctor, in the case of a disease carrier working on raw batches of material, is it true that the baking process will neutralize the ordinary disease germs that may be contained in these raw batches?

DR. SELMON: In the case of a typhoid carrier that would be true; the germs are carried through to the excreta and if he gets some on his hands and then handles things without having first sterilized his hands, that can happen.

MR. CLAIR: Is it true that the baking process will destroy germs?

DR. SELMON: Yes.

MR. CLAIR: Really, then, in processes that are baked, the first danger would be from those who handled them after they are baked.

FRANK T. COLEMAN (Continental Bakeries, New York City): I should like to ask the Doctor if there is legislation country-wide toward forcing the food manufacturers

require a physical examination of food employees by someone outside of the local authorities?

R. SELMON: Not to my knowledge, but there may be some.

R. COLEMAN: Do you advise that employees get physical examination at their expense and furnish a certificate before they actually begin work?

R. SELMON: I don't know that I do. I think most of the manufacturing industry give a physical examination as an expense to the company.

R. COLEMAN: That is quite an expensive proposition, isn't it?

R. SELMON: Yes, it costs several dollars for each individual, if it is done right.

R. COLEMAN: We have so much floating labor that I shouldn't think it would be worth while to spend the money.

R. SELMON: That is where preliminary examinations work in, where you just hit high points, where you catch the gross defects; for permanent employees the examination is much more thorough.

R. COLEMAN: Either kind would require a medical man.

Discussion of the Preliminary Examination

R. SELMON: The first is cheaper because of the small amount of time involved; sometimes it takes about ten minutes.

R. COLEMAN: Why not have our employees do that?

R. SELMON: Could you depend on it?

T. EGGERT (National Biscuit Co., New York City): I should say you couldn't have doctors in New York who give a health card for twenty-five cents.

R. COLEMAN: You could specify your own doctor.

R. EGGERT: In my opinion it would be improper to tell a man where to be examined unless you paid the physician's fee.

R. SUTTON: Isn't the purpose of this preliminary examination, or elimination examination, to determine whether you wish to employ the applicant, and couldn't this examination then be made by a registered nurse who has been trained especially for that?

R. SELMON: I don't think so, Mr. Sutton; to make an examination of value, the examiner must have enough knowledge to see things quickly, size the man up by his physical appearance, tell something about him, whether he has heart disease, a color suggesting anemia or tuberculosis; he must listen intelligently to his heart, to his lungs, and no nurse is trained to hear or to interpret what she hears by the stethoscope over the heart.

R. SUTTON: The reason I asked that question is because I know of a concern (now following the practice, but it did at one time), which had certain questions were asked by the employment manager, questions of a physical nature. They also, to some extent a physical examination to determine conditions like hernia; he passed these examinations he was then subjected to a more thorough one. This employment manager happened to be one whose tendency ran to first aid, and perhaps was more qualified than the ordinary layman, but not a registered nurse.

R. SELMON: I should think it would be hardly practical.

P. WARREN (Minute Tapioca Co., Inc., Orange, Mass.): Suppose you have a man, Dr. Selmon, who is not physically unfit and yet not particularly strong, who might be all right for a fairly light job. Do you hire such a man? Or do you insist he be absolutely o. k.?

R. SELMON: No, I tried to bring that out in the paper.

R. WARREN: I judged so. Supposing you changed that man, or the foreman or superintendent, whoever it is, changed him, to some other job. Do you get a notion of that before the man is changed?

R. SELMON: Yes, that comes around to us. If there is any question on the part of

the employment men, they come to us and look up his history to determine whether he can undertake that work.

MR. WARREN: Are they in a position to determine? Aren't there conditions where, due to an impending layoff, for instance, a man might request that he be transferred because he doesn't want to get laid off? And perhaps the job to which he is being transferred is more than he can handle, but he takes the job.

The point is whether or not that is referred to the medical man before the change is made. How much of the medical statistics are used all of the time in changing men from one job to another? Do you actually use these statistics or are they gathered merely to protect yourself from taking in a man who may have a communicable disease or be ill fit for the work?

DR. SELMON: In our case, the employment manager is informed that he won't be fit for some kinds of work; he knows that the man can do light work, but not heavy work, no strenuous stooping over or anything like that.

J. R. CLAIR (Liberty Mutual Life Insurance Co., Boston, Mass.): I should like to know what your experience has been in the setting up of a system of physical examination in a plant. It is evident it would be a more or less bad procedure for moral purposes to immediately lay off or discharge someone who might be an old employee and yet whom you find to be physically unfit. What has been your experience in setting up a physical examination system in a plant, where no system of that kind has previously been used?

DR. SELMON: I don't believe it can be made compulsory. It would take time.

The Problem of the Old Employee

MR. CLAIR: What would be the procedure supposing your employees were old? Supposing out of a group of 200 you find a half dozen old employees who are evidently unfit for the job they are working on, what do you do with them?

FRANK SMOKE (Kellogg Co., Battle Creek, Mich.): The committee of five passes on them to try to find out what sort of position they can handle. This gives a good check on it, the employment manager's and the doctor's and that of the committee of five.

DR. SELMON: In the instituting of the new employees' examinations we have no trouble; we can require every last one of them to be examined, and the old employees are sold the idea just as fast as possible. But you must go easy on the compulsory part.

FRANK T. COLEMAN (Continental Bakeries, New York City): Is it practical to set an age limit, say sixty?

DR. SELMON: I don't think so; the pension system hasn't been very successful, but I couldn't make a statement on that.

MR. COLEMAN: In reviewing our accident record this year, I find that a number of our serious accidents have happened to men over sixty years of age. I'm getting hard boiled about it, and I'd like to get rid of them. Fortunately, however, my company has a heart, and wishes to take care of these men in view of the fact that at the present time, we have no pension system.

DR. SELMON: There is the difficulty, for one man is old at 40 and another not until 60, depending on the way they have lived. That is the reason for this physical examination. A man may be old in years and not in body. It is very difficult.

M. E. HOUSER (B/G Sandwich Shops, Chicago, Ill.): Referring to the remarks by Mr. Coleman regarding the applicants paying for the examinations, themselves: We operate in 18 cities throughout the country and physical examinations are very important matters with us; we have our own examiner in each city. We send our applicants to these examiners, and we pay for the examinations.

Some time ago the question came up that the applicant should pay the examination fee, but we found it wouldn't work except in one city. The most likely applicant

uld refuse to consider further a position when an examination was required in
; manner.

MR. COLEMAN: Is your labor turnover large?

MR. HOUSER: Yes.

MR. COLEMAN: Then I should think it would be a very expensive proposition.

MR. HOUSER: It is. It runs into several thousands of dollars per year, although I
it recall the exact figures.

We try to use the young folks in our work, a different class. We seek to get the
e of girl known as the home girl, and the boys are clean cut, and our examination
them is very strict. The company pays three dollars for each examination, and
have them re-examined every six months.

MR. COLEMAN: Outside of the increase in good will, do you think it worth while?

MR. HOUSER: Yes. In the majority of cities there are ordinances; the law requires
t restaurant employees be examined, and we are compelled to do it in most cities
we have just gone one step farther and made it universal in our system.

A Position for the Man With One Eye

D. J. STROBEL (Wagner-Taylor Co., Philadelphia, Pa.): Dr. Selmon, supposing
had an applicant for employment who had an artificial eye, would you employ
n?

DR. SELMON: Yes, if he had another good eye.

MR. STROBEL: Supposing he lost the sight of the good eye, then; wouldn't the
nt be held responsible for both?

DR. SELMON: Yes, I think it would be in some states.

VERN D. SUTTON (Postum Co., Battle Creek, Mich.): I don't think you would
held responsible for total loss of vision, but only for the loss of sight of one eye.

CHARLES PRAHL (Gridley Dairy Co., Milwaukee, Wis.): If a man loses an eye,
insurance company or the self-insured pays for the loss of the eye. In our state,
must pay to the Industrial Commission of Wisconsin a certain set sum, \$3,500 for
e. If he loses the other eye, the company pays for the loss of the eye the same
ount as for the first, but the employee gets from this amount an amount equal to
amount of total disability.

So you don't assume any more responsibility when you have an employee lose the
ht of the only good eye he has remaining.

CHAIRMAN HASSE: The same applies to Illinois. If a company employs a man
th one eye, if he loses that eye, he is permanently disabled and is supported by a
cial fund created for this purpose.

MR. SUTTON: He must have proof that he had compensation for the first eye, so
pposing he lost the first eye at home or in childhood and received no compensation.

MR. PRAHL: I am not sure what the law is on that.

MR. EGGERT: I should think it would be the same. He would receive compensation
the second eye and be paid for total disability out of the fund.

CHAIRMAN HASSE: I am afraid we are getting away from the subject.

Are there any other questions? I should like to ask one question of Dr. Selmon:
; you reexamine your employees and how often?

DR. SELMON: That depends on conditions. Some I re-check every three months;
ne of those who have diabetes, sugar in the urine, high blood pressure, I even more
requently re-check. Others about once a year.

CHAIRMAN HASSE: You have no set time?

DR. SELMON: No, it depends on the condition of the employee.

CHARLES PRAHL (Gridley Dairy Co., Milwaukee, Wis.): We have also mutual
nefit associations in our company and we combine the examination with the exam-
ation for the mutual benefit association, and the applicant has to pay a dollar to
in the association. The doctor's fee is split up between the mutual benefit and the

company, and so the cost is low. The company contributes one-half of all the dues to the association and as our labor turnover is rather small, the expense is rather small.

W. H. CUNNINGHAM (Pillsbury Flour Mills Co., Minneapolis, Minn.): Do you have a similar practice with regard to mutual benefit associations, Dr. Selmon?

DR. SELMON: No, our particular mutual benefit association doesn't require a physical examination.

MR. CUNNINGHAM: Is there any difference between the standard for the employment and the standard for the association, Mr. Prael?

MR. PRAEL: No, the physical examination for employment is based on the physical examination for the mutual benefit association: if an applicant can pass the mutual benefit association examination, he can pass the examination for employment. It isn't severe, except in the case of hernia; a man with hernia would be disqualified for the hard work we have.

MR. CUNNINGHAM: Don't you think there is a risk?

MR. PRAEL: Well, all the people we have examined have been healthy.

Discussion of the Convention City Resolution

H. T. EGGERT (National Biscuit Co., New York City): You accept them for employment if you accept them for the mutual benefit association?

MR. PRAEL: Yes, for the men engaged in employment expect the mutual benefit protection as a welfare proposition, even though they shouldn't care to assume the responsibility of it.

CHAIRMAN HASSE: We have just received the following resolution:

"Whereas, The National Safety Congress is more efficiently and economically held in its headquarters city, and

"Whereas, The cost of sending delegates is as low if not lower when the Congress is held in Chicago, and

"Whereas, The city favored by the Congress when moved from point to point gains only at the expense of the delegates and their employers,

"Be It Therefore Resolved, That this Section is in favor of holding the Congress in Chicago regularly during the last week of September in each year."

FRANK T. COLEMAN (Continental Bakeries Co., New York City): That sounds like a chamber of commerce affair, boosting Chicago. I think there is a lot of value in going to other cities to promote interest in safety; we can get much more interest stirred up that way.

I make a motion that resolution be voted down.

(The motion was seconded.)

CHAIRMAN HASSE: It has been moved and seconded that the resolution just read be voted down.

C. J. ALGER (Corn Products Refining Co., Chicago, Ill.): We have all attended conventions before and I think everyone is agreed that this has been the most successful of all the Congresses. Chicago is centrally located, and with our various industries, we have scattered throughout the country and it seems to me that Chicago could bring more people in than would be true of New York. The convention in New York seven or eight years ago was the smallest in point of attendance of any I ever attended.

I think the resolution should be adopted.

MR. COLEMAN: The motion was made and seconded. I call for a vote.

CHAIRMAN HASSE: Gentlemen, we will hold that vote off for a few minutes.

VERN D. SUTTON (Postum Co., Battle Creek, Mich.): Mr. Smoke has gone down to headquarters to see if they fostered this resolution and if they will send someone

e to explain why we should support them in that. After we get their viewpoint, may change or confirm ours.

CHAIRMAN HASSE: At least we will be better able to discuss it, although in the meantime we might be giving our views on it.

MR. EGGERT: I haven't any thoughts either way and am willing to let the majority decide.

MR. ALGER: I should like to inquire in regard to that resolution, is it the opinion of the boys here who have attended previous Congresses that any one city is best suited to have the Congress?

MR. EGGERT: I think the arrangement in Detroit was very unsatisfactory, as the meetings were held in so many places.

CHAIRMAN HASSE: I believe that is the reason it was held in Chicago this year; it is the only city where we can meet together under one roof.

Few Cities Capable of Handling the Congress

G. A. NOXON (Ralston-Purina Co., St. Louis, Mo.): It seems to me that with a convention the size it is, with the exception of the three largest cities, no other city could hold it. We would just have a repetition of what occurred last year in Detroit, with members running all over the city to their meetings. This is the first time we have ever held the meeting so smoothly.

MR. SUTTON: May I ask Mr. Noxon what are the cities he has in mind as being able to handle this convention?

MR. NOXON: I am from St. Louis, but I have in mind New York, Chicago and San Francisco.

MR. SUTTON: The reason I asked for the names of the cities was so we might consider the geographical location of them. The last time we went away from the geographical center of the country was when we went to Boston. I didn't attend that meeting, but I understand from those who did, the convention was not so well attended because it was so far from the delegates' headquarters. It seems to me that if the convention were confined to one central location it would always have a larger and larger attendance.

CHAIRMAN HASSE: We have a gentleman here from headquarters, Mr. Fish.

CARMAN FISH (National Safety Council): This is the first time I have seen this resolution, and I am really not in a position to state whether it is official or not. It looks as if Mr. Prussing is merely trying to get a straw vote on the opinions of the delegates as to whether to hold the Congress in Chicago or in some other city. Of course that is a matter to be decided by the Executive Committee. I do not believe that anybody at present is in a position to give any definite information, although I do not see any harm in your expressing your preferences.

MR. COLEMAN: I should like to ask the speaker if it doesn't stimulate interest to meet in other places, and if it doesn't arouse more interest in safety in other cities where we might meet.

MR. FISH: There is no doubt that holding a Congress in different sections of the country stimulates the interest in safety there. The only trouble is that the Congress is now so large it is difficult to find accommodations for it, and that is one of the reasons why regional conferences are becoming popular.

Motions and Counter Motions

MR. ALGER: In Kansas City this spring they had a regional conference that was well attended, by about 900 delegates, which helps to prove that Chicago is ideally situated geographically to bring in the largest number of people.

MR. SUTTON: I have a motion I should like to put, although it won't be parlia-

mentary with the one preceding it still before the house: I move we table the motion before the house.

A. COWEN (Union Carbide Co., Sault Ste. Marie, Mich.): I want to speak against that. I think that that resolution asking that the permanent meeting place be Chicago hereafter, denotes the growth of the Congress, that it should come to a size that we can't meet anywhere but in Chicago. I think we should meet here regularly, for the next development will be a sectional development, resulting in sectional conferences, with this meeting in Chicago an annual meeting where representatives of all these various section conferences will gather together to consider the whole safety movement. I am heartily in favor of Chicago.

MR. COLEMAN: A motion is before the house; I call for a vote.

MR. SUTTON: Do I understand that Mr. Coleman maintains that my motion is not in order? It wasn't seconded?

MR. ALGER: There was a motion before the house when your motion was made.

MR. SUTTON: My motion pertained to the one that was made.

MR. COLEMAN: It was not seconded, therefore I call for a vote.

CHAIRMAN HASSE: All those in favor of holding future conventions in Chicago—

MR. COLEMAN: That is not the motion. The motion is that the resolution be voted down.

Closing Moments of the Session

CHAIRMAN HASSE: All right. All those in favor of the motion that the resolution be voted down, kindly raise their hands.

(The motion was not carried.)

The other resolution, then, is still before the house.

(Mr. Sutton's motion that the resolution be tabled was seconded and carried.)

MR. SUTTON: I move this Section express itself as favoring, in case the National Safety Council headquarters decides later to hold the convention each year in any one city, that that city be Chicago.

MR. ALGER: I should like to amend that motion to the effect that this group go on record as recommending Chicago as a permanent location to the Executive Committee.

MR. SUTTON: The reason I didn't include that idea is that in case the communication has not come from the Council headquarters and that they are not fixing upon one city as the permanent place to meet and in case this is just a straw vote, we have merely gone on record as favoring Chicago in case they do fix on one city, leaving it with the National Safety Council to determine whether it is advisable to hold it in one city. If they do determine to hold it in one city, then this section would favor Chicago.

MR. ALGER: Then I withdraw my amendment.

CHAIRMAN HASSE: Is there a second to this motion?

(The motion was seconded, put to a vote, and carried.)

CHAIRMAN HASSE: Well, that disposes of that.

We are to have a series of lantern slides which have been furnished us by courtesy of the Kellogg Company.

(The slides were shown and described by Mr. Frank Smoke of the Kellogg Company.)

CHAIRMAN HASSE: Are there any questions? If not, then, our program for the Sixteenth Annual Safety Congress has come to a close. I believe, however, I speak for all when I say the sessions have been of real benefit to us, and in behalf of the officers of the Food Section, I want to thank all the speakers and those who have participated in the discussions.

Although we are closing our sessions for the year 1927, they will still be conducted

Food Section

ough the News Letter, and any problems or anything you may wish to suggest
t will be of help, will be welcomed by Mr. Penty of the Kellogg Company, Battle
ck, Michigan.

ADJOURNMENT.

INDEX

Volume I.

- C Session, Minutes, 289-331.
 Accident Statistics: "Accident situation in the chemical industry", (Whittemore), 567-569.
 Automotive Section, 453-454.
 Construction industry, 650.
 Electric railways. In "Interesting the man on the job in safety", (Allison), 10-111.
 "Where the accidents happen", (Dean), 426.
 Major emphasis in accident prevention", (MacKinnon), 860-863.
 Accident statistics, 659-660.
 Report of Committee on Uniform Accident Statistics, 757.
 Statistical review of the accident experiences of electric railways", (Whittemore), 750-753.
 Statistics—an aid to accident prevention", (Prouty), 934-937.
 Accidents: "Where the accidents happen", (Dean), 424-427.
 Accidents—Costs: Discussion, 931.
 "Why safety in construction work?" (McLean), 657-659.
 Incidental cost of accidents to the employer", (Heinrich), 291-298.
 Accidents, H. H.: "Design and maintenance of equipment as a factor in safety", 18-71.
 Accidents, W. W.: "Safety in the quarry industry", 558-564.
 Advertising: "Advertising what the reader will buy", (Pulcifer), 887-889.
 Accidents, P. G.: "Safety codes as company tools", 384-386.
 Accidents, H. O.: "Interesting the man on the job in safety", 107-111.
 American Society of Safety Engineers: (See Engineering Section)
 Safety Chains: Progress report A. S. S. E.—Engineering Section Research Committee on the effects of annealing in chains, (Thalner), 400-407.
 Annual Banquet: (See Banquet)
 Annual Meeting of Members: (See Business Section).
 Accidents, M. E.: "How to secure the confidence of the operating heads", 311-312.
 Accidents: "Hand and arm injuries", (Starling), 443-447.
 Accidents, E.: "Plant housekeeping and its relation to fire hazards", 224-227.
 Accidents, P. W.: "Care of injured in small plant", 111-114.
 Associated General Contractors: "Accident prevention activities", (Richards), 673-680.
 Automotive Section: Joint meeting with Power Press Section, 477-499.
 Minutes, 421-475.
 Nominating committee report, 449-450.
 Officers, 421.
 Report of officers, (Dunnebacke), 422.
 Report of Statistics Committee, (Cotcher), 423.
 Motion: Resolution, 36-37.
 Safety the first essential for progress in air transport", (Guggenheim), 18-52.
 Back Sprains: Discussion, 118-119.
 Backhaus, A. A.: "Dangers from static electricity in the handling of solvents", 581-587.
 Banquet: Minutes, 75-96.
 Beck, E. B.: Report of Chairman, Engineering Section, 383.
 Bennett, H. K.: "Radio talk to the children", 766-770.
 "Utilizing the radio", 761-766.
 Blank, E. F.: "Inter-plant no-accident competitions", 158-162.
 Body Injuries: "Head and body injuries in industry", (Mullen), 462-467.
 Bonus Systems: "Application of a cash accident prevention bonus", (Loney), 493-491.
 Discussion, 492-493; 497-498.
 Discussion on bonus system for benefit associations, 831-832.
 Boswell, F. W.: "Employees' publication in accident prevention", 436-442.
 Brain Injuries, (See Head Injuries).
 Brakes: Discussion on electric railway brake inspection, 723-724.
 Brakes—Electric Railways: Discussion, 760.
 Brammeier, H. J.: "Safety Sam and The Careful Twins—Handy Andy and Ready Eddy", 86-90.
 Brigades, (See Fire Prevention).
 Brown, L. M.: "Courtesy and its relation to accident prevention", 714-716.
 Bulletin Boards: In "Interplant No-Accident competitions", (Blank), 160.
 Burns: Bibliography on chemical burns, 610.
 Discussion, 467-468.
 Discussion on chemical burns, 612-617.
 "First aid treatment of chemical burns of the eye", (Cosgrove), 606-610.
 "Initial treatment of chemical burns of the eye", (Hubbard), 611-612.
 Business Section: Minutes, 7-45.
 Cade, R. E.: "Employees' publication safety value to food workers, 920-922.
 Cameron, W. H.: Annual report of Managing Director, 38-43.
 Campaigns—Industrial: Discussion, 152-153.
 In "How to organize for safety", (El-lard), 146.
 Portland Cement Association contest, (Curtis), 503-507.
 Inter-plant No-Accident competition, (Blank), 158-162.
 Campaigns—Public: "Safety campaigns and stunts", (Penland), 683-687.
 Campbell, J. C.: "Prevention of eye injuries", 427-423.
 Cattell, Dr. E. J.: "Bigger men, broader views and better business", 65-71.
 Cement Industry: "Fixing accident responsibility", (White), 531-537.
 "How can a mill with a perfect record keep it up?" (Weitknecht), 538-542.
 "How to interest men in their own safety", (Sabin), 510-517.
 Report of Secretary, (Curtis), 503-507.
 Cement Section: Joint luncheon with Quarry and Mining Sections, 557-564.

- Joint session with Quarry Section, 529-555.
 Membership, 529.
 Minutes, 501-528.
 Nominating Committee report, 531.
 Officers, 501.
 Report of Secretary, (Curtis), 503-507.
 Chains: Discussion on tests, 409-411.
 Machine for subjecting chains to repeated loading, 404.
 Progress report, A. S. S. E.—Engineering Section Research Committee on the effects of annealing on chains, (Thalner), 400-407.
 (See also Annealing Chains).
 Challis, L. M.: "Safety committees—a necessity or a nuisance", 104-106.
 Chemical Industry: "Accident situation in the chemical industry", (Whittemore), 567-569.
 "Chemical plant from the standpoint of the foreman", (Streeter), 623-625.
 "Chemical plant safety from the standpoint of the insurance carrier", (Jacobs), 626-630.
 Discussion on where accidents occur, 570.
 Prevention of accidents in chemical laboratories", (Stillman), 571-577.
 "Safe preparation of tanks and other chemical apparatus for repairs and inspection", (Rowland), 592-594.
 (See also Burns; Laboratories).
 Chemical Section: Membership Committee report, 592.
 Minutes, 565-643.
 Nominating Committee report, 591.
 Officers, 565-566.
 Children—Safety Work With: In "Safety campaigns and stunts", (Penland), 683-687.
 Your job and my job", (Prendergast), 80-81.
 "Radio talks to the children", (Bennett), 766-770.
 "Safety Sam and the Careful Twins", 87-90.
 "Utilizing the radio", (Bennett), 761-766.
 Chlorine: Discussion on leakage in chlorine cylinders, 573.
 Classification of Causes of Accidents: Discussion, 117.
 In "How I would seek safety in a manufacturing plant", (Kaems), 181-182.
 In "Machine hazards in the food industry", (Rice), 947-950.
 Cleaning Plants. (See Static Electricity).
 Climer, F. W.: "Successful employees' benefit associations", 782-784.
 Clubs—Industrial: In "How to organize for safety", (Ellerd), 147.
 Coal—Dust: Discussion on dust hazards in handling coal, 942-944.
 Codes: Report of the Steering Committee on Research Standards and Codes, 393-396.
 "Safety codes as company tools", (Agnew), 334-336.
 Committees: Discussion on recommendations of committee on form of discipline, 733-734.
 In "Fixing accident responsibility", (White), 532-534.
 "Organization and functioning of safety committees", (Koehler), 729-733.
 "Safety committees—a necessity or a nuisance", (Challis), 104-106.
 Community, Safety: (See Public Safety).
 Company Magazines: (See Plant Publications).
 Competition: In "How to interest men in their own safety", (Sabin), 513.
 "Inter-plant No-Accident competitions", (Blank), 158-162.
 "Safety in the Quarry industry", (Adams), 558-564.
 (See also Bonus Systems).
 Compulsory Automobile Insurance: (See Insurance—Automobile).
 Conductivity of Liquids: Table, 583.
 Conferences: Report of Steering Committee on Regional Safety Conferences, (Hurlbutt), 391-392.
 Conover, R. G.: "Some editorial problems", 864-869.
 Construction: "Accident prevention activities of the Associated General Contractors", (Richards), 673-680.
 "Health and the construction industry", (Willzbach), 651-653.
 "Keeping out of the rut in safety work", (Morris), 667-671.
 Ohio Statistics, 659-660.
 "Protecting the public", (Langner), 687-691.
 "Why safety in construction work?" (McLean), 654-659.
 Construction Section: Address of Welcome, (Sollitt), 646-647.
 Annual report of the Secretary, (Robinson), 648-650.
 Construction Section—Continued.
 Bulletin Committee, (Tubesing), 654.
 Membership, 650.
 Minutes, 645-692.
 Nominating committee report, 666-667.
 Officers, 645-646.
 Resolution on field secretary need, 681.
 Statistics, 650.
 Contests: Discussion of contest rules, 163-166.
 Discussion of difference in departmental hazard, 162.
 Employees' Publication Section prize contest committee report, 876-881; 904.
 "Inter-plant No-Accident competitions", (Blank), 158-162.
 Portland Cement Association, (Curtis), 503-507.
 "Relationship of accident prevention contests as run in works' papers to employees' benefit associations", (Wilkins), 827-830.
 "Reward for contributors to employees' magazines", (Kupferer), 873-875.
 Conveyors, (See Screw Conveyors).
 Cooperation: "Securing the cooperation of the plant management", (Reninger), 149-152.
 "With representatives of other local companies", (Henry), 128-131.
 Cosgrove, Dr. K. W.: "First aid treatment of chemical burns of the eye", 606-610.
 Costs of Accidents, (See Accidents, Costs).
 Courtesy: "Its relation to accident prevention", (Brown), 714-716.
 Courts, Safety: In "How to interest men in their own safety", (Sabin), 512.

- rtis, A. J. R.: Report of Secretary, 503-507.
- rtis, T.: "Synopsis of the best things which have been brought out in previous Congresses", 698-702.
- ttling Oils: Discussion, 469-470.
- inders, (See also Chlorine cylinders; gas cylinders.)
- Iron, A. C.: "Safety on the high seas", 17-27.
- an, T. N.: "Where the accidents happen", 424-427.
- mpster, J.: "Employees' publications, plant papers, or house organs?" 889-892.
- "Relationship of mutual benefit associations to the safety problems, 799-802.
- rmatists: Discussion on nickel-itch, 468-470.
- rectors of N. S. C.: 4-6.
- discipline: Discussion, 303-304.
- "How should men responsible for accidents be disciplined", (McClain), 299-302.
- Letter, 313-315.
- seases—Occupational: "Some observations of industrial silicosis", (Sayers), 264-279.
- y Cleaning, (See Electricity, Static.)
- ust Explosions: Discussion, 939-940; 944.
- usts: Discussion on dangers, 544.
- utton, H. P.: "How I would edit an employees' magazine", 848-850.
- ectric Railway Section: Bulletin Committee report, 695.
- Committee on cooperation with claims committee, (Hellmuth), 697.
- Discussion and motion on News Letter, 753.
- Joint luncheon with Public Utilities Section, 773-780.
- Membership Committee report, 696.
- Minutes, 693-771.
- Motion on compulsory automobile insurance, 748.
- Nominating Committee report, 741.
- Officers, 693.
- Publicity committee report, (Nutt), 696-697.
- Report of Committee on Uniform Accident Statistics, 757.
- Resolution, 741.
- "Synopsis of best things which have been brought out in previous Congresses", (Curtis), 698-702.
- lectric Railways: Address, (Storrs), 776-780.
- "Courtesy and its relation to accident prevention, (Brown), 714-716.
- "Design and maintenance of equipment as a factor in safety", (Adams), 718-721.
- Discussion on brake inspection, 723-724.
- Discussion on brakes, 760.
- Discussion on colors of cars, 755-756.
- Discussion on folding steps, 722.
- Discussion on installation of warning lights, 702-703.
- Discussion on one man cars, 758-760.
- Discussion on safety zones, 748.
- Discussion on side-swiping, 747.
- Discussion on use of sand, 722; 728.
- "Organization and functioning of safety committees", (Koehler), 729-733.
- "Power of safety in the electric railway field", (Spring), 734-737.
- Protection of trackmen, 760.
- "Selection and training of new men and their relation to safety", (Smith), 704-707.
- "Specific ways to prevent collisions with other vehicles in urban centers and at grade crossings", (Kuhn), 742-744.
- "Statistical review of the accident experiences of electric railways", (Whittemore), 750-753.
- "Synopsis of the best things which have been brought out in previous Congresses", (Curtis), 698-702.
- (See also Gongs).
- Electricity—Static: Bibliography, 586-587.
- "Dangers from static electricity in the handling of solvents", (Backhaus), 581-587.
- Discussion, 370-377; 587-588.
- Discussion of friction caused by automobile tires, 392-393.
- Discussion of grounding chain, 372.
- Discussion on gasoline tank cars, 373.
- Handling sulphur, 588.
- "Progress report of A. S. S. E.—Engineering Section Research Committee on Static electricity", (Singleton), 363-370.
- Ellerd, H. G.: "How to organize for safety", 143-148.
- Employees' Benefit Associations: Discussions, 824-827.
- Discussion on investment of funds, 788-789.
- Discussion on pay for men and women, 785-786.
- Joint luncheon with Employees' Publication Section, 907-912.
- Minutes, 781-835.
- Officers, 781.
- "Relationship of accident prevention contests as run in works' papers to employees' benefit associations", (Wilkins), 827-830.
- "Relationship of mutual benefit associations to the safety problems", (Dempster), 799-802.
- "Relief plant of Bethlehem Steel Corporation and subsidiary companies", (Vary), 817-823.
- "Successful benefit associations", (Climer), 782-784.
- Employees, Old, (See Veteran Employees.)
- Employees' Publication Section: Discussion on change of name, 842-844; 847.
- Discussion on News Letter, 871.
- Discussion on possible revenue, 844-845; 873.
- Joint luncheon with Benefit Association, 907-912.
- Minutes, 837-905.
- Miscellaneous Motions, 886.
- Nominating Committee report, 842.
- Officers, 837.
- Prize contest committee report, 876-881.
- Program Committee report, 838-839.
- Resolution on holding congress in Chicago, 863-864.
- Service Committee appointment, 885.
- (See also Plant Publications.)
- Employees' Publications, (See also Plant Publications.)
- Employees' Representation: In "How to organize for safety", (Ellerd), 146.

- Employment:** Discussion on position for man with one eye, 555.
 "How good physical examinations and follow-up work in employment departments can reduce tuberculosis and decrease accidents", (Kierman), 805-809.
- Engineering Section: Constitution and by-law changes, 390-391.**
 Membership Committee, 396-397.
 Minutes, 361-419.
 Nominating Committee report, 390.
 Officers, 361-363.
 Progress report of A. S. S. E.—Engineering Section Research Committee on elimination of harmful noise, (Snook), 412-415.
 Report of A. S. S. E.—Engineering Section Research Committee on static electricity, (Singleton), 363-370.
 Report, A. S. S. E.—Engineering Section Research Committee on the effects of annealing on chains, (Thalner), 400-407.
 Report of A. S. S. E.—Engineering Section Research Committee on Wire rope attachments and connections, (Sunderland), 377-379.
 Report of Chairman, (Beck), 383.
 Report of Committee on chapter organization and activities, 397-398.
 Report of Committee on electrical hazards, (Auel), 398.
 Report of Steering Committee on Regional Safety Conferences, (Hurlbutt), 391-392.
 Report of the Steering Committee on Research Standards and codes, 393, 396.
 Summaries of reports, 387-390.
- Engineers—Safety:** "Safety engineer as a community factor", (Pollock), 121-128.
- Enthusiasm:** "Putting enthusiasm into safety", (Rose), 52-57.
- Executive Committee—N. S. C.: 3-4; 75-77.**
- Executives, (See Health Supervision of Employees: Physical examination of Executives).**
- Eye Protection:** Discussion on eye inspection campaigns, 682-683.
 "First aid treatment of chemical burns of the eye", (Cosgrove), 606-610.
 "Initial treatment of chemical burns of the eye", (Hubbard), 611-612.
 "Prevention of eye injuries", (Campbell), 427-433.
- Feet-Injuries:** "What price feet and legs?" (Hewitt), 451-454.
- Fire Extinguishers:** Systematic Charging, 214.
- Fire Prevention:** Discussion of teaching of school children, 215-216.
 Discussion of volunteer brigades, 222-224.
 "Fire brigades", (Landuyt), 217-221.
 "First aid equipment in fighting fires", (Welborn), 211-213.
 "Plant housekeeping and its relation to fire hazards", (Arms), 224-227.
 "Studying plant processes to prevent fires", (Richards), 198-206.
- Fire Prevention Session:** Minutes, 197-232.
- Fireworks:** Discussion, 228-229.
 Resolution, 227-228.
- First Aid:** "Care of injured in small plant", (Armstrong), 111-114.
 Discussion, 115-116; 329-331.
 "First aid training and its relation to the prevention of accidents", (Titus), 323-328.
 "First aid treatment of chemical burns of the eye", (Cosgrove), 606-610.
 "Some of the things you should know about first aid", (Fisher), 169-175.
 Fisher, H. E.: "Some of the things you should know about first aid", 169-175.
 "Fixing accident responsibility", (White), 531-537.
- Floors:** Discussion of slipperiness, 468.
- Foley, E. L.:** "Place of the visiting nurse in industry", 279-284.
- Food Industry:** Disease Carrier, 952.
 "Employees' publication safety value to food workers", (Cade), 920-922.
 "Keeping safety alive in the world's largest starch plant", (Hennessy), 924-927.
 "Machine hazards in the food industry", (Rice), 947-950.
 "Value of physical examinations in the food industries", (Selmon), 951-952.
- Food Section:** Cooperation with Toxicab and Fleet-Owners Section, 918-919.
 Minutes, 913-959.
 Nominating Committee report, 933.
 Officers, 913.
 "What the Food Section has accomplished", (Sutton), 914-916.
- Foot Injuries, (See Feet Injuries.)**
- Foremen:** "Application of a cash accident prevention bonus", (Loney), 483-491.
 "Chemical plant from the standpoint of the foremen", (Streeter), 623-625.
 Discussion on holding foremen responsible, 930.
 Discussion, teaching the foremen the need of human interest, 472-473.
 In "Statistics—an aid to accident prevention", (Prouty), 934-937.
 "My Way", (Slaymaker), 183-184.
 "Safety—a part of the foreman's responsibility", (Williams), 494-496.
 "Training foremen in accident prevention", (Myers), 478-483.
- Foreign Languages:** Discussion, 517-519.
- Forster, H. W.:** "Safety—a source of inspiration and a test of courage", 91-96.
- Fractures:** "Head and body injuries in industry", (Mullen), 462-467.
- Gary, E. H.:** Resolution, 33-34.
- Gas Cylinders:** Keep cylinders from tipping over, 580-581.
- Geier, Dr. O. P.:** "What has the health of the worker to do with industry?" 250-254.
- General Session:** Minutes, 47-74.
- Goggles Discipline:** 434.
 Discussion on anti-fogging preparations, 433, 435-436.
 (See also Eye Protection).
- Gongs:** Discussion on electric railway gongs, 726-727.
- Grade Crossings:** "Specific ways to prevent collisions with other vehicles in urban centers and at grade crossings", (Kuhn), 742-744.
- Group Plant Safety Supervisors Session:** 143-168.
- Guards:** Discussion, 448.

- uggenheim, H. F.: "Safety the first essential for progress in air transport", 48-52.
- Uggard, Dr. W. D.: "What price health", 60-64.
- Ude, I.: Address, 521-528.
- and Injuries: "Hand and arm injuries", (Starling), 443-447.
- urdy, C. D.: "Selecting materials for the speech," 342-350.
- "Some guiding principles for the speaker", 333-341.
- "Speaker on the platform", 351-359.
- azard Factor Table: Discussion, 166.
- azard Rating Sheet for Foremen: In "Application of a cash accident prevention bonus", (Loney), 487-491.
- ad Injuries: "Head and body injuries in industry", (Mullen), 462-467.
- alth Service Division, Minutes, 233-238.
- alth Supervision of Employees: Discussion of health service on contributory basis, 286.
- "Health and the construction industry", (Willzbach), 651-653.
- "Health service", (Miller), 789-793.
- "What has the health of the worker to do with industry", (Geier), 250-254.
- "What price health", (Haggard), 60-64.
- alth Supervision of Executives: "Health of Executives", (Sawyer), 255-263.
- inrich, H. W.: "Incidental cost of accidents to the employer", 291-298.
- nessy, H. M.: "Keeping safety alive in the world's largest starch plant", 324-327.
- ary, H. H.: "Cooperation with representatives of other local companies", 123-131.
- mel, H. G.: "Interchange of plant experiences", 153-156.
- witt, E. L.: "What price feet and legs?" 451-454.
- lchert Common Factors", (Mason), 82-86.
- spitals: Joint hospital idea, 115.
- urigan, Dr. P. H.: "Medical department", 620-623.
- use Organs, (See Plant Publications.)
- usekeeping: In "How to interest men in their own safety", (Sabin), 515.
- Plant housekeeping and its relation to fire hazards", (Arms), 224-227.
- bhard, Dr. W. B.: "Initial treatment of chemical burns of the eye", 611-612.
- man Element in Safety: "Bigger men, broader news and better business", (Cattell), 65-71.
- Life's greatest adventure", (Stelzle), 9-17.
- Safety—a source of inspiration and a test of courage", (Forster), 91-96.
- hbutt, F. L.: Report of Steering Committee on Regional Safety Conferences, 291-292.
- id-etal cost of accidents to the employer", (Heinrich), 291-298.
- uterial Physicians and Surgeons: Conference, 222-248.
- uried Safety: Resolution, 35-36.
- chaw: Discussion, 119-120.
- nd Workmen, (See Workmen, In-
dust).
- Insurance: "Chemical plant safety from the standpoint of the insurance carrier", (Jacobs), 626-630.
- Insurance—Automobile: Discussion on compulsory automobile insurance, 748.
- Insurance Premiums. Reductions of: In "Accident prevention activities of the Associated general contractors", (Richards), 675-676.
- "Interchange of plant experiences", (Hensel), 153-156.
- Interest in Safety Work, Maintaining, (See Maintaining Interest in Safety).
- "Intruder", 71-74.
- Investigation of Accidents: Special committee often appointed, 542.
- Jacobs, E. C.: "Chemical plant safety from the standpoint of the insurance carrier", 626-630.
- John, J. B.: Address, 502-503.
- Junior Safety Councils: "Your job and my job", (Prendergast), 80-81.
- Kaems, A. L.: "How I would seek safety in a manufacturing plant", 180-183.
- Kiernan, F.: "How good physical examinations and follow-up work in employment departments can reduce tuberculosis and decrease accidents", 805-809.
- King, W. G.: "Annual address of President", 28-32.
- Chairman Annual Meeting of Members, 1-45.
- Resolution of appreciation, 37-38.
- Koehler, A. W.: "Organization of functioning of safety committees", 729-733.
- Kubu, J. S.: "Specific ways to prevent collisions with other vehicles in urban centers and at grade crossing", 742-744.
- Kupferer, V. H.: "Rewards for contributors to employees' magazines", 873-875.
- Laboratories: "Prevention of accidents in chemical laboratories", (Stillman), 571-577.
- Landuyt, R. G.: "Fire brigade", 217-221.
- Langner, S.: "Protecting the public", 687-691.
- Legs—Injuries: "What price feet and legs?" (Hewitt), 451-454.
- Liddle, R. W.: "How money is wasted on employees' magazines", 881-885.
- "Life's greatest adventures", (Stelzle), 9-17.
- Loney, N. M.: "Application of a cash accident prevention bonus", (Loney), 483-491.
- Lost Time Accidents, (See Classification of Accidents.)
- McClain, G. H.: "How should men responsible for accidents be disciplined?" 299-302.
- McDaniels, L.: Toastmaster at banquet, 78-96.
- McGrath, P. J.: "What I think of safety", 738-741.
- Mackinnon, K. R.: "Major emphasis in accident prevention", 860-863.
- McLean, D. D.: "Why safety in construction work?" 654-659.
- Madden, F. L.: Officer Mulcahy Interrupts, 57-60.
- Mahaffey, P. L.: "What's new in photography?" 853-859.

- Maintaining Interest in Safety: "How to interest men in their own safety", (Sabin), 510-517.
- "Interesting the man on the job in safety", (Allison), 107-111.
- Malingering: Discussion, 287-288.
- Management: Discussion, 456-458; 631-632.
- "Fixing accident responsibility", (White), 531-537.
- "How I would seek safety in a manufacturing plant", (Kaerns), 180-183.
- "How to secure the confidence of the operating heads", (Arkills), 311-312.
- "Plant management viewpoint of safety", (Nixon), 618-620.
- "Securing the cooperation of the plant management", (Reninger), 149-152.
- Managing Director's Annual report, (See National Safety Council.)
- Marine Hazards: "Safety on the high seas", (Dalton), 17-27.
- Masks: Discussion tank cars, 596-597; 599.
- Tanks: 603.
- Mason, Max: "Highest common factors", 82-86.
- Matches: Discussion, 230, 232.
- Medical Supervision of Employees: Discussion on how far medicine and surgery should go, 233-248; 473.
- "Medical department", (Hourigan), 620-623.
- Resolution on preventive medicine", 249.
- Medin, C. B.: "Report on railroad employees' publications", 893-896.
- Meetings of Employees: In "Interchange of plant experiences", (Hensel), 155.
- On company time, 156-157.
- Miller, Dr. E. W.: "Health service", 789-793.
- Mining Section: Joint luncheon with Cement and Mining Sections, 557-564.
- Minor Accidents: Discussion, 157.
- Morey, A. T.: "Why have a plant publication?" 839-842.
- Morris, F. P.: "Keeping out of the rut in safety work", 667-671.
- Mulcahy, Officer: Street traffic problem, 57-60.
- Mullen, Dr. T. F.: "Head and body injuries in industry", 462-467.
- "My Way", (Slaymaker), 183-184.
- Myers, Dr. H.: "Training foremen in accident prevention", 478-482.
- National Safety Council: "Annual address of President", (King), 28-32.
- Executive Committee, 3-4: 75-77.
- Managing Director's Annual report, (Cameron), 38-43.
- "Treasurer's Annual report, (Webber), 43-45.
- Neubig, E. E.: "Report on plant publications of manufacturing companies, 898-903.
- New Employees: Discussion, 710-711.
- Discussion on remuneration, 708.
- "Safety committees—a necessity or a nuisance", (Challis), 105-106.
- "Selection and training of new men and their relation to safety", (Smith), 704-707.
- "New Way", 304-310.
- Nickel-itch, (See Dermatitis)
- Niesz, H. E.: "Acceptance of presidency", 77-78.
- Nixon, A. B.: "Plant management viewpoint of safety", 618-620.
- No-Accident Campaigns, (See campaigns).
- Noises: Discussion, 388-390.
- Discussion, screw machines, 388; 414.
- Discussion on campaigns for elimination, 418.
- Discussion on effects on human organism, 415-417.
- Progress report of A. S. S. E.—Engineering Section Research Committee on elimination of harmful noise, (Snook), 412-415.
- Nominating Committee report, 32-33.
- Nurses: Discussion, 287.
- "Place of the visiting nurse in industry", (Filey), 279-284.
- Officers of N. S. C. (See Executive Committee of N. S. C.)
- Old Employees, (See Veteran Employees.)
- Operating Problem: "Making safety an operating problem—not a specialty", (Webb), 289-291.
- Organization: "How to organize for safety", (Ellerd), 143-148.
- "Interchange of plant experiences", (Hensel), 153-156.
- "Keeping safety alive in the world's largest starch plant", (Hennessy), 924-927.
- Ott, I.: "Combining safety with recreation", 132-134.
- Painting: Discussion on hazards of spray painting, 634-637; 640-643.
- Minority report on Report of Spray Coating Committee, 638-639.
- Penland, C.: "Safety campaigns and stunts", 683-687.
- Photography: "What's new in photography", (Mahaffey), 853-859.
- Physical Examination of Employees: Discussion, 520: 797-798.
- Discussion on electric railway employees, 711-713.
- "Health service", (Miller), 789-793.
- "How good physical examinations and follow-up work in employment department can reduce tuberculosis and decrease accidents", (Kiernan), 805-809.
- "Medical department", (Hourigan), 620-623.
- "Value of physical examinations in the food industries", (Selmon), 951-952.
- Physical Examination of Executives: "Health of executives", (Sawyer), 255-263.
- Plant Publications: "Advertising what the reader will buy", (Fulcipher), 887-889.
- "Employees' publication in accident prevention", (Boswell), 436-442.
- "Employees' publication safety value to food workers", (Cade), 920-922.
- "Employees' publication, plant papers or house organs?" (Dempster), 889-892.
- "How I would edit an employees' magazine", (Dutton), 848-850.
- "How money is wasted on employees' magazines", (Liddle), 881-885.
- "Important function of the plant publications", (Whiting), 907-912.
- "Major emphasis in accident prevention", (MacKinnon), 860-863.

- ize contest committee report, 876-881.
- "Relationship of accident prevention contests as run in works' papers to employees' benefit associations", (Wilkins), 827-830.
- "Report on plant publications of manufacturing companies", (Neubig), 898-903.
- "Report on public utility publications", (Ryan), 897-898.
- "Report on railroad employees' publications", (Medin), 893-896.
- "Rewards for contributors to employees' magazines", (Kupferer), 873-875.
- "Some editorial problems", (Conover), 864-869.
- "Using the plant publication to prevent accidents", (Scott), 845-847.
- "What's new in photography?" (Mahaffey), 853-859.
- "Why have a plant publication?" (Morey), 839-842.
- (See also Employees' Publication Section).
- ants, (See Small Plants).
- ays: "Intruder", 71-74.
- "New Way", 304-310.
- "Responsible", 319-323.
- illock, F.: "Safety engineer as a community factor", 121-128.
- ower Press Section: Joint meeting with Automotive Section, 477-499.
- ayer: Annual meeting, (White), 7-8.
- endergast, J.: "Your job and my job", 80-81.
- resident's Annual Address, (King), 28-32.
- izes: Clock as trophy, 928.
- Discussion, 152-153; 167-168.
- Discussion on prizes for benefit associations, 831-832.
- "Rewards for contributors to employees' magazines", (Kupferer), 873-875.
- outy, R. C.: "Statistics—an aid to accident prevention", 934-937.
- ychology: Discussion on tests, 708-709.
- ublic Safety: "Combining safety with recreation", (Ott), 132-134.
- "Cooperation with representatives of other local companies", (Henry), 128-131.
- "Protecting the public", (Langner), 687-691.
- Resolution, 34-35.
- "Safety campaigns and stunts", (Penland), 683-687.
- "Safety engineer as a community factor", (Pollock), 121-128.
- "Selling safety to the worker through community activities", (Ziolkoroski), 135-139.
- "Specific ways to prevent collisions with other vehicles in urban centers and at grade crossings", (Kuhn), 742-744.
- Street traffic, (Mulcahy), 57-60.
- ublic Speaking Class, 333-359.
- "Selecting materials for the speech", (Hardy), 342-350.
- "Some guiding principles for the speaker", (Hardy), 333-341.
- "Speaker on the platform", (Hardy), 351-359.
- ublic Utilities: "Report on public utility publications", (Ryan), 897-898.
- ublic Utilities Section: Joint luncheon with Electric Railway luncheon, 773-780.
- Pulcifer, K. D.: "Advertising what the reader will buy", 887-889.
- Quarries: "Safety in the Quarry industry", (Adams), 553-564.
- Quarry Section: Joint luncheon with Cement and Mining Sections, 557-564.
- Joint session with Cement Section, 529-555.
- Radio: In "Safety on the high seas", (Dalton), 19-20.
- "Safety Sam and the Careful Twins", 87-90.
- Radio Talks: "Radio talks to the Children", (Bennett), 766-770.
- "Utilizing the radio", (Bennett), 761-766.
- Railroads: "Report on railroad employees' publications", (Medin), 893-896.
- Recreation: "Combining safety with recreation", (Ott), 132-134.
- Regional Conferences, (See Conferences).
- Reninger, H. A.: "Securing the cooperation of the plant management", 149-152.
- Resolution: Abolishing fireworks for private use, 227-228.
- Appreciation to President W. G. King, 37-38.
- Aviation, 36-37.
- Committee report, 33-38.
- Death of Mrs. Kroger, 475-478.
- Discussion on holding Congress in Chicago, 177-180; 475; 863-864; 956-958.
- Electric Railway Section, 741.
- In memory of E. H. Gary, 33-34.
- Industrial safety, 35-36.
- On field secretary for Construction Section, 681.
- On safety recognition in National organizations, 36.
- Preventive medicine, 249.
- Public safety, 34-35.
- Report of the Committee on Uniform Accident Statistics, 757-758.
- Thanks to city of Chicago, 37.
- Respirators: Used in unloading corn, 940.
- Responsibility for Accidents: Discussion, 543.
- "Fixing accident responsibility", (White), 531-537.
- "How should men responsible for accidents be disciplined?" (McClain), 299-302.
- In "How can a mill with a perfect record keep it up?" (Weitknecht), 539-542.
- Letter, 313-315.
- "Responsible", 319-323.
- "Safety a personal responsibility in a small plant", (Shaw), 102-103.
- Resuscitation: Discussion, 176-177.
- Rewards, (See Bonus Systems).
- Rice, L. M.: "Machine hazards in the food industry", 947-950.
- Richards, B.: "Studying plant processes to prevent fire", 198-206.
- Richards, W. R.: "Accident prevention activities of the associated general contractors", 673-680.
- Robinson, J. W.: Annual report of the Secretary, 648-650.
- Ropes: Discussion on wire rope attachments, 380-382.
- "Progress report of A. S. S. E.—Engineering Section Research Commit-

- tee on wire rope attachments and connections", (Sunderland), 377-379.
- Rose, W. G.: "Putting enthusiasm into safety", 52-57.
- Round Table Session, 169-195.
- Rowland, J. M.: "Safe preparation of tanks and other chemical apparatus for repairs and inspection", 592-594.
- "Ruts in Safety Work, Keeping Out", (Morris), 667-671.
- Ryan, F. J.: "Report on public utility publications", 897-898.
- Sabin, W. P.: "How to interest men in their own safety", 510-517.
- "Safety—a source of inspiration and a test of courage", (Forster), 91-96.
- Safety in Small Plants: Minutes, 97-120.
- "Safety Sam and the Careful Twins—Handy Andy and Ready Eddy", 87-90.
- Saltiel, W. D.: "Address of welcome, 8-9.
- Sawyer, Dr. W. A.: "Health of executives", 255-263.
- Sayers, R. R.: "Some observations of industrial silicosis", 264-279.
- Schools—Safety Work in: Address, (Telford), 549-551.
- Discussion, 552-553.
- Fire prevention, 215-216.
- "Safety engineer as a community factor", (Pollock), 123-126.
- Scott, C. B.: "Using the plant publication to prevent accidents", 845-847.
- Screw Conveyors: Discussion, 545-546.
- Selmon, A. C.: "Value of physical examinations in the food industries", 951-952.
- Shaw, J. A.: "Safety a personal responsibility in a small plant", 102-103.
- Signals—Electric Railways: Discussion, 702-703.
- Silicosis, (See Diseases—Occupational)
- Singleton, F. C.: "Progress report of A. S. S. E.—Engineering Section Research Committee on static electricity", 363-370.
- Skull Fractures, (See Head Injuries)
- Slaymaker, S. H.: "My Way", 183-184.
- Small Plants: "Care of injured in small plant", (Armstrong), 111-114.
- "Interesting the man on the job in safety", (Allison), 107-111.
- Minutes, 97-120.
- "Safety a personal responsibility in a small plant", (Shaw), 102-103.
- "Safety Committees—a necessity or a nuisance", (Challis), 104-106.
- "Why should the small plant be interested in safety?" (Weitknecht), 98-101.
- Smith, C. D.: "Selection and training of new men and their relation to safety", 704-707.
- Smoking: Discussion, 229-232.
- Discussion of women smokers, 231.
- Snook, H. C.: Progress report of A. S. S. E.—Engineering Section Research Committee on elimination of harmful noise, 412-415.
- Sollitt, S.: "Address of welcome", 646-647.
- Solvents: "Dangers from static electricity in the handling of solvents", (Backhaus), 581-587.
- Speakers, (See Public Speaking).
- Sprague, A. A.: Chairman general session, 47-74.
- Spray Coating Committee, (See Painting).
- Spring, E. C.: "Power of safety in the electric railway field", 734-737.
- Standards: Report of the Steering Committee on Research, Standard and Codes, 393-396.
- "Safety codes as company tools", (Agnew), 384-386.
- (See also Codes).
- Starch Plants: "Keeping safety alive in the world's largest starch plant", (Hennessy), 924-927.
- Starling, A. W.: "Hand and arm injuries", 443-447.
- Stelzle, C.: "Life's greatest adventure", 9-17.
- Stewart, G. C.: Address at luncheon, 774-776.
- Stillman, Dr. J. W.: "Prevention of accidents in chemical laboratories", 571-577.
- Storrs, L. S.: Address, 776-780.
- Streeter, L. C.: "Chemical plant from the standpoint of the foreman", 623-625.
- Stunts: "Safety campaigns and stunts", (Pentland), 683-687.
- Sulphur: Discussion on handling, 588-589.
- Sulphuric Acid: Discussion on unpacking a hot or a cold tower, 904.
- Sunderland, C. C.: Progress report of A. S. S. E.—Engineering Section Research Committee on wire rope attachments and connections, 377-379.
- Supervisors, Safety: Group Plant safety supervisors session, 143-168.
- "Industrial safety supervisors in small communities", 121-142.
- Surgeons: Discussion of how far medicine and surgery should go, 233-243.
- Sutton, V. D.: "What the Food Section has accomplished", 914-916.
- Tank Cars: Cleaning, 601-603.
- Cleaning sulphuric tank cars, 601.
- Discussion, 596.
- Discussion on lighting, 602.
- "Safe preparation of tanks and other chemical apparatus for repairs and inspection", (Rowland), 592-594.
- Tanks: Discussion, 595-596.
- Discussion on caulking tanks filled with solvents, 593.
- Discussion of leaks, 599-600.
- Discussion on ventilation, 603.
- Discussion on washing, 597-598.
- "Safe preparation of tanks and other chemical apparatus for repairs and inspection", (Rowland), 592-594.
- Telford, M. L.: Address, 549-551.
- Thalner, R. F.: Progress report, A. S. S. E.—Engineering Section Research Committee on the effects of annealing on chains, 400-407.
- Titus, W. A.: "First aid training and its relation to the prevention of accidents", 323-328.
- Treasurer's Annual Report: (See National Safety Council).
- Trucks: Discussion on hand trucks, 929-930.
- Tuberculosis: Discussion, 814-815.
- "How good physical examinations and follow-up work in employment departments can reduce tuberculosis and decrease accidents", (Kiernan), 805-809.
- Uniform Accident Statistics, (See Accident Statistics).

- unusual Accidents: Discussion, 186-195.
 United States Shipping Board Merchant Fleet Corporation: "Safety on the high seas", (Dalton), 17-27.
 Varnum, G. C.: "Safety Sam and the Careful Twins", 87-90.
 Vary, G. W.: "Relief plan of Bethlehem Steel Corporation and subsidiary companies, 817-823.
 Veteran Employees: Discussion, 954.
 Waste: Discussion, 460.
 Webb, H. F.: "Making safety an operating problem—not a specialty", 239-291.
 Webber, H. M.: "Annual report of Treasurer", 43-45.
 Weiknecht, W. H.: "How can a mill with a perfect record keep it up?", 538-542.
 "Why should the small plant be interested in safety?" 98-101.
 Welborn, C. R.: "First aid equipment for fighting fires", 211-213.
 Welcome, Address of (Saltiel), 3-9.
 What price health", (Haggard), 60-64.
 White, R. A.: Prayer", 7-8.
 White, W. L. Jr.: "Fixing accident responsibility", 531-537.
 Whitmore, G. R.: "Statistical review of the accident experience of electric railways", 750-753.
 Whittemore, C. F.: "Accident situation in the chemical industry", 567-569.
 Wilkins, E. T.: "Relationship of accident prevention contests as run in work's papers, to employees' benefit associations", 327-330.
 Williams, A. M.: "Safety—a part of the foreman's responsibility", 494-496.
 Williams, W.: "Important function of the plant magazine", 907-912.
 Wilzbach, Dr. C. A.: "Health and the construction industry", 651-653.
 Wire Rope, (See Rope).
 Workmen—Injured: "Care of injured in small plant", (Armstrong), 111-114.
 "Hand and arm injuries", (Starling), 443-447.
 "Head and body injuries in industry," (Mullen), 462-467.
 "What price feet and legs", (Hewitt), 461-454.
 Yorger, W. F.: "Safety Sam and the Careful Twins—Handy Andy and Ready Eddy", 87-90.
 "Your job and my job", (Prendergast), 80-81.
 Ziolkowski, C.: "Selling safety to the worker through community activities", 135-139.

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SIXTEENTH ANNUAL
SAFETY CONGRESS

VOLUME II



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CONTENTS

	PAGE
Marine Section	3
Metals Section	105
Mining Section	165
Cement, Quarry and Mining Joint Luncheon.....	281
Packers and Tanners Section.....	289
Paper and Pulp Section.....	315
Petroleum Section	377
Power Press Section.....	457
Power Press and Automotive Joint Session.....	489
Public Utilities Section.....	513
Public Utilities and Electric Railway Luncheon.....	609
Quarry Section	617
Cement and Quarry Joint Session.....	641
Cement, Quarry and Mining Joint Luncheon.....	669
Rubber Section	677
Steam Railroad Section.....	733
Taxicab and Fleet Owners Section.....	845
Textile Section	901
Woodworking and Lumber Manufacturing Section.....	945
Index	1009

NOTE

Volume III of these Transactions, containing the Public Safety and Home Safety Sessions, is being mailed automatically to certain members of the National Safety Council who are believed to be interested in the subject. Any other member of the Council may also receive a copy of this Volume III without charge by requesting it.

SIXTEENTH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Marine Section

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Vice-Chairman, (In Charge of Membership and Publicity), ARTHUR M. TODE, The Texas Company, New York City.
Vice-Chairman, (In Charge of Posters and Slides), ROBERT F. HAND, Standard Oil Company, (N. J.), New York City.
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Vice-Chairman (In charge of Stevedoring), F. P. FOISIE, Waterfront Employers Association, Seattle, Wash.
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Tuesday, September 27, 1927

CAPTAIN WM. P. KAIN, Chairman

Manager, American Steamship Owners' Mutual P. & I. Association, New York City

The first session of the Marine Section of the National Safety Council was called to order at nine-forty o'clock by the chairman, Capt. Wm. P. Kain, manager, American Steamship Owners' Mutual P. & I. Association, New York City.

CHAIRMAN KAIN: The section has devoted a great deal of time and attention to the matter of posters. I don't believe at the present time that the poster situation, so far as the Marine Section is concerned, is entirely satisfactory. We have had some difficulty in getting the kind of photographs and material we desire. I believe that during the coming year, we will probably make a much better showing in that respect than we have during the present year.

Capt. Evans will you give us just a short summary of what you have been doing with the statistical records?

CAPT. I. L. EVANS (U. S. P. & I. Agency, Inc., New York, N. Y.): A committee has been called upon, whose principal object is to account for how gauge glasses are manufactured and by whom and why, and also to give the reasons why they break. As a result, I made quite an exhaustive study of the subject and prepared an article which I submitted to the chief engineer of the Council for distribution.

In the matter of statistics, no particular progress has been made by the committee, because they have had no ground upon which to work. The Department of Labor has been working upon the subject of statistics through the cooperation of the steamship owners and other sources, to obtain information for the U. S. Compensation Commission. That, I might say, I propose to refer to more specifically and in detail later in my paper, so it will be a matter of record. I think there is nothing else to be said on behalf of the committee at this time.

A. M. TODE (Texas Company, New York, N. Y.): The substance of the report which I have delivered to your chairman shows that during the past year, we admitted 70 new members to the section. It is quite interesting to see how they are classified.

Annual Report of Membership Committee

At the 1926 Annual Safety Congress held in Detroit, there were enrolled with the Marine Section a total of sixty (60) members. The Membership Committee appointed at that time set as its goal the increasing of the Marine Section membership 100 per cent, a feat never before accomplished by any section of the National Safety Council during the space of one year. Due to the efforts of the several members of your committee, and through the assistance accorded the committee by other members, the Membership Committee now reports that the goal has been achieved. There are now on the rolls of the Marine Section 127 members, an increase of 70 members, equivalent to an increase for the year of 117 per cent.

Number of members in Marine Section as of October 1, 1926.....	60
Cancellations of members received from October 1, 1926, to September 26, 1927	3
	57
Number of new members admitted to Marine Section from October 1, 1926, to September 26, 1927.....	41
Subsidiaries and affiliations of members admitted to Marine Section from October 1, 1926, to September 26, 1927.....	29
Total for year 1927.....	70
Total membership of Marine Section as of September 26, 1927.....	127

The 70 members admitted to the Marine Section during the past year are classified respectively:

Petroleum corporations operating steamships.....	16
General freight and passenger steamship companies.....	14

Marine Section

5

Shipyards and repair yards.....	5
Stevedoring companies.....	6
Industrial companies and equipment manufacturers.....	12
Railroads operating floating equipment.....	2
Insurance companies.....	2
Maritime associations.....	3
Personal membership.....	4
Nautical schools.....	1
Miscellaneous	5
Total.....	<u>70</u>

Summary of Section Memberships

Among our 127 members are included the majority of the great American petroleum corporations, some of the largest and most influential American passenger and freight steamship companies, the largest railroads operating floating equipment, important shipyards, repair yards, stevedoring companies, industrial organizations, etc. A summary of our membership, the large majority of whom are actively and consistently prosecuting accident prevention work in their respective organizations reveals:

Petroleum corporations operating steamships.....	26
General freight and passenger steamship companies.....	24
Shipyards and repair yards.....	8
Stevedoring companies.....	12
Industrial companies and equipment manufacturers.....	13
Railroads operating floating equipment.....	19
Insurance companies.....	5
Maritime associations.....	6
Personal memberships	4
Miscellaneous	10
Total.....	<u>127</u>

Respectfully submitted,

Captain R. C. Brennan, Pacific Steamship Company,
 Wm. L. Bunker, California Petroleum Corporation,
 Alexander Hynd, Garland Steamship Company,
 C. D. Kennedy, Waterfront Employers' Association of Portland,
 Fern Wood, Williams Steamship Company,
 G. D. Zeh, Associated Oil Company,
 Arthur M. Tode, chairman, The Texas Company.

CHAIRMAN KAIN: I believe, Mr. Tode, you are the only representative of the nominating committee present and I ask you to report tomorrow.

We will now devote our time to the papers and discussions that are on the program. The first paper is entitled "The Maritime Safety Movement and Its Relation to America's Merchant Marine Problem," by Mr. Norman F. Titus, chief, Transportation Division, Bureau of Foreign & Domestic Commerce, U. S. Department of Commerce, Washington, D. C. Unfortunately, Mr. Titus has been in Europe during the greater part of the summer and he was not able to get back in time to attend the Congress. Mr. Roberts of the Department of Commerce will read Mr. Titus' paper.

The Maritime Safety Movement and Its Relation to America's Merchant Marine Problem

Norman F. Titus, Chief, Transportation Division, Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Washington, D. C.

Americans, generally, are beginning to realize quite definitely that their country can no longer pursue a policy of isolation and self-sufficiency. Irresistible economic forces, largely due to the World War, have brought about new conditions which are presenting problems demanding early recognition and settlement.

As a result of its economic evolution, the United States is now a creditor nation; this is a new role, for hitherto it has been a debtor nation. This new development inevitably will produce profound changes in our economic status and force upon us new lines of action and new responsibilities. It is possible that, very shortly, we shall be importing more than we export and thus shall have an unfavorable trade balance. Such a change, however, will be accompanied by a great development of other functions of service, the payments for which are classified as invisible items on the international balance sheet. In other words, America may buy more than she sells, but she will equalize matters by acting as banker, ship-owner, insurance underwriter and investor for other nations. In this way other nations will pay invisible tribute to her. The study of economic history reveals the operation of these principles with great clearness.

However, it does not take a student of economics to recognize the growing importance of the necessity for an American merchant marine; the mere fact that the United States has a foreign trade of ten billion dollars a year, and that the freight bill for transporting this great quantity of goods is six hundred million dollars a year, is proof enough that our merchant marine is an imperative necessity. Obviously, as good merchants, Americans should do as much of their own delivering as possible.

Nevertheless, it does not require any evangelist to expound the doctrine of an American merchant marine as the American public is already strongly on record concerning this matter. Ever since the World War taught us the supreme importance of shipping, we have been clamorous for a merchant marine. Only last year this fact was evidenced in a most emphatic manner. The Shipping Board had been called upon by the United States Senate to prepare and submit to it comprehensive and concrete plans for building up and maintaining an adequate merchant marine, either publicly or privately owned and operated, for commerce and national security. The Board supplemented its own study and investigation by conducting public hearings in thirty-three cities, and also by addressing nine thousand questionnaires to representative organizations and individuals throughout the country.

The result of these inquiries was summarized in three statements:

- No. 1. It was unanimously held that the United States should have an adequate merchant marine for national defense and commerce.
- No. 2. With almost equal unanimity it was held that the merchant marine should be privately owned.
- No. 3. With equal unanimity it was held that until it is made possible for private interests to successfully own and operate the American merchant marine, the Federal Government must continue to do so.

Thus we have a clear and definite public affirmation of our merchant marine policy in favor of private ownership and operation as enunciated in the Mer-

chant Marine Act of 1920. This is as it should be, for one of the fundamental principles of our democracy is the preservation of the vital initiative and enterprise of our people. This statement of principle may be clear, but the actual putting it into practice constitutes our American merchant marine problem.

It has been pointed out repeatedly that the prerequisite of any successful operation of American merchant vessels in the foreign trade by private initiative is equality of opportunity with our principal foreign competitors. All that American shipowners have ever asked is an even start with their competitors; with this even start they guarantee profits. If they cannot guarantee profits, the investor will turn elsewhere, and without a supply of funds an American merchant marine would be an impossibility.

Three Issues to Be Met by Ship Owners

At the present time there are three issues that have to be met in order to achieve the necessary equality of opportunity for American shipowners. They are:

(1) The capital charges of our shipping must equalize those of our foreign competitors.

(2) Operating costs must approximate those of our competitors.

(3) Investors must be definitely assured of freedom of private owners from government competition; in fact, the menace of the great government fleet must be removed once and for all.

These various factors are too well known to require elucidation, for they have been debated in and out of Congress for years and there is a very extensive literature on the subject. Suffice it to say, however, that these disadvantages arise both from legislative requirements and restrictions and also industrial charges, all of which, in the main, have their genesis in commendable causes—better wages and better conditions for American labor.

Many solutions have been offered for these difficulties; but, while it is obvious that some form of governmental aid must be extended to maintain a merchant marine adequate for commerce and national security, nevertheless, the public and shipowners generally have looked with disfavor on any subsidy based on the tonnage or speed of the ship or upon the size or organization of the crew. Out of the continuous discussion, however, has been evolved a plan which is now meeting with such favor. It calls for a vigorous adherence to the spirit and letter of the Merchant Marine Act of 1920, quickly reducing government operations and placing ships in private hands under what is known as the trade route contract system.

This plan first calls for a committee of inquiry composed of representatives of shippers, ship owners and government departments to determine exactly which trade routes are vitally necessary.

The next step is a study of each individual route and an evaluation of its physical operation. In this study the committee will consider all factors of physical operations, cargo offerings, competition, etc.; it will determine what it should cost to maintain a service of a certain definite number of sailings per year. If the route can, in the judgment of the committee, be operated under normal conditions at a profit, then no governmental aid would be recommended. If, however, aid is necessary, the committee will determine the amount. After all this investigation has been completed, the plan proposed is that the government shall contract with private owners to render service in each route, the government paying a bonus of such a sum as the committee determines.

There are many details connected with this scheme. For instance, the Chamber of Commerce of the United States holds that the routes should be put up

for competitive bidding. Others hold the view that the government shipping organization should be revamped. At any rate, this trade route contract plan seems to offer a feasible solution of this merchant marine problem that has vexed us so sorely. Such a solution would guarantee equality of opportunity and enable our shipowners to get an even start in maritime competition.

However, this theory of trade route contracts is only half the story; for once we place our shipowners on even basis with foreign shipowners, American genius will be called upon to produce and maintain that refinement of operation that will give the same supremacy in maritime affairs that America possesses in industry. If this supremacy is to be attained it must be acquired by the same methods; the shipping executive must display the same capacity for efficiency, economy and scientific management that his brother industrial executive displays.

A Successful Battle with Rising Costs

For over a generation American industry has been battling with the question of higher costs and has been conspicuously successful in its efforts. So striking have been the results that, during the last two or three years, delegations and commissions from Europe have arrived in this country to study our industrial methods. Their purpose has been to ascertain how we could pay the highest real wages in the world and still compete with other nations in the world's markets. These visits were a frank recognition of our industrial supremacy; this supremacy being based upon original methods, most of which are distinctively American.

The shelves of every library are weighted with books dealing with the subject of American industrial methods. In these volumes we find our educational and social systems analyzed as to their effects upon our industrial progress; there are books without number upon mass production, refinements of methods and machinery, discussions of the human element in business, elimination of waste, scientific management, employee representation, safety engineering, cost accounting and many allied subjects.

Although industry has made such a remarkable record in the solving of its problems, apparently it has never occurred to shipping executives to profit by this experience. Railroad executives have been more alert, however, for during the last five years they have adopted many of the principles found in industry with the result that a veritable revolution has been wrought in railroading. The developments in railroading, through more scientific management and speeding up of service, have been such as to have produced remarkable effects upon business generally. The reduction of stocks in merchandising and similar changes, have been largely due to the improvement in rail transportation.

Herein lies a tremendous opportunity for shipping. By concerted and militant effort on the part of shipowners, the government aid program based upon trade route contracts can be consummated. With this achieved, shipping would have the equality of opportunity that has long been its dream. With this dream realized, adoption of the same intelligent and scientific methods as prevail in industry would make our merchant marine an outstanding success.

In launching such a new program the maritime safety movement is, undoubtedly, one of the most obvious and promising methods of attack. For several years, especially the last two, shipping has been laboring under excessive costs for personal injury insurance; this has been due to the increasing severity and number of accidents. As the increase in rate has been caused by excessive accidents, the remedy is to reduce the number of accidents. Industry has faced

this same issue for twenty-five years and has successfully met it with safety engineering.

Thus shipping has a great evil, but a remedy lies ready at hand. Wherever tried, safety engineering has been remarkably successful. Its general adoption by American shipping would be a first step in a program of efficiency, economy and scientific management that would put shipping on the same plane as industry and make possible real American maritime supremacy.

CHAIRMAN KAIN: Gentlemen, you have heard the paper which Mr. Roberts has just read. We are open for discussion.

CAPT. I. L. EVANS (U. S. P. & I. Agency, Inc., New York City, N. Y.): From my view of the situation, the conditions and problems and the possibilities which Mr. Titus has described in the paper are so obvious they are hardly open for discussion. I don't believe there is anyone to take issue—we all agree with them. The only problem to be answered is how to get them put into effect.

MR. ROBERTS: I presume your educational campaign would have something to do with that—posters and so on.

CHAIRMAN KAIN: The next paper is entitled "Marine Statistics and Their Relation to Seamen's Compensation," by Capt. Irving L. Evans, U. S. P. & I. Agency, Inc., New York City.

CAPT. EVANS: The title of my paper is a little more narrow in fact than I have treated the subject. In a way, it fits in with the paper by Mr. Titus. Here, again, we have the problem of trying to make the ship owners see the advantage of taking up and following some of the suggestions which have been and are being made.

Marine Statistics and Their Relation to Seamen's Compensation

Irving L. Evans, Vice-President, United States P. & I. Agency, New York City

There are many excellent reasons why every American ship owner should be deeply interested in marine accident statistics.

The use of the word "statistics" seems to have the same effect upon many marine men that a rough sea ordinarily has upon a landsman. Statistics, as here used, means only complete information about a particular and important phase of the ship owner's business, to which he now pays but slight attention, because usually he is relieved by insurance from financial responsibility for accidents occurring on the ships.

The ship owner has complete information, or "statistics," as to the methods and sources of obtaining cargo and passengers to carry and thereby earn revenue. If American ship owners are to compete successfully with foreign flag vessels, they must look not only to increasing the tonnage to be carried in American bottoms, but also to the reduction of overhead and operating expenses. This can be done, to some extent, at least, by wise and intelligent handling of the information constantly passing through the office of every ship owner. It is in the form of reports of accidents, damage and loss, also the payment of many claims. This applies not only to claims for personal injuries, illness and deaths, but to cargo damage, shortage and other claims.

Complete information, or statistics, covering marine accidents and claims will not only enable ship owners to reduce the number of accidents and claims, and thereby save, through a reduction in the total amount paid for claims, insurance premiums, or assessments under compensation laws, but will place them

in a position to deal intelligently and successfully with proposed Federal legislation, whether favorable or adverse.

At the annual meeting of the Marine Section of the National Safety Council at Cleveland, Ohio, on October 1, 1925, I stated that, in my opinion, there would soon be a Federal Compensation law covering the marine industry. Just twenty-one months later such a law, covering a large part of the industry, went into effect. It needs no stretch of imagination to foresee the presentation to Congress, in the very near future, of a proposed Compensation Law for the entire marine industry. This will come, I believe, either as an amendment to the present act, which became effective on July 1, 1927, to modify and change that law and include the men on seagoing ships, or as a separate act to cover seamen. I am reliably informed that steps will be taken, by the organization representing the men covered by the existing law, to increase the maximum allowances and to make other changes for their benefit. The consensus of opinion seems to be that there is room for improvements in the law, which should benefit the ship owners as well as their employees.

A Safety Code for the Marine Industry

The ship owner should not only have complete information to insure the passage of fair and reasonable amendments to the existing compensation law, when, and if made, but also to inaugurate the presentation and adoption of a safety code for the marine industry. Such a code is bound to come, and, in my opinion, will be introduced in Congress in a comparatively short time. It will undoubtedly cover the marine industry as a whole, when it comes, because the United States Compensation Commission has already been authorized and directed, by Section 41 of the present Federal Compensation Act, covering longshoremen and harbor workers, to investigate and study safety provisions and causes of injuries in employments covered by the act; also from time to time to make to Congress, and to employers, such recommendations as it may deem proper, as to the best means of preventing accidents.

American ship owners are already over-regulated to a point where they are hampered in competition with ships of other nations. The only way they will get relief through helpful and favorable legislation is, in my opinion, by being prepared to inaugurate and work for the repeal of certain laws and parts of laws, together with the modification and passage of others.

Our ship owners are found fighting before Congressional committees, trying to have proposed adverse legislation, initiated by others, modified, far more often than they are found working for the passage of something favorable which they have themselves initiated. In order to inspire confidence in Congress and to secure the support of the public in favor of improved legislation in aid of the American Merchant Marine, ship owners must be prepared to present facts to Congress in statistical form to justify and substantiate their recommendations. This can and will be done only when the ship owners, working through some central body or organization, place their combined knowledge and experience, in statistical form, where it can be used for their mutual interest and benefit. This principle applies whether they are working for the prevention of accidents, the adoption of a safety code, or the passage of a ship subsidy bill.

Before attempting to fight for the passage of favorable laws or to defeat those that are unfavorable, complete information, or statistics are necessary. Every ship owner recognizes and appreciates the value of statistics, or exact information, when he has to appear before a Congressional committee.

Statistics, as such, have little, if any, intrinsic value, but they are highly

valuable as beacon lights to guide the actions of those seeking to accomplish a definite purpose. No compensation law can be prepared, enacted and administered intelligently without statistics, to be utilized as rules and guides for those dealing with the subject.

We often hear statements made to the effect that statistics cannot be kept of accidents in the marine industry, and particularly those occurring on board ships, because the hours of labor are too irregular and uncertain. We know, from the splendid work done at Seattle, Washington, by the Waterfront Employers, and others elsewhere, in compiling, classifying and recording exact statistical information covering injuries to longshoremen at that port, and the causes thereof, that that branch of the industry can be properly handled.

There seems to be some doubt and confusion as to what information should be kept and recorded to be of value. There are some principles followed in compiling standard accident statistics which are applicable to the marine industry, in my opinion, based upon my knowledge and experience in that industry, with particular reference to the men afloat.

The marine industry is seriously handicapped in that there is no central source of information, reliable or otherwise, showing even approximately the number of deaths and permanent personal injuries, to say nothing of accidents of a less serious nature occurring on board ships.

Three Factors in Standard Accident Statistics

The record in standard accident statistics consists of three factors, which are used in practically all branches of industry. They are:

1. The exposure factor, determined by the total hours worked.
2. The frequency factor, shown by the number of accidents.
3. The severity factor represented by the time lost by reason of accidents.

In the standard plan accident severity rates are figured upon the days lost per each thousand hours worked; and accident frequency rates are based upon the number of lost time accidents for each million hours worked.

Accident severity rates and frequency rates can be determined from the above basic data, in the marine as well as in other branches of industry.

The accidents may be divided into three groups. First, those causing only temporary disability; second, those causing permanent disability, either partial or total, and, third, those resulting in death. The next important steps are: (a), to record the number of accidents causing loss of time beyond the shift or watch on which the men are injured; (b), the number of days lost on account of such accidents, and, (c), the total number of hours worked by all employees during the period under consideration. For temporary disability, the actual number of days lost, exclusive of Sundays, is employed in standard accident statistics. In cases of permanent partial or total disability and deaths, the time lost is determined by consulting a table which forms a part of the standard accident statistical plan. Standard accident statistics may, therefore, be used in the marine industry as a whole, in my opinion, for the following reasons and with the following slight modifications and exceptions:

Section 2 of the Act of March 15, 1915, commonly called the Seamen's Act, provides that "the sailors shall, when at sea, be divided into at least two watches and the firemen, oilers, and water tenders into at least three watches, which shall be kept on duty successively for the periods of ordinary work incident to the sailing and management of the vessel."

The Supreme Court of the United States in the case of *William O'Hara et al vs. Luckenbach S. S. Co.*, 1926, A. M. C. 149, decided in effect, on January 4, 1926, that it was unlawful to divide crews of ships into watches or to work them

while at sea other than as required or permitted by Section 2 of the Seamen's Act, except, of course, in the event of an emergency.

This makes it clear that deck crew, the sailors, may be worked for twelve hours out of twenty-four and the engine and fire room crews worked only eight hours out of twenty-four while at sea. The hours of work of the licensed deck and engine room officers, the mates and engineers, while at sea are also limited by law to eight hours in twenty-four, except in cases of emergency.

The law does not fix the hours of the men in the steward's department, those preparing and serving meals, shall work while at sea. Their hours are long and irregular, but it will be fair, for statistical purposes, to adopt twelve hours in twenty-four, the same as may be lawfully required of sailors.

Necessary Work Must Be Done on All Days

It is apparent that while at sea ship's crews must work Sundays and holidays, watch and watch. Section 2 of the Seaman's Act also provides that while such vessels are in a safe harbor, no seamen shall be required to do any unnecessary work on Sundays and certain specified regular holidays, but this does not prevent the performance of work by the whole or any part of the crew, necessary for the safety of the vessel or her cargo and for several other specified purposes, nor does such provision prevent the dispatch of a vessel on her regular schedule or when ready to proceed on her voyage. The work that may be and is required at any time during the voyage, even when the ship is in a safe harbor, is, therefore, so varied and extensive that no change from the watch and watch basis of computing hours of labor would seem to be necessary or advisable.

Crews are usually signed on within twenty-four hours of sailing time and frequently start to stand watch and watch from that time. They at least start on sailing day. It would be fair, therefore, to take as the basis, for statistical purposes, the number of hours per day which men may be worked lawfully and apply that for each day from the beginning until the end of the voyage, starting the day the crew signs articles and continuing until they are paid off, which must be within forty-eight hours after the ship is entered at the Custom House. Whether the sailing and arriving days should be used, or the days articles are signed and the crew paid off is unimportant so long as a uniform policy is adopted. This latter is important and the coastwise voyages would have to be arranged on the same basis as those in foreign trade. It is not only necessary that a uniform basis for keeping statistics be adopted, but that uniform reports and other forms be used.

Section 2 of the Seamen's Act provides that "at all times while such vessel is in a safe harbor, nine hours, including the anchor watch, shall constitute a day's work." Nine hours work per day, therefore, is the proper basis to use for all members of a ship's crew between the end of one voyage and the commencement of the next. Since the hours of labor in port and at sea are fixed by law, that requirement furnishes the best basis for statistics.

The increase in the membership of the Marine Section from sixty one year ago to more than twice that number at the present time is excellent proof that broad interest has been aroused in accident prevention work. Another proof of increasing interest is the fact that during the past three months the U. S. Department of Labor has had a corp of experts checking over the records of steamship companies and other sources of information, to obtain data about actual injury and death cases which have been handled, in order that these facts may be used before Congress, by the United States Employees' Compensation Commission, to demonstrate whether or not a compensation law for

seamen would be better than the present unsatisfactory and economically unsound plan of compensating them for their injuries.

The ship owners, without exception, have shown keen interest in the compilation of the desired information and have either made their records available to the Department of Labor or volunteered to themselves obtain the information from their files, at their own expense, and place it at the disposal of the Government. No better proof of their interest in the subject could be desired or obtained.

I am advised, however, by the representatives of the Department of Labor that of all the many files examined by them personally, estimated to me at more than two thousand, only about 10 per cent contained complete information which would enable them to determine, for statistical purposes, the number of days lost by the man as a result of an accident, the amount of money, if any, paid for injuries, whether he had been paid wages to the end of the voyage, period of hospitalization, etc. This information had to be obtained by the representatives of the Department of Labor from independent sources, although it was easily obtainable and should have been in the files in practically every case.

It would appear, therefore, to be of vital interest and importance to ship owners to collect, classify and distribute such information through their respective associations, or otherwise. Acquiring knowledge is of little consequence unless one applies the knowledge acquired.

The ship owners have demonstrated their interest in the safety movement and if they would know the value of the idea, they should try it out.

A More Minute Study of Statistics

CHAIRMAN KAIN: Gentlemen, we are now open for discussion on Capt. Evans' paper.

R. E. PROUTY (Aetna Life Insurance Co., New York City): I think most of those present are familiar with the fact that I wrote an article on the general subject of accident statistics in the marine industry, which appeared in the NATIONAL SAFETY NEWS. The basis which I suggested for the securing of exposure figures was somewhat different from that suggested by Capt. Evans. I am not attempting to show that my plan is better than the other. I know, however, that we have a gentleman here who arrives at his exposure in a slightly different manner, and I wonder if Mr. Arkills won't say something.

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): Since Capt. Evans' paper was presented in Cleveland two years ago, I have looked back upon that as one of the fundamentals of statistical gathering. It gives the whole general plan for such work. What we need to do now, I think, is to go more minutely into the different branches outlined in that paper. To answer the question on exposure, we are arriving at our exposure through well formed statistics that are available in our office as to the actual earnings of the men working on the waterfront. We have their average daily wage, their average hourly wage, including time and overtime and penalty time, which in our port for last year amounted to \$1.03½ per hour worked. Now, if you take the payroll of any employer operating in those ports on Puget Sound where these men serve, if you divide that payroll by one dollar three and one-half cents, it gives you the main hours of exposure, which to us is a rather simple way of arriving at the amount of exposure.

I would like to mention a couple of other items in connection with Capt. Evans' paper of today. He mentioned something about the causes of accidents. It is my candid opinion, that if we would go to the very cause of each accident and group those accidents of similar nature, show the actual cause, we would find some very willing engineers when it comes to making certain deck equipment changes. For

instance, on some ships, I am sure that winches would be thrown in the bay and new winches installed, and they would be paid for in three or four trips on just the cargo broken through faulty winches and faulty gear.

Now, to go to another subject that Capt. Evans touched on today, this matter of a safety code which the commission is to suggest to Congress and to the employers. One of our employers takes the attitude that when that is suggested to him he can turn it down. I tried to disabuse his mind of that idea. I would like an expression from this group as to whether or not it is possible for the employer to have very much to say when the code is suggested. Going on the thought that it will not amount to much, the employer's viewpoint on this, we have gone ahead and drafted a tentative safety code. I have given out a few copies to those present, and I certainly want to see the blue pencil stuck through that in every place there is a possible chance to make a hole. If we adopt a safety code, I think we should have one that spells safety and not bureaucracy, and it should be a minimum safety code in every regard and not the maximum requirement.

CHAIRMAN KAIN: Mr. Arkills, I would like to ask you how that code is being prepared. Is it by one or two men.

Safety Committee Helped in Formulating Rules

MR. ARKILLS: Our safety committee over a period of three years covered 50 items that were suitable to be worked over into rules of action. That formed the nucleus about which we started to build this code. The English laws on maritime shipping and safety laid down a few more. We have revamped some of those, or Americanized them, and we then took up everything else that we could get from industry that would in any way fit the marine industry, and have worked them into this code. I imagine there are about 200 items in it now. There are at least 50 more that I shall want to put in it myself when I return to Seattle, together with those that are coming in daily from the mimeograph copies that I have sent out for blue pencilling by more of our employers and safety engineers around the town.

CHAIRMAN KAIN: Do I understand this code is to cover the entire operation of ships?

MR. ARKILLS: Owing to the fact that the compensation act, as it is now written, does not cover ship operation, we haven't gone into that; excepting where it does say "ships," we have covered some items. I think they will all be cut out.

CHAIRMAN KAIN: Is it your intention to submit that to all the ship owners on the Atlantic coast, for instance, before adopting it?

MR. ARKILLS: I haven't copies enough at present, but I should be glad if you thought possibly you could have mimeograph copies made in New York.

CHAIRMAN KAIN: It would be very helpful to do that.

CAPT. EVANS: In answer to Mr. Arkills' statement about the employer at Seattle who felt inclined to turn down the suggestion of the Compensation Commission if made, I think legally and technically he is entitled within his rights, because the act merely provides that the commission has power to suggest to Congress or to employers. If they have power only to suggest to Congress, we would certainly not say that the suggestion was law. If, therefore, we suggest to the employer, it has no more effect than the suggestion to Congress and there is no provision for any penalty in the act or elsewhere for his failure to follow the suggestion.

Now as to the basis for getting statistics, while I have read the article prepared by the chairman of our program committee, I feel that the basis for getting a thing of this kind on board ships, the basis for hours of labor, must be that which is fixed by law and which is actually followed. I don't see how you can take any other basis in the ship personnel, because that is the one which is followed.

I should like to suggest to this section that the chairman be authorized to take up with the steamship owners, who are members of the association, the question of appointing a committee to work with the Marine Section and its officers and committees, on a plan to suggest to the Steamship Owners Association a basis for getting at statistics for the marine industry. I offer that as a motion.

(The motion was seconded, was put to a vote and carried.)

CHAIRMAN KAIN: In that connection, I might read an article from the Council which deals in a general way with what is known as safe practices pamphlets or semi-technical papers on subjects which are of specific interest to the various industries represented in the National Safety Council.

A Plan for Sectional Safe Practices Pamphlets

Suggestion. It has been suggested that next year each industrial section should complete three safe practices pamphlets on semi-technical subjects which are of specific interest to the industry represented by that section.

What Has Already Been Done. Several sections have already done some work of this kind so well that other sections should be encouraged to undertake similar projects. For instance, the Construction Section has one sectional pamphlet on "Construction Work"; the Paper and Pulp Section has one pamphlet on "Paper and Pulp Mills"; the Metals Section two pamphlets, one on "Cleaning and Finishing Room in Foundries," the other on "Blast Furnaces"; the Mining Section has two pamphlets, one on "Underground Mine Cars and Haulage," the other on "Mine Rescue Training and Operation"; The Textile Section one on "Cotton Mills"; and the Public Utilities Section one pamphlet on "Protection of the Public in Public Utilities Operations." Sample copies of several of these pamphlets are attached to this letter.

How to Get Started. If this general suggestion is approved by your section, the chairman of your Engineering Committee might be given responsibility for working out the detailed plans. His plans and recommendations would be submitted to your Executive Committee; if approved, he would be asked to do everything necessary to put the plan into effect.

Suggested Plan. Attached is a list of all subjects which have been discussed at Congress meetings of your section. After each subject are listed the names of those men who spoke on that subject.

It is the suggestion that the chairman of your Engineering Committee study this list of subjects, making such additions as may be necessary to secure a complete list of all of the major accident problems in your industry. Then from this list select at least the three best subjects which could be developed into three Safe Practices Pamphlets.

A special committee of five to ten members of the section should be selected to handle each subject. In selecting a committee, it might be advisable to give special consideration to the men who spoke on the given subjects at the Congress. If a certain man presented a formal paper on that subject, perhaps he might be made chairman of the committee.

As soon as a committee is appointed, the Council's staff will send the chairman of that committee a copy of the congress paper which was presented on that subject, together with all other related data that is available. The committee will use this paper and data in preparing its pamphlet report.

Work of Committee. Members of the committee may be asked to meet from time to time, but the majority of the work can undoubtedly be done through correspondence. The work may be divided through the appointment of subcommittees, or the

chairman of the committee may find it necessary to prepare the first draft of the report single-handed. Copies of this draft can be given to each member of the committee for review. The committee chairman should take the criticisms and suggestions for improvement which come to him from his committee members, correcting his first draft accordingly, and then send out copies of a second draft for further review. He will go through this process until one draft (it may be the second, third, fourth or fifth draft) is approved by the majority of the committee. This draft should then be presented to the sectional executive committee for final approval and publication by the National Safety Council.

Reasons for Adopting This Plan. (1) This will bring out into the open much good data that is now "buried" in the congress proceedings.

(2) It will bring up to date and summarize all existing data on a given subject.

(3) Each pamphlet will present the cumulative experience of a group of members. As it is now, each congress paper presents the viewpoint of but one man.

(4) It will multiply the number of active workers in each section. It would be ideal to have every member of the section actively working on one or more committees.

Won't you please see that the contents of this letter are discussed and understood by the members of your section? Then notify this office what action is to be taken.

Sincerely yours,

W. Dean Keefer, Chief Engineer and Director,
Industrial Division, National Safety Council.

A List of Subjects and Authors

<i>Year</i>	<i>Subject</i>	<i>Author</i>
1923	Marine Fire Hazards	F. S. Titsworth, Attorney, New York City.
	Ship Stevedoring Hazards	W. E. Welch, Travelers Insurance Co., Hartford, Conn.
	Uses of the All-Purpose Canister Gas Masks Aboard Ships.	Capt. S. M. McBride, Chemical Warfare Service, Washington, D. C.
	Need and Functions of Ship Safety Committees.	George A. Marr, Secretary, Lake Carriers Assn., Cleveland.
	Carbon Dioxide in Marine Fires.	Chas. L. Jones, Institute of Ind. Service, Pittsburgh, Pa.
	Ship Personnel Hazards	Capt. Irving L. Evans, U. S. P. & I. Agency, New York City.
1924	Maritime Casualties	R. F. Edwards, Prudential Insurance Co., Newark, N. J.
	Reducing Accident Costs in Water-front Work—the Conflict Between Compensation and Admiralty Laws.	J. F. Fouhy, Manager, Smith Insurance Service, Inc., New York, N. Y.
1925	Fuel Oil—the Elimination of All Hazards Incidental to Its Handling.	J. H. Welter, Manager, Barber Asphalt Co., Maurer, N. J.
	Organizing for Safety on Board Ship.	A. R. Bush, Barber Asphalt Co., Maurer, N. J.
	Marine Statistics—Their Value and Compilation.	R. F. Edwards, Prudential Insurance Co., Newark, N. J.

Marine Safety of Personnel.	Capt. Irving L. Evans, U. S. P. & I. Agency Emergency Fleet Corp., New York, N. Y.
A Year's Attack of Stevedoring Accidents on Puget Sound.	M. E. Arkills, Waterfront Employers of Seattle, Seattle, Wash.
1926 Accident Prevention on Tank Steamships.	A. M. Tode, Marine Department. Texas Co., New York, N. Y.
Safety Engineering as Applied to Shipbuilding.	R. E. Prouty, Aetna Life Insurance Co., New York, N. Y.
Protection and Indemnity Insurance in the United States.	A. J. Smith, Marine Office of America, New York, N. Y.
Inventive Genius Developed by Ship Safety Committee Work.	George A. Marr, Secretary, Lake Carriers Assn., Cleveland, Ohio.
Accident Prevention Work in Passenger, Automobile and Freight Ferry Service.	W. S. Wollner, Northwest Pacific R. R. Co., San Francisco, Calif.
Safe Practices in Steamship Terminal Operations.	A. C. Warfel, Hartford Accident & Indemnity Co., St. Louis, Mo.

Valuable Data That Should Be Utilized

CHAIRMAN KAIN: There is attached to this letter a list of the subjects which have been discussed before the Marine Section of the Council from its inception. I think there is a great deal of valuable data in many of those papers, in fact I am sure there is, and that data together with the valuable papers that are being presented at this session of the Congress, will undoubtedly be of considerable help in the work of preparing a pamphlet for the coming year.

I think some of the steamship companies are represented here. I would like to have an expression of opinion on the advisability or inadvisability of drafting a code of safe practices in connection with steamship operation.

M. D. McINTYRE (Pickands, Mather & Co.): I think the code would cause a lot of trouble.

CHAIRMAN KAIN: I think the various industries represented in the Council have had that very point in mind. We all know, for instance, that state legislatures and the federal Congress are very much inclined to grab anything that is labelled a code and introduce it into the various legislatures to become law. Of course, once that is done, it is more or less an inflexible proposition and there is always danger that there will be features introduced which, while they might do in one section of the country or in one branch of industry, would work hardship in another section of the country or in some other branch of industry.

We, of course, know there are a great many types of ships in service and that they are operating under various conditions; so it seems to me that it would be rather dangerous to bring out a code unless it had first been criticized and examined by practically everyone in the industry and had met with their approval.

R. E. PROUTY (Aetna Life Insurance Co., New York City): Mr. Arkills evidently has a code in mind and it would be wise, if it could be so arranged, that the material which the Waterfront Employers of Seattle and the West Coast are working on could be used not for code purposes, but rather as a contribution toward a safe practice pamphlet which could be gotten out merely as a suggestion by the National Safety Council.

MR. McINTYRE: Perhaps that would be of much more interest to the industry than to have a code.

CHAIRMAN KAIN: I think that point is well taken. Anything that is labelled a code is much more apt to be adopted in law.

CAPT. EVANS: I might say in that connection that the Lake Carriers' Association, of which Mr. McIntyre's company is a member, has a pamphlet containing a long list of safety suggestions or recommendations submitted by the association to its members. It contains many very excellent suggestions and some of those pamphlets were circulated among this section when its membership was not nearly the size that it now is. Many of the suggestions are applicable to the operation of coastwise ships equally with ships on the Great Lakes. They do not call that a code. It is unnecessary to call it a code. If they don't adopt a code of some kind or a practice pamphlet of some kind and attempt to do something, they will find themselves regulated upon this as they have upon most every other subject by some law from Congress. It is only that suggestion that I have been trying to emphasize—that unless those in the industry themselves take some action, they will find that something will come either from the seamen or their representatives, or from some member of Congress who has been interested in the subject through some other source.

Minimum Requirements Outlined in the Code

ELMER B. TOLSTED (Fonda-Tolsted, Inc., New York and Chicago): It seems to me that it may be desirable to bring out your code before you bring out your safe practices pamphlet. That sounds like getting the cart before the horse, but when you look at it practically, I don't think it is doing so. Your safe practices pamphlet is very likely to be taken as a standard and everything that is found to be in the safe practices pamphlet is likely to be put into the code, whereas if you start on the code, get that out first, you can add a lot of things in the safe practices pamphlet. The things in the code are requirements, those in the safe practices pamphlet are merely recommendations. Therefore, I believe that it would be desirable to bring out your code first and have it as harmless as possible, and the safe practices pamphlet can have all the recommendations you please. That is a practical recommendation, I believe, for the saving of considerable money in the industry.

CHAIRMAN KAIN: Is your idea to make that code as simple as possible? Would you adopt minimum requirements for the code?

MR. TOLSTED: That is what your code is likely to be. It is most likely to be absolute requirements, things that must be done and as such should be as simple as it can possibly be made.

CAPT. EVANS: The problem to my mind is not as difficult of solution as it might seem. The United States Steamboat Inspection Service has authority by statute from Congress to make such rules and regulations for the safety of life on shipboard as they may consider necessary and advisable. Such rules and regulations, when approved by the Secretary of Commerce, have the force and effect of law. They can be changed on 30 days' notice by merely calling a meeting of the Board of Supervising Inspectors. That is the kind of code I have in mind, but I suggest and I would recommend that the ship owners prepare themselves with such a code and go, not to Congress, but to the Steamboat Inspection Service of the Department of Commerce and suggest what should be done; get the advice, aid and assistance of that body and then put something into effect. Congress will not interfere because it will already have the force and effect of law.

If they find that it is a hardship, that it is not workable, they can go back with the suggestion that certain modifications and changes be made and in that way place themselves within the control of the proper department of the government. There will be authority back of the code, but it will not be placed where it needs an act of Congress to change it.

CHAIRMAN KAIN: Do you believe, Captain, that if that were done it would pre-empt any legislation?

CAPT. EVANS: I do because it has the same effect.

CHAIRMAN KAIN: Of course, at the present time, the steamboat inspectors are largely devoting their activities to passenger craft.

CAPT. EVANS: That is true. There is no question about their authority under the law.

CHAIRMAN KAIN: No, that is very true. Of course, there is an advantage in that they have an organization all set up to handle such matters.

CAPT. EVANS: Yes, and their men would know whether or not the different phases and suggestions were practicable or not, whereas, with all due respect to the members of Congress, they would be guided by such advice and suggestions as they would get from outside sources without practical knowledge of the subject.

CHAIRMAN KAIN: There is a feeling today, I believe, in the steamship world, that the steamboat inspectors should be curtailed rather than given more authority to impose restrictions or limitations on the operation of ships.

CAPT. EVANS: Well, I can only point to the beacons that are staring the ship owners in the face, that is, Section 41 of the present compensation law covering longshoremen and harbor workers. That has already authorized the Compensation Commission to make suggestions to Congress and to employers relative to safety provisions and cause of injury; it certainly points to future action by the commission. It points to the intention of Congress to act because it calls for suggestions upon the subject.

CHAIRMAN KAIN: Are there any other comments? I think we have covered the situation pretty thoroughly. We can go on to the next paper.

Building Safety Into Ships

H. E. Parker, Fore River Plant, Bethlehem Shipbuilding Corporation,
Quincy, Mass.

The subject upon which I have been requested to address you is one that has claimed and received the undivided attention and best efforts of naval architects, marine engineers and shipbuilders for generations past.

The hazard of travel by sea has furnished an endless subject for song and story, and the mere sight of the ocean in its immensity awes the beholder and impresses him at once with the sense of its resistless power and of his own insignificance.

Mankind has built vessels, of varied forms of construction, for centuries, and in them has used all the navigable seas and streams of the globe for travel and trade routes, braving the hazards of storms, rocks and reefs, collisions, fire and other causes of shipwreck through which the sea has collected its enormous toll of human lives and property.

The same hazards confront us today, but we have made some progress in our endeavor to minimize these hazards and their effects, through improvement in hull construction, the use of radio-telegraphy, provision of life-saving apparatus and appliances, signalling and communication systems, fire detection and extinguishing systems, etc.

The subject is so vast that we must confine ourselves to brief mention of a few of the outstanding developments tending toward the production of safer ships and increasing the factor of safety for those who travel upon the seas.

The main factor in the development of hull construction, tending toward the greater safety and strength of ships, is the watertight subdivision of hulls.

It is obvious that the equipment of a ship with life-saving apparatus and appliances is secondary to the construction of internal bulkheads, dividing the ship

into watertight compartments which will secure such a reserve of buoyancy as will enable the ship to remain afloat for a reasonable period of time after a serious accident, and thereby insure, with the aid of proper and efficient arrangements, that all the units of the life-saving apparatus can be safely launched into the water with their quota of passengers.

About the middle of the last century some of the ships were being built of wood, some of iron, and a smaller proportion were of composite construction. Iron, as a material for ships, had definitely established itself; but many shipbuilders and shipowners preferred wood, and others preferred the structural advantages arising from the use of iron framing partially plated, with the advantages of a wooden skin to receive copper sheathing and thereby avoid the fouling of bottom which was experienced by iron vessels sailing on long voyages.

The service records of iron ships built during that period prove conclusively that, despite the limitations then imposed by the comparatively primitive rolled iron industry, the foremost builders of iron ships could, and did, design and build good ships.

The evolutionary changes in the forms of construction, as rolled iron manufacture reached more advanced stages, would be interesting to dwell upon, but, unfortunately, the limits of this paper forbid more than a mere mention of the subject.

The Old Iron Ships Had Wooden Decks

For several years following the first appearance of iron ships, they were fitted with wooden decks, which covered only stringers and tie plates, iron decks being unthought of. As ships increased in size the necessity for providing greater strength than that obtained through the use of stringers and tie plates finally resulted in the fitting of iron decks, but, at first they were covered with wooden deck plates. Later the wooden sheathing was discarded, except on passenger ships and those ships built for some special trades, and unsheathed steel decks became the usual thing on cargo steamers.

Various preparations have been placed upon the market, and used somewhat extensively, for the purpose of protecting iron and steel decks from corrosion, and, in addition, affording the other advantages associated with wood sheathing.

Now, to return to the subject of watertight subdivision. In Great Britain's Merchant Shipping Act of 1854, it was enacted that "every steamship built of iron, of 100 tons and upwards, shall be subdivided by substantial, transverse, watertight partitions, so that the fore part of the ship shall be separated from the engine room by one of such partitions, and so that the after part of such ship shall be separated from the engine room by another of such partitions; also, that every screw ship built of iron shall, in addition to the aforesaid partitions, be fitted with a small, watertight compartment inclosing the after extremity of the shaft."

These partitions, or bulkheads, were to be provided in addition to the collision bulkheads which were required to be fitted forward on all vessels of that period.

This law was repealed in July, 1862, and the reason given for the repeal was: "not because of any doubts as to the necessity for proper and sufficient watertight partitions, but because these enactments, which required only two of such partitions for all sizes and classes of ships, had become practically useless or mischievous."

It was found that in large vessels more partitions were necessary to insure

the safety of the ship, than the number required by the law in question; and it was thought better to leave builders and designers unrestricted in providing extra strength and security for the various types and sizes of ships, rather than to pin them down by statutory regulations, which could not be drawn up in such form as to cover the constantly changing needs and circumstances of the shipbuilding trade.

The loss of 233 persons in the passenger ship "London" in 1866, together with the foundering of the "Amalia," led to a meeting of the Council of the Institution of Naval Architects to consider the general question of safety of life at sea. It was considered that one of the things far from satisfactory at that time was the number, position and construction of bulkheads in passenger and other ocean steamers. Recommendations were formulated by the Council in 1867, the fifth of the list reading as follows:

"It would add much to the strength and security of steamships if transverse and longitudinal bulkheads, coal bunkers, iron lower decks and screw alleys were all so connected with the hull of the ship and each other, as to form independent cellular compartments, watertight and having all their communications with the decks and each other by watertight doors, worked from the deck. In proportioning the compartments (especially in ships devoted to passengers), it is desirable to so arrange them, that if any two adjacent compartments be filled with water, or placed in free communication with sea, the remaining compartments will float the ship. It is considered that no iron passenger ship so well constructed unless her compartments be so proportioned that she would float safely were any one of them to be filled with water, or placed in free communication with the sea. Double bottoms are to be regarded as a great element both of safety and strength in the structure of a large iron ship."

The British Admiralty Investigation of 1875

The matter of double bottoms will be considered later on in this paper, but now it is desired to call attention to the fact that the foregoing recommendations to shipowners and shipbuilders had but little effect, as was shown by the results of an investigation made by the British Admiralty in 1875, for the purpose of determining the suitability of mercantile vessels for certain government purposes. It was found that only about thirty vessels complied with the minimum requirements deemed necessary by the Council in 1867, while over 4,000 vessels failed to meet the minimum requirements.

Following this investigation there was a decided improvement in ship construction, conforming to the requirements mentioned, for in 1883 some 400 vessels were found that complied with the minimum requirements as formulated by the Council.

Many of the vessels of that period had bulkheads fitted that ended at the height of the load waterline and were therefore useless, in so far as the safety of the ship after damage was concerned; as a matter of fact such bulkheads were primarily fitted for the purpose of adding strength.

In reference to the matter of double bottoms, it was about 1860 that water ballast tanks began to form a part of the bottom structure of steam colliers. The cellular double bottom is to a large extent an evolutionary development of the "McIntyre" tank, so the early steam colliers were to that extent the progenitors of the typical mercantile steamer of today.

In 1876 a system of double bottom, bracket framing was introduced; but it was not until about 1880 that the cellular double bottom appeared in mercantile ships in a form at all resembling the present form: although an arrangement somewhat like it had been adopted some years previous in armored warships, but without the characteristic feature of the margin plates at each

bilge, with its frame attachments, which up to the present time, with some modification, is peculiar to the mercantile steamer.

In 1887 cellular double bottoms had become quite general in both cargo and passenger ships, but up to a couple of years later some of the largest and fastest ships were constructed without double bottoms, and with ordinary floors and shaped keelsons standing upon them. A few years later only vessels built for carrying petroleum in bulk, and some of the smallest cargo steamers in the coasting trade, were being built in that way.

Results shown in the cases of collision of large steel ships fitted with double bottoms have demonstrated quite conclusively the great protective value of the double bottom.

It might prove of interest to note here that ships carrying cattle from this country to England were fitted with bilge keels for the purpose of reducing rolling long before the practice became general upon passenger ships. Cattle carried by the ships were injured by heavy rolling, therefore the ships were fitted with bilge keels.

The shipping classification organizations have played an important part in obtaining increased subdivision construction in ships, particularly since 1882. Their requirements insisted upon more bulkheads for the larger vessels than were demanded by the repeal law of 1854, the increased number of the bulkheads being determined by the length of the ship, and the requirements specified the approximate positions of the bulkheads.

In 1887 a committee of the House of Commons of England, appointed to consider the laws relating to boats and other life-saving apparatus, stated in its report: "The proper placing of bulkheads so as to enable a ship to keep afloat for some length of time after an accident has occurred, is most important for saving life at sea, and a thing upon which the full efficiency of life-saving apparatus largely depends."

Bulkheads Become Established in Ship Construction

An advisory committee appointed shortly afterward by the British Board of Trade, expressed the same opinion; and in March, 1890, a special committee was appointed by that body to consider and report upon "the manner in which ships shall be sub-divided so that they may float in moderate weather with any two compartments in free communication with the sea," and further "what precautions are necessary as to openings in longitudinal bulkheads to enable the water to pass freely, or under control, from one side to the other in case of the ship showing signs of instability, as might readily be the case should she be struck on a transverse bulkhead and two compartments, both on one side, be in free communication with the sea."

The committee recommended that the suggested standard should apply to all seagoing steam vessels, not less than 47½ feet in length, which held passenger certificates under the Merchant Shipping Act and also to passenger channel steamers, irrespective of their length, whose principal employment was the carriage of passengers and mail.

Somewhat less rigid requirements were proposed for smaller types of seagoing vessels. The committee further recommended "that a compartment subdivided by one or more longitudinal bulkheads should be treated as one compartment only, unless the owners notify the Board of Trade, that the vessel will not have her stability seriously reduced, or lost, — that some part of the bulkhead deck at the side is underwater, in the event of a space between a longitudinal bulkhead and the vessel's side, or of two such adjoining spaces on the same side of the vessel being open to the sea. If the Board of Trade

is not satisfied in this respect, trimming valves should be fitted at such longitudinal bulkheads."

The report of this special committee exerted a beneficial influence tending toward a further improvement of watertight subdivision of ships and a consequent increase of safety.

The "Titanic" which sank with a loss of 1,498 lives, following her collision with an iceberg in 1912, and whose loss shocked the civilized world, had only a single skin on her sides above the double bottom. It was the general opinion that if the ship had been fitted with an inner skin carried up the sides of the ship from the inner bottom skin she would not have been lost.

After the loss of the "Titanic" her sister ship, the "Olympic," was withdrawn from service for a number of months while having an inner skin fitted.

Longitudinal bulkheads are fitted in the best and fastest ships crossing the ocean today. The additional protection afforded in the case of a collision where the outer skin of a ship is penetrated is quite obvious.

Methods of Stiffening Watertight Bulkheads

The stiffening of watertight bulkheads has been greatly improved upon. In 1860 the only stiffening provided, beyond what was afforded by the several decks, consisted of angle bars of reverse frame size spaced about 30 inches apart. The steamer of small tonnage built at that time usually had more decks than would be the case today, but the bulkhead stiffenings were, as a rule, inadequate to the task of resisting the pressure of a hold being filled with water. Lloyd's Register increased the stiffening requirements by insisting upon vertical stiffeners, of frame angle size, and the addition of horizontal stiffeners spaced four feet apart. Later on deep vertical webs at the middle line and on each side were added, their number being determined by the breadth of the vessel, and these were supplemented by semi-box stiffeners in cases where decks were not laid on the beams and by fitting brackets to the heels of the vertical stiffeners and to the extremities of the horizontal stiffeners. Subsequent developments resulted in the general practice of using vertical stiffeners only, frequently formed by flanging the edges of the bulkhead plates, which for this purpose are arranged vertically. The stiffening of the bulkheads in the way of each "tween deck" and in the holds, being governed by both the depth from the top of the bulkheads and by the height of "tween decks" or depth of holds, as the case may be. The stiffening of transverse watertight bulkheads of today is a decided contrast to that of the past.

The loss of the "Titanic," already mentioned, brought about the great International Conference on Safety of Life at Sea, held at London, England, from November 12, 1913, until January 20, 1914, with official commissioners representing the Governments of the United States (where commissioners were sent to represent the President of the United States), Great Britain and Possessions, France, Italy, Russia, Germany, Spain, Austria, Belgium, Netherlands, Norway, Sweden and Denmark, having at their disposal the knowledge, skill and experience of the world's foremost naval architects, marine engineers, shipbuilders, shipowners and navigators, united for the purpose of making a world-wide effort to minimize, so far as human skill and effort might contribute, the hazards confronting lives and ships at sea. The conference accomplished its purpose by the adoption of Articles and Regulations prescribing the standards and structures to be used for minimizing every known form of hazard to life at sea. The Articles and Regulations cover the greatest range, prescribing for sea patrol and destruction of derelicts, navigation safety laws, communication of distress signals, provisions of life saving apparatus and equipment, anti-fogging equipment, training of ship's crews in boat and fire drills, etc.

Senate Document No. 462, Sixty-Third Congress, Second Session, published by the Government Printing Office in April, 1914, defines the types of vessels in the United States to which the Convention Articles and Regulations apply.

That the modern ship, constructed in accordance with the requirements demanded by the rules and regulations adopted by the International Conference on Safety of Life at Sea, is a safer ship than any constructed in the past was convincingly demonstrated on May 23, 1927, when the steamship "Malolo," while on her trial trip, was rammed by the freighter "Jacob Christensen" while proceeding through a fog about 15 miles southwest of Nantucket Shoal lightship. Distress calls radioed by the "Malolo" after the crash brought ships to her side from every point of the compass, but they resumed their voyages later when told that the injured ship was not in need of assistance. The "Malolo" was towed to New York for repairs. A few brief extracts from an account of the accident, which appeared in the May 29 issue of the *New York Times* gives us the following information: "Her two fire-room compartments were flooded with more than 6,000 tons of water, which had poured through a great gash below the waterline, yet the ship floated on a comparatively even keel, although drawing more than her normal draught."

The Wonderful Efficiency of the "Malolo"

"An enemy ship seeking to disable her could not have selected a more vital spot," is the opinion of Rear Admiral David W. Taylor, U. S. N., retired (who was on board as an observer), "yet she remained afloat. It is unprecedented," he said, "to see a ship rammed square amidships and still float. The 'Empress of Ireland' went down in a few minutes, in the St. Lawrence River from a similar injury. You can judge how hard she ('Jacob Christensen') hit us ('Malolo') by the fact that she struck on the port side and cracked a plate on the opposite side of the boat. It hit just at the bulkhead partition. We owe our escape to the lessons learned in the 'Titanic' disaster. At the International Convention for Saving Life at Sea, in London, after that accident, the question of water-tight bulkheads, height of bulkheads and such matters were discussed and regulations recommended. This boat is built in accordance with those regulations although such construction is not a law in this country."

From the same newspaper account we learn that "after the 'Malolo' had been tied up to the Hoboken pier about one hour, divers for the Merritt, Chatman and Scott Companies went down to see the actual amount of damage done. They reported that 24 feet below the waterline there is a gash ten feet long and four feet wide, reaching for about ten feet into the hull. The divers also found four other breaks about eight inches long."

The "Malolo" carries 20 non-sinkable lifeboats, with a varying capacity of 1,016 people; 54 more than her total list of passengers and crew. Two of these lifeboats are heavy duty motor boats, each equipped with "wireless" sending and receiving apparatus and capable of towing all the other lifeboats.

The circumstances attendant upon the accident and the nature of the injury received by the "Malolo" furnish a complete illustration, requiring no elaboration, of the value of the subdivision of the hulls of ships into water-tight compartments. It is well worth the expenditure of considerable thought and money, and the effecting of compromises where necessary, if it leads to the designing and building of hulls which will not lose their buoyancy and stability when subjected to hazards of the sea and at the same time are not open to any serious commercial or financial objections.

We might note a few more points regarding the structure and equipment of ships, tending toward greater safety, before bringing this paper to a close. Ships

ships are required to steam through ice are protected by means of special framing and plating forward near the water-line. Suitable steering gear is a matter of great importance and is given special attention in the design of all ships. Submarine hull signals are of great importance. These signals travel faster and farther than in the air and have the added advantage that at the depth where the signal is being transmitted the successful transmission of signals is not prevented by the heaviest gale. Ships equipped with the receiving instruments are enabled to pick up these signals from lightships when all other means fail.

Radio-telegraphy plays such a tremendous part in the safety of lives at sea and the fact is so well recognized that the mere mention of it suffices. Lifeboats, life rafts, and other buoyant apparatus and appliances are a necessary part of every ship's equipment and are following the general trend of improvement in design and construction. For the prevention of fire on ships, the elimination of wood and other combustible material, as far as possible, will reduce the fire hazard. In addition to the usual means of extinguishing fire by the use of water and steam jets, there are several fire detection and fire extinguishing systems; some of these operate in conjunction with each other, the pipe line through which the detector indicates the presence of fire in any compartment serving also to carry the extinguishing fluid for distribution throughout that compartment, the same being operated by the turning of a valve.

The ships built today have greater strength of structure, provide greater security against the hazards of the sea and maintain a greater regularity of schedule than the ships of the past.

Some of this development and improvement can be credited to the substitution of mild steel for iron and the use of high tenacity steel for those parts of the ship's structure subjected to the principal tensile stresses. Some of the development is due to the improvements made in marine steam engines, to the application of the steam turbine and to the further advancement furnished by the diesel engine and electric propulsion.

Progress in the processes of steel manufacturing, in the rolling of steel plates and sectional material, have been conducive to more efficient structural combination and therefore to stronger and safer ships.

Judging by past performance we can look forward with great hope to the future. We cannot tell what tomorrow will bring forth, but progress ever moves forward and we have every right to believe that the ships to be built in the future will be the best and safest that the world has ever known.

Possibilities in the Use of Stainless Steel

CHAIRMAN KAIN: That is a very interesting paper, Mr. Parker, and I thank you on behalf of the section.

Gentlemen, have you any questions you would like to ask Mr. Parker in connection with his paper?

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): We have some winches now that are equipped with stainless steel. I wonder if it would be possible to use stainless steel in the hulls of ships to overcome the rust.

MR. PARKER: It is quite possible to use stainless steel at the present time, though they haven't developed it to the point where it can be used commercially for that purpose. I understand it has been considered for hulls for some time but up to the present time, the engineers say "no." That is the only reply I can make. In regard to its use around winches, that is getting to be a very general practice and I think the engineers practically recommend it.

MR. ARKILLS: Isn't that on account of the cost, perhaps?

MR. PARKER: That is what I mean, that it is not commercially used now for that reason.

CHAIRMAN KAIN: Are there any other questions, gentlemen?

A. M. TODE (The Texas Co., New York City). On the subject of stainless steel, we have used that to quite an extent on our oil tankers in the piston rods, valve stem, etc., on our oil pumps and we found it very desirable. It is true that the first cost is higher, but I think the majority of steamship owners will be glad to pay the additional price for that material when they realize how much better it works out afterwards. In the oil tanker trade, we would like to have a greater use for stainless steel, that is, we would like to have it adapted to more of our work. It is unfortunate that up to the present time, it has not come into such common use. We also use on our oil tankers what is called a vent or vacuum valve. These valves are put on the tanks in order to relieve any pressure due to expansion and contraction of the oil. For many years these valves have been made of regular steel and fitted with springs. Gasoline has a very harmful effect on steel, not only in the tanks themselves, but especially on these valves. The tankers must have these valves in good condition at all times, because if they should stick and the pressure in the tanks should increase to an appreciable extent, the tanks will be ruptured. This has happened on numerous occasions. We are now going to have these valves manufactured for us of stainless steel so that corrosion will be eliminated and the sticking of these valves will practically be eliminated.

Stainless Steel of Advantage to Oil Companies

The construction of stainless steel hulls, of course, is a very large subject. Speaking for the oil tanker trade, I think that if stainless steel could be manufactured at a reasonable price, it would meet with a great deal of approval with the oil companies, because we have a great deal of trouble in having the tanks rust. In fact, it is commonly known that oil tankers when first built are put in what is called the light oil trade—that is gasoline trade—because of the tendency to corrode rapidly. After ships have been in the light oil trade anywhere from seven to ten years they are taken out and used for carrying crude petroleum, because that has a preservative effect. We have tried any number of paints and various concoctions which have been offered us, in order to prevent them from rusting. We have never yet been able to find anything which will withstand the action of the gasoline and save our plates.

There is another manufactured process which has come into prominence in the last few years that is known as chromium steel plate. We have tried that in various parts of our ships and found it very successful. Of course, that is quite high in price, too. There is a method of merely covering the surface of the steel with palladium or chromium, a very light coating, of course. That coating is also being used by automobile manufacturers now for the nickelware on the automobiles to prevent rusting.

MR. ARKILLS: I believe the cost of paint in five or ten years, just painting the hulls, which is unnecessary with stainless steel, would pretty nearly in itself absorb that first cost that would be additional to the ordinary steel. At any rate, any replacement of plates would eat it up very rapidly.

CHAIRMAN KAIN: One of the most common causes of accidents, at least on freighters, has been the falling of men through the hatches. The present type of hatch, used on general cargo ships, appears to be unsafe under certain conditions. I think shipowners would certainly welcome a different type which would help reduce accidents.

MR. PARKER: Of course, your accidents are controlled pretty much by the regulations set up by the American Bureau of Shipping, which states that you must have a hatch of such a nature which is a water-tight hatch. Now there have been quite a number of discussions relative to the very thing you speak of. One answer is it is a non-slipping floor material around these hatches, the impression being that the reason men are falling into the hatches is that they stoop over and their feet go out from under them. That seems to be getting a good deal of attention and I think that it is really coming. Take naval vessels, for instance, they are using non-slippable gratings, ladders and things like that of a special make, just for that purpose.

The slipping on ships seems to be the biggest hazard in connection with the ordinary run of ships, although not the biggest hazard in connection with oil tankers.

MR. TODE: I would like to correct you, to say our accidents are mostly due to falls on oil tankers.

The Wooden Hatch a Source of Accidents

CHAIRMAN KAIN: We have had some very serious accidents with the wooden hatch which is quite generally used. The hatch covers are not always kept up as thoroughly as they should be, but even when they are, we occasionally find that the shipbuilders have turned out an arrangement of hatches which in itself contributes to the accident. I am referring particularly now to the dimensions of the hatches. You will often find, for instance, in any given hold that the dimensions of the hatches on the weather deck are different from those on the 'tween deck. As you know, in handling cargo those wooden hatches are shuffled around more or less and are put on very carelessly, often fitting too loosely, so that there is not sufficient bearing surface under the hatch covers. The longshoremen often fall into the holds with the hatch covers, a drop of possibly 20 or 30 feet. It seems that in taking precautions to prevent these accidents, they could begin by standardizing the hatches on any given ship.

MR. PARKER: There is no question but that could be done. I do know this, that shipbuilders are absolutely wide open for any kind of suggestion that will minimize accidents. To shipbuilders, accidents have gotten to be a very serious thing. It seems that some of the ships that have been turned out by shipbuilders have a Jonah attached to them, having had several accidents, and that has quite a reflection on the builders themselves. They are, as I say, very wide open now to receive anything in the way of recommendations which will minimize accidents on any ship they build.

CHAIRMAN KAIN: Do you know whether they are making any effort to design a different type of hatch, one which would be less liable to cause accident?

MR. PARKER: No I don't think they are because that is a peculiar thing about shipbuilding. You have to take into consideration that there are no two ships alike. You may build, say, two or four ships which you say are alike. But there were no two ships ever built alike. The government, today, is trying out a scheme on naval vessels to build six scout cruisers supposedly alike, but it is one whale of a job to bring that about.

CAPT. EVANS: You see no reason do you, Mr. Parker, why they should not have hatchways of the same size in ships of general class and why the sections of hatches for those standard hatchways should not be made the same dimensions, so that if they should get misplaced or one substituted for another as is now frequently done, they will make a fair fit?

MR. PARKER: There is no reason why they couldn't standardize that as far as I can see, excepting it would have to be standardized according to types.

CAPT. EVANS: The importance of it is emphasized by the experience of the past summer. There occurred ten or a dozen deaths in as many days, as a result of men going through hatches.

MR. PARKER: Was that through the main hatches?

CAPT. EVANS: Through the 'tween and main deck hatches, the regular cargo hatches 'tween decks or bridge deck or main deck, or whatever it might be.

MR. PARKER: In most of the modern ships the cargo hatches are built up approximately 30 inches with a protective flange all the way around, which is the first step that helps the condition that you speak of. Practically every ship being built today carries that flange on each deck.

The Chief Difficulty May Lie 'tween Decks

CHAIRMAN KAIN: I think the chief difficulty is on the 'tween decks. They put on those wooden hatches and use them as a platform while loading the cargo in the 'tween deck compartments. I think by far most of the accidents occur in that way, although there are a few happening at the weather deck hatches.

MR. PARKER: Most of them are coming out with that flange on at every deck. If you pass through three decks you have three flanges. On some of the ships that were put out during the war, so-called shipping board vessels, a great many of them are perfectly flush, you can step right off.

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): Mr. Chairman, would it not be possible to make up all hatches in multiples of certain figures, like even-feet and half feet, and no hatch be made any other dimension? If you go on board a ship now and measure the hatches, you will find them four feet, one and three-eighths and some eight feet, one and three-quarters. Those are things for which there is no excuse in the construction of a vessel. In the making of a 40-foot hatch, you can make it a few inches longer or shorter to reach that multiple. They could easily be established. They would come in regular dimensions, then your hatches would always fit all they way through the whole ship.

MR. PARKER: The principle of hatches is entirely the other way. When you build a ship, you build the hatches as large as you can between certain points. That is where you get your unusual dimensions.

MR. ARKILLS: That isn't the only thing that is done backwards on ships.

There is one other thing I don't think comes up in the paper you have read. That is the location of the gooseneck, with reference to the side of the ship. You will find the gooseneck or the heel of the boom located away out near the rail on one ship with a great long boom. There is no way of getting any drift on your guy. The next ship will have a short boom and single mast and the heel will be near the center line.

The Engine That Wouldn't Fit

MR. PARKER: Of course, when a man wants a ship built, he gives you the design and you merely work out the details in construction. That reminds me of a contract we took a short time ago. A man wanted us to build a ship and he wanted a certain type of engine which he was going to purchase, himself. We took the contract under that basis and when we commenced to go over the plans, found no way possible to get the engine into the ship at all.

In another case a man wanted us to build a ship for him and he was going to furnish the power equipment, the engine and boiler, etc. When we checked the thing up, we found when we put the engine and boiler in, it couldn't carry a pound of cargo.

But I do feel this way, that shipbuilding today is growing by leaps and bounds to a much safer ship in all ways.

MR. ARKILLS: The principal point that I wanted to bring up was that we find lots of ships with the mast amidship and two short booms that will scarcely reach over the side of the ship, which means that in trimming your booms and handling cargo, you often have to lower them so much in order to get out; that you don't drift enough in your falls which makes your falls pull very much against each other and causes failure of guys or booms or other gear. That is one thing we might recommend that our American Marine Standards Committee look into and make recommendations on.

The other item is an engineering proposition. When we made those boom tests in Seattle at the University of Washington, among other things, we found that one man went so far as to say that the boom could be considered as a column. If you will go aboard any cargo ship with any length of boom at all and hold up a straight edge when the cargo boom is lowered in the position of work and sight over the top of your straight edge and boom, you will find many times the boom is below the straight edge in the center at the belly of the boom which means it is not in center. Yet if you consider that as a column, you are considering it under its wrong engineering elements and there is the first engineering mistake in the treatment of booms. We should treat them under a different engineering principle, and that being true, I think we should do something to get more engineering into the construction of booms, into the maintenance of them and into the setting of the masts.

I think those are two very important things. I have seen many failures that seem to point right back to those two simple things that have just come up from present practice, rather than engineering requirement.

No Two Ships Have the Same Arrangement of Parts

CHAIRMAN KAIN: I think what you said is quite true. The matter of booms, in fact all the cargo handling equipment on ships, does not come under the supervision of the steamboat inspectors. The classification societies practically pay no attention to it, so that in the final analysis, the design and arrangement of that gear, whether it be a moving part or a fixed part, is left largely to the discretion of the shipyard or to the personal views of the owner, and the result is that we have a great many different rigs. In hardly any two ships will you find the same arrangement. Some of them are very good, others are fair, some really dangerous and the ships operate possibly for the entire period of their lives with the particular arrangement put on them when built. If something carries away, it is renewed, but it is very improbable that any alteration is made in the design or structural arrangement of the gear. One thing you mentioned this morning, the matter of goosenecks on cargo booms. Often they are very poorly designed or fitted. There is considerable corrosion of the metal at that particular location because it is exposed to the weather. The boom gooseneck is often more or less neglected by ships' crews, becomes frozen and the first time it is used carries away and you have a serious accident. I think that the Marine Section could very well afford to work with the Marine Standards Committee and also with the naval architects and the Classification Society, to try to work out some better general arrangements for the cargo handling gear on ships.

MR. ARKILLS: I came across a proposition recently that might be of interest from an engineering standpoint. That was along the line of a ship that had broken or bent down two steel booms. An examination of the booms showed they were full strength five-ton booms, according to American Marine standards and to standard practice of the day, but the winch was a foreign one with a heavy rotor and very

small solenoid brake; the result being that when they came up against anything solid, the rotor continued to operate, even after the power had been shut off, on account of the small solenoid brake which did not stop the rotor soon enough to save the booms. As a result, in five months seven booms had been bent down on that vessel. There is no doubt in my mind but that it was just engineering unbalance that caused it.

CHAIRMAN KAIN: That was really an electrical problem rather than a mechanical one.

MR. ARKILLS: It is a balance of design that was not attained in that particular instance.

Placing a Prohibitive Load on the Wooden Boom

CAPT. T. W. SHERIDAN (New York State Nautical School, New York City): I have quite a number of times seen wooden booms broken that were supposedly up to full strength, probably due to the load being swung out, and lowered away too fast, permitting it to bring up with a sharp turn. You get a much greater stress than the mere weight of the load because of the fact that you are actually stopping a falling body with its momentum. That puts a sudden stress on the boom or sometimes buckles the boom and breaks it in the middle, especially if it is away out.

MR. ARKILLS: We have that same difficulty on two different lines of ships. They have very fast winches and they hold well on stopping or reversing double winches and the operators quite often like to drop the load away down, almost to the bottom of the hold and then stop it suddenly. The whole gear is just flopping in the air when they do it. I have made quite a campaign against that very thing with our hatch tenders and foremen and the result has been that you see very little of it any more. It is absolutely foolish because there is plenty of time to take that load down slowly and stop without that sudden impact.

R. E. PROUTY (Aetna Life Insurance Co., New York City): I have been greatly impressed while listening to the discussion this morning, with the possibility of having a generation of men at sea who will have a greater knowledge of the ways and means of preventing accidents. By accidents I mean both personal injuries and property damage. It seems to me that the finest field in which work can be done is among the young men attending the nautical schools. They will be the men who will carry on and I have wondered as I have been sitting here, if it would be possible to arrange with the several schools to have a half-day or day session, perhaps once a year—perhaps a joint session of the students and the members of the Marine Section—who might happen to be in that particular vicinity—and stir up as much enthusiasm as can be stirred up by providing through the section, competent speakers for such meetings. I understand, of course, that the educational activities pertaining to safety are carried on through the entire curriculum, but they would, perhaps, put a little more emphasis on it. As to the practicability of the plan, I would have to refer to gentlemen who are more familiar with the school conditions. I would like to put that on the table and hear what you think of the subject.

Safe Practices to Be Studied in the School Ship

7

CAPT. SHERIDAN: I think they have lecturers on all kinds of subjects. I think it could be very easily arranged.

MR. TODE: In fact, I can say that Capt. Tomb, whom I saw just before the school ship sailed, intended to have in the curriculum for the coming winter, something on safe practices and desired to have someone from the Marine Section come aboard the ship and deliver a talk on modern steamship safe practices to the cadets.

E. B. TOLSTED (Fonda-Tolsted, Inc., New York City): Mr. Parker has spoken of building the hatches 30 inches above the deck. How high would it be practical to build those up? Could you go up to 42 inches or 48 inches? How high would be practical to go?

MR. PARKER: I don't know that it would make much difference whether it is 30 inches or 60 inches in that particular respect, except that I don't think it would be practicable to build them beyond the point where a man could look over.

MR. TOLSTED: The reason I ask that question is that safety engineers in other fields have found 42 inches the minimum height a railing should be built. A railing 30 inches high is low enough to sit upon and is low enough to fall over. A railing 42 inches high is not low enough to fall over and can't be easily sat upon, although you can climb on it. If hatches were built 42 inches high, they would be railings in the proper sense of the word.

Accidents Due to the Hatch Cover

CAPT. EVANS: The answer to that would be that now, with the hatch coamings the way they are built, the men perform a great deal of their work without getting up on them. The number of accidents might be increased in proportion to the height you increase hatch coamings. A great deal of the difficulty now comes in the men putting on one or two sections of hatches and then getting up on those to put on the remainder; and in putting sections in the wrong place and then walking over them. Those sections slip and fall and that is exactly what happens now causing many injuries. Others step on the hatch coamings to make short cuts.

MR. PARKER: I have a suggestion to make here to shipowners to adopt a practice we have in a shipyard. Whenever putting on hatch covers, start from the bottom and come up and if a man falls he can't fall more than six or eight feet. That is a strict rule. You have to start from the bottom of the ship and come up, putting in each deck as you come through. We have two or three things in that line relative to hatch covers. We have never had a man fall yet.

CAPT. EVANS: That is a perfectly good rule where you are putting on all hatches where a ship is in port. It is well recognized that it is general practice for ships merely to put on the weather deck hatches, leave the rest open in order for the holds to air out, "sweeten" as they refer to them, while the ship is in port. That is one of the reasons that the weather deck hatch is closed and the rest remain open most of the time in port.

MR. ARKILLS: There is still another feature there. On a day when it looks rainy and they knock off at noon, or for dinner at night, they put on the top cover so as not to have to cover all the way down—go away for the hour and come back to take that cover off. It is too much unnecessary work to cover all the way up and down.

CHAIRMAN KAIN: In so far as these 'tween decks are concerned, you mentioned the fact that most of the ships built immediately after the war had no coamings on the 'tween-deck hatches.

Deficiencies of the War Time Built Vessel

MR. PARKER: Yes, a lot of the shipping board vessels were built during the war period under great stress and they left off a lot of things they didn't think necessary. Among them hatch coamings on the 'tween decks.

CHAIRMAN KAIN: That has worked out to the ship owner's advantage in another way in connection with the handling of cargo. Most of the cargo is dragged out of the 'tween decks to the hatch. We have found that where they had the hatch

coamings, the sacks were inclined to catch and tear and that did a great deal of damage to the cargo.

MR. PARKER: I think your answer to that particular question is in having the hatch larger on the 'tween deck.

MR. ARKILLS: Even at that, a large load will tear and break against the edge. It doesn't make enough difference. They do not make them more than eighteen inches, which isn't sufficient.

Then, to answer Mr. Tolsted's question from another angle, if the hatch coaming were made 42 inches high, it would be found that the hatch tender or signal man would be leaning over there and would endanger himself from the cargo hitting him. If he has to watch out, he stays back enough so he is on his feet and alert, he isn't in a reclining position or in a state of mind where he lets go his thought of care. Another thing, every bit you raise the hatch coaming, you raise the load in coming out of the ship. The lower that side is, the less liable you are to hit that with your tray and slingboard and spill the draft down on the men working below.

Possible to Design a Different Type of Hatch

CHAIRMAN KAIN: Do you think it would be possible, Mr. Parker, to design hatch covers entirely different in type, which would be safer, for instance some sort of a suitable steel hatch?

MR. PARKER: Well, of course, they do have various types now, which from that standpoint, I should say, are perfectly safe. As I gather it, it is a question of raising or lowering the hatch covers.

I think the problem can be easily solved in that connection by a recommendation from this body to two sources—one, the naval architects and the other the American Bureau.

MR. ARKILLS: How about the American Marine Standards Committee?

MR. PARKER: Yes, that is all right. There is continual talk on this question of what they can do in designing to improve the safety of ships while in operation. That is a big question. The trouble is that they, perhaps, don't have enough information at this time. As a matter of fact, a good deal of this is news to me in connection with men actually falling through these hatches.

CAPT. EVANS: The most frequent source of serious injuries is putting on, taking off and crossing hatches.

MR. PARKER: I should say that would be rather startling news to naval architects.

MR. ARKILLS: I would like to ask Mr. Parker what his opinion is of sectionalizing hatches such as the Pacific Steamship Co. have done on all their coastwise vessels? They have sectionalized them to the point where they handle them with the gear instead of by hand. This saves considerable time, does away with the breakage, makes them stronger and they don't have that danger of men falling through 'tween deck hatches.

Further Details of the Discussion

MR. PARKER: I think that is really the best answer to the whole question and that is coming quite rapidly. There was considerable objection to that from the owners.

MR. ARKILLS: I can easily see why a complete hatch that is hinged and lifts up, opening the entire hatch at once is very objectionable when it comes to handling deck rods, long rails and long pieces of lumber down the hatch, because it is in the way.

MR. PARKER: It can't be a hinged type. We have built some on the east coast.

our sections to the hatch. They are much safer in that respect without any question. There is no man-handling to that. It seems the only objection is the fact that it is too much trouble for them to open a hatch for ventilation, by taking off a section of the hatch. In this case they would have to lift it up. In the other case they can send a seaman up there to lift three or four sections and let it go. Whether that objection would hold water if it were put up to the naval architects and people like that, I don't know.

MR. ARKILLS: I can see where it would be a drawback in fumigation.

MR. PARKER: Fumigation on some of the ships is pretty necessary.

DR. F. X. CRAWFORD (United Fruit Co., Boston, Mass.): I might say, Mr. Chairman, that we have ships with four sections and if there is no leakage—or if the leakage is small it makes little difference in the engineroom and fireroom—we can do fumigation in the summertime easily in thirty minutes.

MR. ARKILLS: The point I was trying to make on this fumigation is that when you open the ship for fumigation, or after the fumigant has been left aboard a certain prescribed length of time, then you send men above to open up to allow it to freely air itself out. You have no equipment there to open that up until you get up steam in the boiler.

DR. CRAWFORD: You could take one of the deck officers and one man, it can be done with those two men, or you could take an officer and let him do it alone, put on two clips into the hatch cover and go back to the winch and lift it.

CHAIRMAN KAIN: Are there any further questions? If not, we will go on to the next paper.

Unfortunately, Mr. Hand is on a trip to Panama and is unable to be with us. Mr. Prouty will read Mr. Hand's paper.

Practical Benefits From The Physical Examination of Seamen

Robert F. Hand, Standard Oil Company of New Jersey, New York City

When Mr. Ralph E. Prouty, chairman of the Program Committee of the Marine Section, spoke to me about preparing a paper on the Physical Examination of Seamen the matter didn't cause me any great concern. In our own company we make a regular practice of examining seamen before signing them on, and it wasn't until I began to jot down a few notes on the subject that the thought struck me how relatively few steamship companies follow this line. It was this thought that led me into a broader field, namely, the attitude of the shipowner toward accident prevention.

Happily, as a result of the untiring work of our own and other organizations engaged in the promotion of safety afloat, I think that the average ship operator is beginning to realize that accidents enter every definitely into the debit side of his voyage accounts. It was not only the consistent hammering of safety talks, articles and posters—the psychology of advertising, so to speak—which brought about this condition, but cold statistics showing the actual monetary loss from an accident, the meaning of which could not be overlooked. The notable reduction in the number of accidents at sea each year is the fruit by which the work of the National Safety Council may be shown.

Mr. Arthur M. Tode, chairman of our Membership Committee, Captain J. P. Kain, chairman of the Marine Section, as well as Mr. W. E. Welch, our former chairman, can probably tell us just how hard it is in some instances to convince shipowners of the practical benefits of accident preven-

tion. The answer in so many cases is "We are members of this and that organization and do not feel that it is advisable for us to add to our list at the present time." The trouble is that even in companies which are members of the National Safety Council the attitude of the management is inclined to be more or less passive, and you know as well as I that before the rank and file can be "sold" on the safety idea you have got to sell the executive officers and keep them sold.

A Lack of Cooperation Handicaps Safe Practices

If the manager of a department walks in at ten o'clock every morning and is inclined to be lenient on punctuality, you won't find many of the clerks in a hurry to reach their desks before nine. Exactly the same is true of accident prevention and there are few places where this is more strikingly exemplified than on the dock. The pier superintendent or boss stevedore may have his own ideas on the safe type of equipment for handling a particular kind of cargo but if his suggestions are ignored or receive little encouragement from the management his attitude will be one of "what's the use?" When a sling breaks due to a defective rope, when obsolete clamps slip on a load of steel plates and the mass goes crashing to the bottom of the hold, or when a winch fails to hold under the weight of a draft because it is too worn or of insufficient power to handle the loads being swung into the ship, the responsibility too often lies not with the stevedore, not with the pier superintendent, but at the door of the owner himself. There is a moral power in the attitude of the management on any subject connected with the business which is invariably reflected in the work of minor executives and employees.

Men in the shipping business as a rule are a pretty hard-headed crowd—they are natural skeptics. They have to be. With constantly fluctuating freight rates, close competition and the general uncertainty of the industry, the shipowner cannot afford to gamble on any plan, the benefits of which are theoretical or at least indirect. This might be said to be one of the reasons why the physical examination of seamen has not become more general, were it not for the fact that experience covering a period of several years has demonstrated beyond the shadow of a doubt that the saving from this practice is real and definite.

An Argument for Physical Examination

The other objection seems to come from those who are opposed to "mixing sentiment with business." They point out, and not entirely without reason, that seamen as a class are pampered too much, that well-meaning but impractical legislation has restricted the power of the master and undermined discipline on shipboard, that the activities of shyster "sea lawyers" have resulted in a claim for damages against the company every time a man slips on deck or hits his finger with a hammer. Here again the objection is but another argument for physical examination. It is true that the treatment of bad teeth, removal of tonsils, operation for hernia, correction of varicose veins, hydroceles and hemorrhoids, and the encouragement among members of the crew of corrective, curative and hygienic measures do afford the man a valuable protection against future diseases and injury, but the economic saving to the owners is a direct one. Let's get down to a few concrete cases.

The requirements of the doctrine of "Maintenance and Cure" and the liability of heavy damages for accident and sickness, under which a ship operates

when faced with the possibilities contained within the provisions of the Jones Act, leave the shipowner wide open to all kinds of fraud. If a man should slip going over the rail, for example, it would be very hard to prove that a hernia did not occur or become greatly aggravated by that simple mishap. The strong possibility that cheap lawyers who thrive on such cases will try to fake a damage claim against the shipowner shows the wisdom of insuring that a man has a sound physique before he places a foot on deck. It is much cheaper to know in the first place that he has no physical defects before leaving the employment office. Experience in handling the disabilities of seamen shows that any physical defect of chronic disease, no matter of how long a duration or whether or not it is known or suspected by the man himself, becomes a liability of the ship.

The Rate of Rejections for Physical Causes

The rate of rejections for physical causes varies from month to month but the average is between three and four per cent—depending, of course, on the turnover, most of the rejections occurring among new applicants. Hernia and tuberculosis rank highest among the causes of rejection; then come chronic heart diseases, acute infections, such as syphilis or gonorrhea, contagious skin diseases, hydrocele, serious varicose veins and other hazardous infirmities. If the applicant has joint or other minor defects it is wise to make a note of such in case the claim is made later that the disability in question is due to some accident which occurred while the man was employed on the vessel.

The liability of the ship for damages is obvious in the case of hernia and chronic diseases. To force a man to correct his defect, take proper treatment or to find a suitable employment which is free from the dangers of the sea and long absences from medical attention, is a direct economical saving to all parties, and the elimination of infections or contagious diseases from the ship's personnel is not only beneficial to the man himself but is a protection to the rest of the crew.

In selling any idea or service the first question asked, naturally, is "What is it going to cost me?" And the second, "What return will I get for my money?" Let us see what physical examination amounts to in dollars and cents and how it can best be carried out.

In steamship companies operating vessels on regular trade routes between fixed ports, it will probably pay, at least at the home port, to employ a physician on a salary basis. The doctor not only can carry out the physical examination of seamen but may also see to it that the company's vessels are maintained in a sanitary condition.

There Are Five Definite Benefits

At some of the outports, of course, this will not be practicable and the same is true in smaller companies with only a very few ships. In such cases, however, a local doctor can be engaged to examine seamen before they are signed on. The cost of his service varies between \$2 and \$5 per man, depending upon the port.

The actual monetary return from the physical examination of seamen, while a very real one, is difficult to estimate. However, against this comparatively small cost you have the following definite benefits:

1. Rejection of men unfit for service.
2. Correction of minor defects which may later become aggravated. If the

examination of applicants is carried out properly and in the right spirit, men with minor defects are able to give full and competent service.

3. Consequent protection of the shipowner against possible fraudulent claims for damages.

4. Protection of the crew against infections or contagious diseases, which insures healthier, more efficient workers.

5. A steadier group of seamen which reduces labor turnover, thus ultimately cutting down the operating cost of the ship.

The Government Now Provides a Physical Examination

As a matter of fact the benefits of physical examination have already been recognized by the United States Shipping Board which completed arrangements not long ago in all ports of the United States whereby American seamen will receive thorough physical examination prior to shipping on vessels of the Government Merchant Marine. Medical departments have been installed in the different Sea Service Bureaus; and in ports where the Shipping Board does not have its own physicians, the physical examinations will be given by regular medical officers of the United States Public Health Service, acting in conjunction with Local Officials of the Shipping Board. In a few ports where these medical examinations have already been tried out, gratifying results have been obtained. Not only have the examinations been of value to the crews, but they have also proven of great economic benefit to the American merchant marine by assuring at all times a supply of seamen who are known to be in the best physical condition.

In the last analysis, however, you can't blame the general reluctance to adopt this plan entirely on the shipowner. Human beings are all more or less selfish and while the safety of the workers themselves is naturally the prime consideration in accident prevention, you won't find the average owner showing much concern over the fact of a seaman slipping on deck a few hundred miles out at sea. When you can show him, though, that even a minor accident is affecting the operating cost of his vessel you've got him interested and when, furthermore, you can prove to him that such accidents have been and can be prevented you'll convince even the hardest skeptic that, here at least, a little "sentiment with business" has its economic value.

CHAIRMAN KAIN: Dr. Crawford, I think you have had considerable experience in this matter of physical examinations of seamen.

Thorough Examination Is Approved

DR. F. X. CRAWFORD (United Fruit Co., Boston, Mass.): Well, I might say that we examine every man every trip. The first examination is not quite as extensive as the paper would suggest. I think I rather agree with the paper, we should go through a more thorough examination. The first examination is principally for physical defects that might prevent a man from being a seaman; second, hernia; third, venereal disease. A man going out on the next trip is merely examined as to venereal disease. We are operating in Boston five British ships and, under the law, bringing in an alien seaman with a contagious disease makes a costly proposition to us. It costs anywhere from \$50 to \$500 to cure him and we are compelled by the United States laws to pay that bill. I don't hesitate to forbid shipment of any man whom I consider not fit for sea duty, and in consequence we have reduced our expenses. So I believe it is a very important thing and I think every ship owner who doesn't have a medical examination of his crew is very foolish. For instance, a man might slip on the deck and say he had a hernia as a result. He might have

hernia all the time, but simply went on board ship as a means of forcing the pany to pay for his operation and give him compensation while in the hospital. an example of that, before we had a physical examination on shore, we had a work one hour. When I arrived in the afternoon he said he was sore. He at nine the next morning and came to my office. He claimed he got it there it cost us \$300 for that man. He came there with the direct intention of making pay the bill. That is just as true on the ships. I think it is a very, very ortant thing to have a physical examination and it would pay for itself many s. It has with us.

HAIRMAN KAIN: You have no doubt it will pay, even where it is necessary to the doctor on fee basis?

The Physical Examination Will Pay Many Times Over

R. CRAWFORD: It will pay for itself many, many times over in the course of a ; and eliminate cases that would surely cost money later. Take, for instance, an with defective sight or some physical defect like a weak heart or poor legs would allow him to fall and break one leg or do some other injury to himself ; ould cost you a great many hundreds of dollars and I am sure that doctor would for his salary many, many times over every year you have him.

HAIRMAN KAIN: Your examinations are not confined to men serving on ships or foreign flags?

R. CRAWFORD: Even on American ships, just simply for cleanliness. I imagine ie course of a year, I turn down 20 or 30 cases of hernia and probably 50 to 60 s of venereal disease. You can see how easily that would amount to a large of money. Take for instance 50 cases of venereal disease that we have kept the ships, they would average at least \$100 apiece a year, or \$5,000.

APT. EVANS: I might add that I was reliably informed during the past few ks that an effort will be made to have the law amended so as to include the ig of all seamen at the expense of ship owners. Of course, originally the intent he law was to prevent ship owners from bringing men suffering from loathsome contagious diseases into this country. It was interpreted first that the man must on in a foreign country, but later was interpreted again to mean signing on in country. Therefore, in the case of a man signing on in the port of Boston, g to Panama and coming back to Boston again, we were liable for that man's lition, even though he may have had it before he signed on the ship at Boston even though he may have been sailing out of an American port for three years.

R. CRAWFORD: It makes no difference and it is unfair as it is. A ship coming this country, or an American ship bringing in an alien suffering that way ought ay his bill, but I think it is unfair to pick up that man in a port of the United es, take him out and then bring him back and be forced to pay his bill. Not .that, but if they can prove that you took that man out without proper exam- on, they will fine you \$1,000 as well.

Accident Costs No Small Portion of the Voyage Costs.

HAIRMAN KAIN: They can even go farther, in the cases that are incurable; can compel you to deport the man.

APT. EVANS: That applies also even though he had been in the country three s.

R. ARKILLS: Mr. Chairman, there was an assertion made in the paper some- g to this effect—that the accident costs are no small portion of the voyage costs. onder if anyone has ever compiled the accident costs against the voyage costs

to show the actual percentage. I believe they would be very convincing figures to ship owners and would probably help to sell your safety program to such owners.

CAPT. EVANS: I might say that our company makes to the Shipping Board each month a report which analyzes each claim, takes up the nature of the claim, the amount demanded, the cause of the accident, the time lost, money expended and the amount paid finally, so that if that were taken and segregated from the other costs, you could get a very convincing picture as to just what the situation is. We have not, however, attempted to take that and apply it against the other costs of the voyage to get at the picture mentioned.

A Medical Club Plan in Seattle

MR. ARKILLS: While we are on this medical proposition, I would like to say just one word in connection with a medical club in Seattle. The men came to the safety committee, composed of four members from among the men and four members of the employers, and asked if it would be possible to get medical attention off the job: and after the passage of this compensation act we felt that if they were covered for all their accidents and sickness off the job, it would practically do away with the passing of the hat in the Hall. We encouraged it and looked up three or four different places where such medical clubs had been formed; and they have gone ahead and contracted for seventy-five cents a month now, and I dare say that over three-quarters of them have availed themselves of this voluntary proposition. For that seventy-five cents a month they get, off the job, all accident and health medical attention.

On the first day of August a man who was intoxicated and trying to negotiate the street at a crossing, was knocked down by an automobile. He happened to be in this medical club and it cost the bridge clinic something around \$600 to take care of that one case before they had ever gotten a cent from the contract. They are carrying on very faithfully and the thing is spreading and will, I imagine, take in better than 95 percent of the men inside of six months.

MR. PARKER: Is the company a contributor?

MR. ARKILLS: No, the companies have nothing to do with it excepting that they have loaned their paymaster to the men to act as a clearing house for that seventy-five cents per month out of their pay. We have a central pay office that pays most of the payroll right at the Hall.

MR. PARKER: Do you operate a relief department in the plant?

MR. ARKILLS: No.

Only the Unlicensed Personnel Is Examined

CAPT. EVANS: Doctor, in your examinations on the ships of the United Fruit Line, do you include in the examinations the officers of the ships?

DR. CRAWFORD: No, just the so-called unlicensed personnel.

J. S. HUNTER (Atlantic Refining Co., Philadelphia, Pa.): We include our licensed personnel. We had a case of that kind and three were turned out for hernia.

DR. CRAWFORD: Everybody is examined. The examination they go through is similar to that which an insurance company will put a man through. The examination of the crew that I spoke of is just a superficial examination, but the officer personnel of the entire company must go through the thorough physical examination. Everybody on salary entering the company must pass this examination—everybody, no matter in which branch they enter.

Ships—Personal Injuries

Milton D. McIntyre, Pickands, Mather & Company, Cleveland, O.

In the development and study of accident prevention, I think it is generally agreed that any organization which expects to secure satisfactory results in having its employees conduct operations with a minimum of personal injuries and loss of life, must realize that safety work, both ashore and on shipboard, occupies a distinct and important place in its affairs.

It is essential that the chief executive be sincere and in entire sympathy with accident prevention, and interested in having his officials devote time and vigorous effort to that work. He should know that the real and directing influence must come down from his office, and his attitude and safety policies be well known to all of the employees. He should be interested in learning the where;



when, how and why of at least each serious or fatal accident that occurs to his employees. Mere authorization of expenditure for proper mechanical guards to make the operations safe, without active and earnest effort, is not alone sufficient. An unusual number of accidents, as shown by the record, should be viewed with as much concern as a rising cost statement, for it is pretty certain to indicate that somewhere down the line inefficiency exists in that organization. While his officials, and the employees under them, may do much on their own initiative, we can quite safely say that much more could and would be accomplished with active encouragement and genuine support from the chief executive.

Included in the various operations of our company, we have a fleet of 44 ships engaged in the carrying of bulk freight, ore, coal, limestone and grain, on the Great Lakes. Once a year all masters and chief engineers are called to headquarters of the company in Cleveland, Ohio, for a conference, during

which considerable time is given to the discussion of accident prevention. This conference closes with a banquet and snappy program which promotes mutual acquaintance and cooperation. We have the same plan of ship's safety committees which was presented before our Congress several years ago by Mr. Marr, of the Lake Carriers' Association, which, briefly outlined, is as follows:

Six men, three from forward and three from after end, compose this committee, which always includes the lowest licensed men from the forward end and the engineer's department. (Boatswain and handy men are included if carried.) The balance of the committee is selected by the master and chief engineer, from each end of the ship, no two to be of any one grade. One of the licensed men is appointed by the master to act as chairman, the other licensed man serving as secretary. Meetings are called by the master some time between the fifteenth and the last of each month. Both he and the chief engineer, however, attend only in an advisory capacity. They, as well as the members of the committee, sign the minutes indicating their attendance. Copies of the minutes are sent to the manager of the fleet and to the association.

Special Duties of the Committee Members

Duties of the committee members are: Consideration of safety, instructions to new men, discussion of injuries occurring on other ships and, where they have authority to act, the carrying out through their respective departments of such steps as the committee finds advisable. Members who have not authority to act recommend that their superior officer give the matter necessary attention. Each member of the committee receives two dollars from the master at the end of the season for each meeting attended, and if no accident to any of the ship's crew requiring absence from the ship, has occurred during the season, a bonus of \$10 is paid from the office to each member of the committee who is still a member of the crew, and who has attended at least six meetings. Ship owners in this association report to it the nature of injury and description of accidents occurring on their ships, and brief resumes are sent monthly to all members so that there is excellent opportunity for keeping posted on the accidents and safety recommendations on the other fellows' ships.

In addition, the Lake Carriers Association furnishes a Code of Recommendations prepared from the experience of all the vessels, covering the following points: Lights, hatches, hand rails and gratings, ladders, rigging, tackle, gear and stagings, machinery, valves, boilers, pipe lines, etc.; fire, cables, loading and unloading, life preservers, warnings, boat and fire drills and first aid.

We have found that safety meetings held by the men on shipboard are most effective in getting the safety idea over to the rank and file, and in keeping it alive. The number of ships in our fleet receiving the bonus has increased each year. In 1923, 22 per cent; in 1924, 30 per cent; in 1925, 47 per cent; in 1926, 70 per cent.

Meetings That Offer a Basis of Contact

These monthly meetings create a certain contact between the management and the entire crew and tend to make the committee members feel a responsibility in keeping the ship's accident record clear. Soon after these meetings have been held, the crew inquire and hear what matters were discussed, and know that the company is interested in safety. I would like to read a few excerpts from the minutes of some of our vessels, as they are typical of the way in which our committees accept their responsibility.

"When back oiling coal bunker, see that all coal is off angle irons and shelf pieces so that there will be no danger of accident."

"This ship has the distinction of not having a man leave on account of personal injury from accident since the fall of 1920. Let this committee watch their step and watch the action of others and advise new members of our crew when they ship, as to any danger that may confront them. Always bear in mind that it is the duty of this committee to advise and try to enforce the safety rules."

"Captain reminded us to keep people off the ship that have no business aboard, telling each member he has authority to keep strangers off boat, and it is his duty to find out a visitor's business and report to one of the officers, and he would handle the case as he saw fit."

"Captain attended meeting and required each member to relate some act he has done since last meeting, toward the promotion of safety."

"Warned shipmates to use ladder in coming aboard instead of walking up the mooring cable."

The Fleet Superintendent Goes Over Accident Reports

Our office deals directly with employees in handling all claims for injuries. All accident reports are carefully gone over by our fleet superintendent, and any accidents involving laxity in the enforcement of safety rules, lack of proper supervision or bad practices, are promptly discussed with the ship's officers, who know that a full explanation is going to be required.

While the committee system is helpful, it is not a complete panacea in preventing all injuries. Some men seem to be slow to know when they are in danger themselves or doing something that may injure others. We have found that injuries occur frequently when handling lines and cables. The men apparently misunderstand signals or neglect to use the becket, and fingers are caught between the spile and cable when the engine takes up on the cable. Quite a number of accidents happen when men run along the deck. Recently one of our sailors who was in a hurry to get back to supper, while running down the deck, slipped and severely injured his knee. The fire hold and engine room contribute to the shipboard injuries; clinkers get on firemen's ankles while cleaning fires; coal passer neglects to have a blister taken care of and finally has infection set in; fingers damaged when oiling or feeling engine. We have been very insistent in keeping strangers and newsboys off our ships. Some time ago a newsboy, attempting to board one of the ships, fell from the ladder to the dock, quite severely injuring his hip. As a result, we have had to be very careful in keeping everybody off the ship who has no business aboard. Injuries have been quite frequent also on account of falls, such as slipping on an oily hatch cover, and slipping on the deck during a storm. Men have attempted to go aboard while intoxicated, and have fallen off the gangplank. We have also had instances where men in the same condition attempt to get aboard on the mooring line, which has not proven to be a very safe means of getting aboard. Accidents happen because material has been left where it should not have been, causing injury when it fell from some upper place on the ship. Ladder accidents have been caused by slipping, barking shins, by not having a sure hold, or going down the ladder the wrong way. Not long ago a sailor was going ashore and went down and off a ladder which was about four feet from the dock; he did not notice that it was not on the dock, and that the vessel was shifting along the dock.

As we all know, the United States Longshoremen's and Harbor Workers'

Compensation Act, effective since July 1, 1927, applies to employees, excepting seamen, injured on shipboard, and this will do away with the litigations which have heretofore been possible between employee and employer. The principle of compensation has now been well established and it is to be hoped that in the near future our Congress will enact a fair compensation law which will include seamen and provide an equitable remedy to assure injured seamen and their dependents certain and sure relief. While they do receive medical service now, their injuries and misfortunes still expose them to a certain class of attorney who perhaps would not welcome a law which would take away a large source of income. When the State Compensation Acts began to operate, many employers seemed to show considerably more interest in accident prevention, but many industries always had given that work the attention it deserved. It is pleasant to realize that many ship owners have accepted their responsibility to their employees in seeing that anything possible and reasonable is done for their safety and freedom from accidents.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session of the Marine Section was called to order at nine-thirty o'clock by the chairman, Capt. Wm. P. Kain.

CHAIRMAN KAIN: The first business before the meeting is the annual election of officers of the section. Mr. Tode, I believe you have the report of the nominating committee.

Report of the Nominating Committee

Chairman, A. R. Bush, The Barber Asphalt Company, Maurer, N. J.

Vice-Chairman (In Charge of Membership and Publicity), Arthur M. Tode, The Texas Company, New York City.

Vice-Chairman (In Charge of Posters and Slides), Robert F. Hand, Standard Oil Company (N. J.), New York City.

Vice-Chairman (In Charge of Information and Service), Capt. R. C. Brennan, Pacific Steamship Company, Seattle, Wash.

Vice-Chairman (In Charge of Stevedoring), F. P. Foisie, Waterfront Employers' Association, Seattle, Wash.

Secretary and News-Letter Editor, W. E. Welch, The Travelers' Insurance Company, New York City.

Program Committee Chairman, John S. Hunter, The Atlantic Refining Company, Philadelphia, Pa.

Research and Statistics Committee Chairman, Capt. Irving L. Evans, United States P. & I. Agency, Inc., New York City.

Engineering Committee Chairman, R. E. Prouty, Aetna Life Insurance Company, New York City.

Executive Committee, the officers and Capt. G. Bartlett, Cosmopolitan Shipping Company, Hoboken, N. J.; R. F. Edwards, The Prudential Insurance Company, Newark, N. J.; Capt. Reginald Fay, The New York Central Railroad Company, New York City; W. A. Kiggins, Jr., A. H. Bull & Company, Inc., New York City; Capt. W. P. Kain, Shipowners' Claims Bureau, Inc., New York City; Ellis Knowles, C. D. Mallory & Company, Inc., New York City; Eugene F. Moran, Jr., Moran Towing & Transportation Company, New York City; Capt. C. H. Potter, Potter Transportation Company, New York City; C. Story, Jr., Cities Service Transportation Company, New York City; Fern Wood, Williams Steamship Company, Inc., New York City; J. Wright, Export Steamship Corporation, New York City; D. J. Murphy, Murphy Cook & Company, Philadelphia, Pa.

CHAIRMAN KAIN: Gentlemen, you have heard the names of the officers as reported by the nominating committee. What is your pleasure?

CAPT. I. L. EVANS (United States P. & I. Agency, New York City): I move the nominations be closed and the Secretary be instructed to cast a unanimous ballot.

(The motion was seconded and carried and the Secretary cast the unanimous vote of the meeting for the men nominated.)

CHAIRMAN KAIN: The first paper this morning is by Mr. A. M. Tode of the Texas Company.

Observations on Safety Precautions Aboard Tank Steamships

Arthur M. Tode, Superintendent, Technical Division, Marine Department, The Texas Company, New York City.

Maritime nations have always been interested in the question of safety of life at sea, although, probably, early sea regulations were at first more concerned with property than life. As geometry teaches us, "the greater includes the less," and as the safety of life is largely dependent on the staunchness and experienced operation of ships, it follows that the improved seaworthiness of vessels, together with modern safeguards against collision, fire and other accidents, tend more and more for security of life.

The subject of safety of life at sea cannot be solved from any particular point of view. Many angles must be considered concerning the safety of tank ships and of their personnel, the prevention of accidents, fires and explosions and other hazards peculiar to this type of water transportation. It will be of interest to review some experiences of the past, point out possible dangers and focus attention where consideration is required.

Property of enormous value in the maritime industry is destroyed and many lives are lost every year by fire. The prevention of such tragedies and of accidents to sea-faring personnel and property on board ship is, therefore, one of utmost importance. The maritime industries have come to recognize that conservation of resources in this direction is an essential factor in present day ship operation, and deserving of most careful consideration and study.

Considering the types of vessels engaged in carrying the world's commerce, practicable safety in their operation, and accident prevention afloat, may roughly be divided into three groups: passenger liners, general merchant and freight vessels, and tank ships. Whereas experience shows many similar marine accidents occur on all types of vessels, there are some safety precautions necessary to be observed which are peculiar to each of the three classes defined. Such safety precautions are also dependent upon the particular type, as well as trade and service of the ships, and individuality must be exercised in the adoption of means and methods best suited to their needs.

Fire on board any vessel at sea is undoubtedly the worst of catastrophes. Every officer and member of a ship's crew must exercise eternal vigilance to guard against its dread occurrence. In spite of all the precautions which are taken, however, numerous cases of fire at sea and on vessels while in port or undergoing repairs have taken place. Unfortunately, some fires have been due to carelessness on the part of shipyard workers or members of the ship's complement, others to defective electrical or mechanical equipment, some, probably, to "an act of God," while the origin of many fires has never been satisfactorily explained. Often of a spectacular nature, the destruction of ships by fire at sea during the last few years has resulted in the publication of many important reports and papers pertaining to these losses. Of the several kinds of vessels mentioned heretofore, the operation of tank ships, from the standpoints of both safety and economy, is one of prime importance.

Tank Ships and Their Cargoes

The use of petroleum products increased rapidly some years ago and, augmented by the urgent requirements of the world war, necessitated the building of many tank ships.

Depending upon the service in which they are engaged the vessels of an

oil company's fleet are designated as refined oil ships or as dark oil ships. The cargoes carried are classified as highly flammable products (i. e., naphtha, naphtha distillates, all grades of gasoline, benzine and similar highly volatile products), flammable products (i. e., light Mexican, South American, and all domestic crudes), and less flammable products (i. e. Panuco crude, fuel oils, gas oil, water white, lubricating oils and similar products which are but slightly volatile). Molasses, asphalt, cocoanut oil, and creosote are included among other bulk cargoes transported in tankers.

Since the building of the first tank ship about the year 1872, fires and explosions have occurred at various times due to the accidental ignition of mixtures

Mar. 18



FIRE!

What Would Fire at Sea Mean to YOU?

Don't smoke in your berth or in other unauthorized places. (Use only safety matches.)	Keep the coal bunkers ventilated.
Don't throw oily rags about the decks.	Don't tamper with electrical equipment.
Don't use gasoline for cleaning purposes.	Observe safety and fire prevention rules strictly.
	If you find a dangerous condition, report it at once.

Every Man in the Crew Must Help to Prevent Fires

of air with vapors of the more volatile hydrocarbons. Accidents resulting from this cause have frequently involved serious loss of life and destruction of property. The observance of stringent rules on tankers to minimize such accidents is therefore of utmost importance.

Oil cargoes as carried in tank ships are generally considered a hazardous commodity regardless of the nature of the oil. A cargo of high flash oil is, however, no more hazardous than carrying oil as fuel, except that there is more of it. Additional precautions are necessary when transporting low flash and volatile oils as cargoes, but it is a fact that even fuel oil is volatile when heated, irrespective of the cargoes carried, therefore, certain precautions must be observed which may vary, depending on the grades and characteristics of the oil.

The real danger aboard tank ships is the fact that a fire starting anywhere in the ship may possibly ignite the entire fuel and cargo. The important function in safeguarding any ship from fire is a strict observance by all per-

sons of the necessary regulations and the providing of the most up-to-date methods of extinguishing any fire before it has an opportunity to spread.

General Characteristics of Petroleum Vapors

Certain characteristics of petroleum vapors have been established through scientific research, as well as the investigation of fires and explosions which have occurred on board ship. In this way the oil companies have been able to minimize the occurrence of accidents due to the ignition of these vapors. It has been found that certain crude oils and refined oils evaporate freely at ordinary temperatures. The vapors which result are heavier than air, and when mixed in certain proportions with air become highly flammable.

Due to their greater density, the vapors arising from the surface of oil in a tank will not become diffused in uniform proportion with the adjacent air. Such vapor will tend to form a very rich mixture immediately above the surface and a leaner one at the top of the container. It has also been observed that such vapors, which in reality are fluids, may remain for a considerable length of time in the generating receptacle, or may flow unperceived for some distance in stream lines.

Investigations made by petroleum corporations have also proven that vapors given off from a petroleum product and diffused with air in a confined space result in a mixture which at first is merely flammable, burning rapidly when ignited but without audible explosion. Combustion takes place with greater rapidity, together with increasing volume of sound, as the proportion of vapor to air increases. If this is continued the proportions conducive of violent explosions are finally reached. Thereafter, any further increase in vapor content will result in a reduction in the energy of combustion and flame of longer duration. From a flammable but non-explosive state such mixtures become explosive, followed by a flammable condition as at first.

Oil will not ignite except in the presence of air. The vapor or gas from the oil is, however, highly explosive when mixed with certain proportions of air. Oil or its vapors will not ignite of its own accord but only by the application of heat of a higher temperature than its flash or fire points. However, the vapor will be readily ignited if brought in contact with a spark or flame. Oil vapor, being heavier than air, tends to collect in pockets in the lower part of the ship's tanks, double bottoms and adjacent spaces. Investigations have shown that oil upon ignition may tend to flare back to its source, in this way igniting an open tank from whence it came.

Flash Point and Fire Point

As the hazards of transporting oil are in proportion to the flash and fire points of the product, a more detailed explanation of these two characteristics will be of interest. If oil fuel is heated in an open vessel vapor comes away in increasing quantities as the temperature rises, but this vapor will have no tendency whatever to light itself, i. e., there is no danger of spontaneous combustion. The vapor will not take fire unless a light is applied to it. If a light is applied at intervals to the surface of the oil, a condition is reached at which the vapor will give a sudden flame or flash of fire. This is called the flash test and the temperature at which this occurs is called the open cup flash point. If the oil is raised to still higher temperatures, a condition will presently be reached when the vapor takes fire, upon a light being applied, and burns continuously. This is called the fire test, and the temperature of the oil is then known as the fire point.

In order to obtain more accurate measurements, the close flash test has

STOP! ACCIDENTS

They are
unnecessary
wasteful
costly



LADDER NOT LASHED

Protect yourself and your
shipmates by lashing lad-
ders and gangways securely.
Also, look before you step.

been developed. This is a more precise method and has practically superseded the open flash test. In the close test, oil is gradually heated in a closed vessel, the mixture of vapor and air above the oil being well stirred up to make it uniform. A light is applied at intervals until at a definite temperature a flash is obtained, which is considerably below that of the open test. The open flashpoint is generally 30 to 35 degrees, Fahr., above the close test, and the fire test 45 to 55 degrees, Fahr., higher still.

Vapor is given off from oil in somewhat the same way as from water, until the air above the surface is "saturated," but it is not given off in considerable quantities until the temperature is within about 3 or 4 degrees of the close flash point.

General Safety Rules and Regulations

The operation of tank steamers and the repairs which must be made at periodic intervals is governed by features peculiar to this type of vessel. Quick turn arounds are absolutely necessary to the economical operation of tankers. Oil cargoes are rapidly loaded and discharged and a tank ship is apt to be in port only 24 hours for such purposes each trip. Another feature relates to the peculiar repairs which must be effected on oil tanks, oil pumps, oil piping, heater coils, etc., involving a large amount of oil-tight work. Any gassy condition must be eliminated before repair work is started on deck, in the tanks, or in adjacent spaces. The combination of all these features makes the management of tank ships an exacting one.

Rules and regulations covering every possible hazard from fire and explosion have been promulgated by the several petroleum corporations. These regulations include every phase covering the safe loading and discharging of the vessels, precautions to be observed in the cleaning of cargo and fuel tanks preparatory to executing repair work, defects to be guarded against in electrical and mechanical equipment, rigid instructions against smoking, carrying of naked lights, etc. Such regulations may vary slightly with the different companies, depending upon the particular conditions, yet similar general safety rules are strictly observed on all tank ships.

Prevention of Boiler Room Oil Fires

The chief risks of fires on board all ships burning oil as fuel, whether passenger, freight or tank ships, are in the boiler room. These risks arise by leaks from valves or pipe joints, by faulty burners, or by incorrect manipulation of the burners. There are risks of fire and explosion due to percolation of oil and vapor through joints of the steel plating and by loosening of rust enabling leakage to occur, hence the fitting of cofferdams for safety. The vapor, and the oil itself, are liable to leak through riveted and caulked joints of steel work, even though these have passed a good watertight test. The pipes for filling and emptying oil fuel, and the vent pipes, should be as short and direct as possible, and be so arranged that if any leakage occurs, dripping or any fine spray arising will not reach hot surfaces of the boilers, steam pipes, etc. The pipes for supplying oil to the furnaces should be carefully led in the same way, and all joints made metal to metal on these delivery pipes, in which considerable pressures exist.

In lighting up the boilers skill is required to avoid the formation of volumes of an explosive mixture in the furnaces and uptakes. Every precaution should be taken to prevent unburned oil from collecting in the furnace, as the hot brick gasifies it and there is serious danger of a flareback and a violent explosion. Proper precautions will eliminate such dangers. No matter how hot



the furnace may be, if all burners are temporarily secured, no attempt should be made to relight from the incandescent brickwork. Very serious accidents have resulted from this practice.

The oil must be quite free from water or from sediment of any kind, as these may cause the flames of the burners in one furnace to be momentarily extinguished while spraying will still continue, and immediately afterwards the mixture may be fired by explosion. The burners must be maintained in a clean, efficient condition to avoid stoppage by carbon deposit, and also to prevent dripping, both of which lead to difficulties involving fire risk. The fire rooms should be kept scrupulously clean, and no old clothes, rags or pieces of wood which would absorb oil should be allowed to remain, in case of a burst of flame from any cause. Drip pans should be provided in front of the boiler furnace and under the fuel pumps and should be kept in clean condition. Where boiler room bulkheads are covered with insulation, an inspection should be made from time to time to ascertain that no fuel oil has leaked through into the insulating material, thus constituting a fire menace. The bilges in the boiler room and pump rooms should be thoroughly hosed out frequently and all oily bilge water should be immediately and completely removed.

Excessive temperature of oil to the burners is another source of danger because the tendency of oil to leak increases with rising temperature. In most mechanical atomizing systems the oil is heated above its fire point, the only factor of safety being that it is not in contact with air until it reaches the burner tips. Excessive oil pressure is also dangerous, due to possibility of some part of the system bursting. The relief valve which is provided for safety in this system should be adjusted for the desired pressure and together with the thermometer and gauges in the oil discharge lines, should be checked for accuracy at regular intervals. Another important factor in fire prevention is avoidance of soot accumulation in the uptakes and stacks. Proper regulation of burners and frequent use of mechanical soot blowers will minimize such accumulations. Cooperation should exist between the deck and engine departments regarding the best time to blow tubes. This operation often results in burning masses of soot flying from the stack and landing on the decks, and ships are frequently headed into the wind when tubes are being blown.

Safety Precautions When Loading or Discharging

Oil cargoes are pumped into and out of tankers through flexible hose connections. For the purpose of grounding static electricity generated in a vessel and thereby eliminate sparking at the cargo connections when connecting or disconnecting the hose an electric short circuiting device is usually provided. All scuppers from which a spill might flow are plugged oil-tight with wooden plugs. While vessels are loading or discharging flammable products, the tank tops are kept closed and the tank top dogs slacked off and thrown back. The ullage plug holes on the cargo tank tops are covered with a fine mesh wire gauze or wet gunnysacks until the ullage plugs are permanently secured in place. Loading certain petroleum products "overall" (that is, with an open end of hose inserted in an open hatch or manhole), is a dangerous procedure on account of the gas generated. Lubricating oils, having a high flash point, are commonly loaded in this fashion with entire safety.

The overflowing of a tank when loading cargo is a very serious occurrence and a matter which is carefully guarded against. Some serious accidents in the past can be directly attributed to neglect in this respect. Besides danger of explosions and aside from the fact that the presence of floating oil in the

vicinity of a ship is a direct menace to the vessel, tank overflows frequently cause undesirable and injurious pollution of adjacent waters, and is a direct violation of harbor ordinances.

When loading a vessel the several tanks are carefully watched and frequently gauged. When the cargo enters the expansion trunk, the purpose of which is to provide a confined space at the top of a tank to limit the free surface, the rate of loading is reduced and every precaution taken to prevent an overflow. When loading tanks, allowance is made, of course, for the expansion and contraction of the oil due to changes in temperature. Valves in ship's filling lines must not be closed while pumping, to avoid overflowing, as this is likely to burst the hose.

The bursting of a hose when loading or discharging is another serious matter. This is guarded against by maintaining the proper pressure on the cargo



pumps, as well as by visual inspection and pressure tests of the hoses at regular intervals. The hose connections to the ship's manifolds must be solidly made to prevent leakage while pumping cargoes. The loading finished, care should be exercised, in disconnecting, to drain the hose, preferably by hoisting its middle portion, to avoid danger incident to spilling oil on deck. Cargo hose when not in use should be securely stowed in some protected place, in order that deterioration as a result of exposure to weather or moisture may be avoided.

In some instances the loading of highly flammable products after dark or during severe electrical storms is prohibited. During such times all fires on board are extinguished and shore steam is used for the operation of auxiliary machinery and for the heating system. Depending upon terminal and local regulations, flammable and less flammable products are usually allowed to be discharged after dark and vessels permitted to use their own steam.

On some ships gas-freeing pipes are fitted to each tank and carried up masts

in order to allow gas to escape or air to enter should changes in pressure occur while at sea, due to changes in temperature; also when loading or discharging cargoes with the hatches closed. This arrangement permits the evacuation of dangerous gases in an elevated zone where cause for fire is but rarely found. It is usual to fit valves on these pipes, which are spring or deadweight loaded, and open either to vacuum or pressure; these avoid the unnecessary loss of vapor and do not open until a definitely arranged pressure accumulates.

Most tank ships have automatic vent and vacuum valves fitted directly on the cargo tank hatch covers; these valves are deserving of careful periodic inspection to insure their being in good operative condition at all times. The openings of these vents or valves are covered with fine mesh copper wire gauze. It is a common failing which should be guarded against, to paint over this gauze, clogging it up completely and practically sealing the vent. The important function of the gauze is to prevent a fire on deck from flashing back into the tank, it having been found that a flame cannot penetrate a finely divided screen. Instances have been reported of tankers afire on deck, where gas emitted from the tank vents, due to the heat, burned as enormous gas jets without igniting the tanks. To minimize the danger of fire due to open ullage covers when loading or discharging cargoes, these openings are often fitted with fine mesh copper wire gauze screens serving as a protection against fire penetrating into a tank, similar to the vent screens.

Cleaning and Gas-Freeing Tanks for Cargo or Repairs

In order to prevent fires and injury to persons and property which may result when tanks are being cleaned or repaired, it is necessary to be assured that tanks about to undergo repairs or cleaning, and under certain circumstances their adjacent compartments, are free from sediment and dangerous or explosive gases. The real danger exists when oil has been pumped from the tanks. After finishing what can be done to clear a tank by the pumps there remains a quantity of oil, or oily sediment, which must be removed by hand. The tank may be thoroughly steamed out and then washed out by filling with water and pumping it out several times and every effort made to thoroughly ventilate it by means of windsails and portable fans, and yet oil vapor will remain.

This vapor is so much heavier than air that it hangs about in every recess of the framing. It is at times necessary to drive the air supply in with considerable turbulence, to stir up and wash out the vapor from these dead corners. Oil has a remarkable capacity for penetrating between the laps and joints of plating and framing, and is held there by rust and scale acting as a sponge. Oil so held when the tank has been emptied and cleaned, is a source of danger for some time and the utmost care must be exercised in cleaning and ventilating the tanks.

As a rule tank vessels are not delivered to a shipyard for repairs until all tanks are steamed, smothered and sealed, or until a gas-free certificate covering all tanks in the ship has been issued. When emergency dry-docking is necessary and no tanks or pumproom repairs are contemplated, the tanks are smothered with steam and sealed prior to the vessel's arrival at the yard, and so maintained until her departure therefrom.

Before a vessel proceeds to a shipyard when repairs are necessary in and/or around cargo tanks, and/or fuel tanks, the several tanks are cleaned by steaming, ventilating, washing down, pumping dry and wiping up, followed by a final inspection to assure that all oil and sediment are removed. The necessary intensity and duration of each process varies according to the con-

dition of the tanks and the nature of the previous cargo carried therein and rests upon the judgment of the officers in charge.

The discharge of washings from cargo and fuel tanks of tank vessels as well as passenger or freight ships is usually done while the vessels are at least 50 miles from the nearest headland. This is in accordance with an agreement reached by delegates from 13 countries at the Preliminary International Conference on Oil Pollution of Navigable Waters held at Washington, D. C., during June, 1926. One of the important provisions of the draft adopted at this conference was to the effect that the discharge of oil or oily mixtures be prohibited within such areas if the oil content exceeds .05 of one per cent:



that is, if it is sufficient to constitute a film on the surface of the sea visible to the naked eye in daylight in clear weather.

American, as well as foreign companies operating tankers are observing this provision. When the ships are en route to loading ports or repair yards the various tanks which have been ballasted are drained into one tank and the mixture there retained until arrival at the port of destination, where facilities are provided for its disposal. In this manner a vessel can refrain from discharging oil within the 50-mile zone and still arrive in port with all tanks clean with the exception of the one tank in which the oily mixture from the ballasted tanks has been collected. Oil separating devices for cleaning the discharge from cargo and fuel tanks have, within recent years, been installed on a number of ships and may assist materially in the future to overcome the objectionable features relative to the oil pollution of inland and navigable waters.

When tanks are prepared for steaming the cover and ullage holes are closed, but left unfastened, and steam at a line pressure of about 75 pounds

is allowed to enter the tank through the smothering line for as long a period as considered necessary. Upon completion of steaming, the hatch covers are thrown open and a windsail rigged into the tank to create air circulation within, thus expelling gases and steam. In cases where the gas content of the air in the tanks is usually high, additional air is forced into the tanks by a portable blower and a canvas duct. Another system employs compressed air which is forced through suction and discharge manifolds on deck, into the tanks; this method has the additional advantage of clearing the cargo lines of vapor and creating good turbulence at the bottom of the tanks. The cargo pumps are also used at times to assist in the expulsion of the gases.

When windsails and blowers have been rigged, the process of washing down is carried on by means of hose connected to a hot water line, the main condenser overboard discharge being commonly employed for this purpose. The washing operation is extended from the top of the tank to the sides and beams, and finally the bottom is thoroughly flushed. Frequently, after the foregoing has been accomplished, sediment still remains clinging to the bulkheads or structural members in the tank and a second steaming period and washing operation must be carried out. When the tanks have been properly washed they are wiped thoroughly dry by means of buckets, brushes, scoops and rags. Special care is exercised to flush adjacent pipe lines, and all suction and discharge valves are kept open up to the master valve on each side of the tank in question.

From what has been briefly reviewed regarding cleaning and gas freeing of cargo tanks, the precautions which are taken to safeguard life and property become apparent. After this work has been carried out to the satisfaction of the officer in charge and the vessel proceeds to a shipyard, no repair work in the tanks or in their vicinity is permitted until the tank or tanks have been certified to be gas free by an outside chemist. In some ports a gas-free certificate may be required to be issued in the near future before a vessel may proceed to a repair yard.

In order that no misunderstanding can occur when describing the gaseous contents of tanks on the certificate the only notations which appear are: "Safe for men," "Not safe for fire," "Safe for men and fire," and "Not safe."

"Not safe" is used when oil or dangerous sediment is present in the tanks or leakage from adjacent compartments may occur, or when the gas content of the air is greater than two-tenths of one per cent. At such times men entering tanks must be equipped with life lines and gas masks and a constant watch maintained on deck for their safety.

Precautions While at Shipyard

In addition to ordinary repairs to hull and machinery periodically made in shipyards on all types of steamships, the tank ship requires repairs of a more or less special nature. This, as has been previously mentioned, is due to her peculiar construction involving much oil-tight work on tanks, bulkheads, pumps, oil piping, heater coils, etc. The precautions taken to insure delivery of a tank vessel to the yard in a gas-free condition have been reviewed.

When it is necessary to drain a tank in drydock, precaution should be taken to catch any mixture of oil and water to prevent it from spreading to the drydock. When renewals of rivets are necessary, care must be observed to mark plainly dangerous compartments from the outside and to otherwise warn workers engaged on the repairs. Before any contemplated work to the cargo lines is undertaken, it is important to ascertain that these have

been thoroughly drained and blown out, so that when lines are broken, compartments will not be flooded, whereby great risk may be incurred, especially if men are at work with torches of fire.

Ventilation of certain tanks is often necessary during the progress of work in the yard. There is always danger of oil vapor from oil seepings in the tanks, under rivet heads, etc., and it frequently happens that when a rivet is renewed flames burst forth around it. Instructions against smoking, carrying of naked lights, permitting strangers on board, etc., are just as important to be observed while the vessel is undergoing repairs as when it is in service.

A number of fires aboard vessels have occurred while the ships were on drydock or undergoing repairs. It must be conceded that where acetylene burners, portable forges and hot rivets are being handled, there is much



greater possibility of fire coming in contact with flammable material whether or not the ship happens to be a tanker.

The danger of fire due to spontaneous combustion must be guarded against on all ships. Waste material, particularly if wet with oil, must not be permitted to accumulate in confined spaces where oxidation of the flammable material may proceed with such rapidity that its temperature is brought up to the point of ignition. With the view toward removing every possible fire hazard, the paint lockers, lamp lockers, closets and store rooms should be cleaned out at frequent intervals in order to assure that no oil rags or other flammable material has been left aboard.

Defective ship's wiring has been the cause of many fires. Whenever insulation is damaged by heavy weather or other causes, particularly where there is immediate danger of a short circuit, repairs should be immediately effected.

There are just two ways to extinguish fire. One is to cool the material below its burning point. This is usually accomplished with water, or chemi-

cal solution consisting chiefly of water. The other method is to smother the fire by cutting off the supply of oxygen, without which fire cannot exist. Water is not very effective for the purpose of extinguishing oil fires because the burning oil floating on the surface of the water spreads as more water is applied. In the case of ordinary fire, such as burning wood, water derives its efficacy mainly from its cooling effect, which is useless when dealing with a light-oil fire; in such a case the oil floating on the water and having an ample supply of oxygen, continues to burn.

It has been recognized that to deal effectively with an oil fire the air must be excluded by means of a "blanket" of steam, sand, non-combustible gas, or



Accidents Don't "Happen" They Are CAUSED!

Replace floor plates and gratings
promptly or rope off the opening.
It always pays to be careful.

some substance that will stand up to and not be broken down or destroyed by the heat; the smothering effect must continue till the temperature has been reduced, otherwise the fire will again break out. The efficacy of the various fire-extinguishing agencies mentioned is dependent upon the particular location and dimension of a fire. Small fires have been quickly overcome by sand; water is reported to have been successfully used in extinguishing fuel oil fires in some cases; steam is a valuable agency on account of its capacity to displace the air, while a most effective method is a system for discharging non-combustible gas into compartments where fires may threaten.

The fire-fighting apparatus with which tankers are equipped, besides axes, water buckets, hoses, hand or portable extinguishers conveniently located about the ship, includes a steam smothering system in the boiler rooms and tanks, while on many modern tank ships an elaborate system for the discharge of inert smothering gas into the various compartments is installed. Carbon dioxide gas (CO_2), which is commonly employed for this purpose, is

stored in a number of steel cylinders manifolded together in batteries, each cylinder containing about fifty pounds of gas, located in a convenient and protected place such as the compartment under the midship house. The engine room, pump rooms, cargo tanks and spaces protected are provided with leads through distributing valves from the common supply. The remote control release handles are located in a place accessible in case of emergency, such as the pilot house or flying bridge. In case of a fire in any one or more of the cargo oil tanks or fuel tanks, it is only necessary to pull the proper control handle in order to release a bank of cylinders, thereby discharging a large volume of high velocity gas into the compartment to extinguish the fire.

Fires in cargo oil and fuel tanks usually occur when the hatch covers over the expansion trunks are open. Experiments have shown that by the use of carbon dioxide it was only the expansion trunk openings which needed



to be protected. Projecting of blankets of carbon dioxide gas across the opening cuts off the oxygen supply completely and causes entire extinction of a fire in a few seconds, the time depending upon the volume of air space between the blankets of gas and the burning oil level.

Importance of Education and Supervision

Fire prevention aboard ship being of most vital importance in every phase of a vessel's operation it is absolutely necessary that every possible precaution should be taken to insure all fire-detecting apparatus and fire-fighting gear being always ready for immediate and efficient service. The elimination of all accidents in the transportation of petroleum products will probably never be realized, but the elimination of hazards incident to its handling is within the bounds of possibility if accomplished with competent and trained personnel, proper methods and equipment.

Safety measures can be formulated, modern fire-fighting apparatus may be

installed, and rules and regulations can be laid down, but they will be productive of little good unless every member of a ship's complement accepts his part of the responsibility and does his share toward the prevention of fires and accidents.

Portable resuscitation apparatus and gas masks are indispensable aboard every tanker. Of equal importance is the necessity for the ship's officers and members of the crew to be familiar with the operation of the equipment for administering artificial respiration. It is also desirable that the men be instructed in manual artificial respiration, preferably the prone-pressure method which has saved the lives of many persons threatened with asphyxiation.

In the training and educational programs fostered by the petroleum corporations, there must be included a counteraction to the human tendency to become careless when "it's all in a day's work"; this tendency to become careless can be lessened by constantly reminding the personnel of potential dangers and pointing out to them the serious consequences which may follow any let-down in accident prevention work. If the minds of the working men be trained against carelessness and chance taking, there will be eliminated a large percentage of the accidents which occur on board ship. Education, therefore, is the prime factor in the successful accomplishment of any safety program.

Most Knowledge Comes Through the Eye

It is claimed that 85 per cent of all human knowledge comes through the eyes. Good safety posters are especially effective where foreign crews may be employed whose members do not, perhaps, speak or read the English language. In such cases safety pictures will convey their messages in a language for which the eyes alone are necessary. Safety posters depicting the correct and incorrect methods of performing certain tasks can, by the universal language of the eyes be imposed upon the most illiterate persons.

Properly instituted safety work is a proved economic asset in any steamship company. The applying of safety education has its reward not merely in a saving in the cost of accidents but also in a better relationship between the company and its employees. A study of the best methods and machinery to be employed to handle their products with safety is continually being made by the petroleum corporations. More than ever the human factor which enters into the safety movement is receiving consideration.

Safety work on tank ships, as in any other line of industry, necessitates a program of education and supervision. The problem of eliminating the hazards incident to handling petroleum products demands that the persons engaged in this work be acquainted with its inherent dangers, and taught the necessary precautions which must be followed in avoiding these dangers.

Proper supervision must include the men, the ship and the machinery. The licensed personnel on the vessels, who frequently complain of the inexperience of the men in their charge, must be taught to realize their own responsibility in this condition and make serious efforts to train and instruct their subordinates. The Marine Department management, in turn, must inaugurate methods which will arouse an interest among the officers on the ships so that the principles of safety will, through them, be indelibly impressed upon the men. The importance of this is apparent when the large turnover of the unlicensed personnel in comparison with the officer replacement is considered, and the fact that a careful analysis of accidents on ships reveals that from 75 to 85 per cent of the injuries are sustained by unlicensed personnel. Inexperience, ignorance and carelessness are the reasons often assigned by engineers in charge of marine safety work for the continual recurrence of accidents

among unlicensed members of the crew and are undoubtedly best overcome by the close supervision and, above all, the personal example of safe and competent superior officers.

There are approximately 1,100 oil tankers afloat of over 1,000 gross tons each, of which over 700 fly the American or the British flag. Considering the nature and volume of the cargoes carried in oil tank ships, the comparative freedom from loss and damage by fire and explosion is a tribute to the skill and care exercised by those sailing in these vessels.

CHAIRMAN KAIN: I think that is a very important and timely paper. During the past year we have had some very disastrous explosions on tank steamers. There has been very large loss of life and a great many serious injuries and unusually heavy property loss not only on the ship, but to other property belonging to third parties. Generally speaking, these tank steamers are owned by oil or petroleum companies or by companies solely engaged in transportation. I think most—in fact, all—of the people operating those steamers are thoroughly familiar with the precautions to be taken in avoiding these explosions and accidents. However, there is considerable difficulty in getting the people on the ships and some of the supervising officers to observe the precautions. I don't know how we are going to overcome this, unless we undertake a campaign of education for the personnel on the ships.

Have any of you gentlemen any questions you would like to ask Mr. Tode? He has covered the subject very thoroughly.

Problem of the Oil Cut Off Valve

CAPT. T. W. SHERIDAN (New York State Nautical School, New York City): I would like to ask Mr. Tode a question. On every merchant vessel not only oil, but cargo vessels burning fuel oil, the local inspectors' regulations require a valve be fitted from the upper deck, generally around the engine room, reaching down. This valve cuts off the supply of oil from the settling tank to the fuel oil pump. It has been my observation in some dozen vessels at different times that with one or two exceptions these valves are absolutely neglected. Either the personnel don't know where they are, or they are disconnected. Is that due to the fact that the personnel do not consider these valves necessary for the safety of the vessel, or is it just due to ignorance and the usual human neglect to take precaution?

MR. TODE: I would say that is due to neglect. I am not answering you directly. I don't recall just the paragraph you refer to, but I have also noticed that the safety valves or steam stop valves which should have reach rods going to the upper deck so boilers can be disconnected in case of a blowout or if for any cause the engine has to be stopped and you can't get to them, are neglected, notwithstanding there is a stringent order that they be connected up; so I would say it is probably due to neglect.

CAPT. SHERIDAN: I think that an investigation or search for safety precautions of this nature should be stressed, not only with the personnel, but with the marine superintendents. I think an additional valve should be fitted to shut off steam from the pumps which pump oil from the settling tank into the heater.

MR. TODE: That is done in some cases.

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): A lot of this paper applies to the ordinary cargo ship that burns oil, and I believe there ought to be some way of getting this knowledge over to them, so that they could profit by this paper. They sometimes clean those tanks and put molasses into a tank that has had oil in it. I am speaking now of ships running between the islands and the west coast, and I am sure these same precautions apply to a great extent in those ordinary cargo ships that burn oil and carry oil.

CHAIRMAN KAIN: I think you are quite right. I know that steamship companies,

both on the Atlantic and Pacific, have the same difficulty and most of the serious fires we have had on oil-burning ships have been caused by failure to observe these well-known practices.

CAPT. I. L. EVANS (United States P. & I. Agency, New York City): I would say the article contains a liberal education for most marine engineers on subjects they have little knowledge of. It would be a valuable paper to have distributed among engineering personnel especially.

CHAIRMAN KAIN: It will, of course, appear in the transactions of this Congress, but we will also have articles printed separately for distribution to members of the section.

O. D. MOORE (Pennsylvania Railroad, Philadelphia, Pa.): I think this paper is of general interest on account of the increasing use of oil in the propulsion of vessels. The Diesel engine burns a lighter grade of oil, as a rule, than is used in oil burning equipment and at the present time, the United States Steamboat Inspection Service has formulated no specific requirements for Diesel propelled ships. We are interested in the fire hazard in a fleet of about seven boats and while the amount of oil carried is comparatively small, there is nothing to go by in the way of experience with relation to the fire hazard.

O. D. MOORE (Pennsylvania Railroad, Philadelphia, Pa.): I might mention that there is a pamphlet prepared by the Marine Hazards Committee of the National Fire Protection Association, which covers these general features in a rather thorough way with specific reference to marine operation.

CHAIRMAN KAIN: If there is no further comment, we will go on to the next paper on the program.

Mr. Foisie unfortunately cannot be here and I am going to ask Mr. Bush to read the paper.

Safety and Productivity in 'Port Cargo Handling

F. P. FOISIE, Waterfront Employers' Association, Seattle, Wash.

Relatively little is known of either safety or productivity in port cargo handling—except that the costs of handling cargo are exorbitant and the accident rate is fearful.

Some conception of stevedoring accidents can be gained from the fact that the insurance premium approximates 20 per cent on the pay roll; in other words, of six men employed stowing cargo the work of one pays the insurance on the other five. There seems no other way at present for measuring the accident rate because there is little accumulation of accident experience in port cargo handling; what little there is remains unstandardized; and the need of exchanging experience is not yet realized.

Some conception of the cost of handling cargo may be gleaned from these facts. Manchester Liners, Ltd., report in their annual meeting of 1925 that 115 days' freight earnings out of 365 days (nearly a third) have been absorbed by the cost of stevedoring alone. The United States Shipping Board furnishes corroborative facts: the stevedoring, wharfage and other cargo expense taken from a considerable number of completed ventures for 1927 in the United Kingdom, South American and Asiatic service cost from one-quarter to more than one-third of the operating revenue.

Fortunately shipping will soon know something of the costs of both accidents and tonnage handled. The Longshoremen's and Harbor Workers' Compensation Act will no doubt lead soon to a compulsory uniform system of reporting accidents, and therefore costs. The United States Department of Labor has inaugurated a study based on the standard unit of man-hour-tons of productivity in cargo-handling in all of the large ports of the country by a competent

research man, Dr. Boris Stern. There is reason to believe that the results in both fields will startle attention and impel action.

Exponents of safety recognize that material handling is prolific of accidents. Of course, cargo handling is devoted solely to material handling. In most ports the labor is casual and therefore fertile of accidents. Moreover, the plant (the ship) is constantly changing, and there are the variables of time, tide, weather, etc., always encountered. These and other factors may be offered in explanation of an inherent high hazard but the fact remains that they are insufficient excuse for the inertia generally to be found in shipping management on the subject of accident prevention.

"The Relationship of Industrial Safety and Production," as developed by the American Engineering Council, goes unrecognized in most ports of the country. Although the Council was not able to extend its studies on this question of relationship of safety and productivity to stevedoring because of lack of the necessary available records, I have no hesitation in stating from personal experience that the conclusions reached by the Council as applied to industrial safety and production apply with equal validity to port cargo handling. Here are the major conclusions reached by Mr. J. E. Hannum, director for the Engineering Council of a study of five thousand plants; ("stevedoring" has been substituted for "industry" and "stevedore" for "factory.") (From NATIONAL SAFETY NEWS for August, 1927.)

Findings That May Apply Also to the Marine Industry

"Maximum productivity in stevedoring is dependent upon the reduction of accidents to an irreducible minimum.

"The initiation of accident prevention is as much a responsibility of the major executives in stevedoring as is the initiation of improvements in productivity.

"Many stevedoring executives have not given to accident prevention that degree of attention and direction that its economic and humanitarian significance warrants.

"The accident and production performances of the best stevedores clearly show that tremendous improvements can be achieved by the remaining stevedores.

"Organized safety work which is effective in reducing the frequency and severity of accidents is being carried on only in a relatively small percentage of stevedoring companies.

"A large number of companies keep no accident records, and make no attempt to analyze such records for determining ways and means of decreasing accidents.

"The weight of evidence supports the common belief that the safe stevedore is the efficient stevedore, and the efficient stevedore is the safe stevedore."

Mr. H. W. Heinrich, of the Travelers Insurance Company, in the study of five thousand accidents summarized in his article, "The Incidental Cost of Accidents," in the NATIONAL SAFETY NEWS for February, 1927, states that the cost of accidents—lost time of other employees, damage to materials and machines, interference with production, etc.—is four times the cost of compensation, medical aid, etc. The "incidental" costs are four times the direct costs. If we may accept that conclusion, then this interesting calculation follows: if the insurance premium for stevedoring operations is 20 per cent on the pay roll, and the "incidental" cost of accidents is four times the cost of the accidents themselves, then the direct and indirect cost of stevedoring accidents amounts to as much again as the full stevedoring pay roll. Moreover, if this stevedoring pay roll approximates one-quarter to one-third of the operating expenses then steve-

doring with its accidents rolls up a most formidable expense and, unquestionably, waste.

This sort of statistical generalization has been resorted to before with shipping interests by many persons for years past—with little result except irritation. Fortunately shipping will be compelled to pay attention to both safety and productivity in the near future. The new Federal Compensation Act calls for a stevedoring safety code by Congress in the near future. We appear to be in a fair way to have legislative intervention in stevedoring management, the inevitable result of failure of the industry to prevent its own accident wastage. Perhaps an even more effective factor compelling attention to the relationship of safety and productivity in port cargo handling is the increasingly severe competition steadily at work, resulting in ever closer scrutiny of costs, and leading toward their sharp reduction.

Factors Making for Safety and Productivity

Although there is little that is known concerning accident prevention and productivity in port cargo handling certain factors making for both safety and high productivity are exceedingly well known, including:

- (1) The necessity of knowing production costs and accident rates.
- (2) Regularization of employment; the decasualization of longshore labor.
- (3) A port safety program, including a safety engineer in each large port, with a joint safety organization of men and employers, working in a common effort and toward a common interest.
- (4) Steady experimentation in designing and operating improved mechanical means of port cargo handling. The presence of surplus labor in most ports of the country has and will inevitably continue to interject severe labor restrictions on the introduction of labor saving machinery in port cargo handling.
- (5) Experience rating for every risk, with premiums accordingly, should furnish a sharp prod to bad experience and continued encouragement to good experience.

The writer's experience leads him to the conclusion that in shipping as in inland industries, personnel problems and production problems are interdependent; whatever makes for competent personnel direction helps toward production; and vice versa, that which represents studied management attention to production cannot fail to take into consideration accident prevention.

A common observation on board ship in port is that where you have cheap casual labor and hectic conditions of supervision and operations, accidents are frequent and severe, and tonnage low. Although the evidence is not available in tangible form to present to shipping management in support of the following statement, shipping concerns doing business in the several ports of the country no doubt can produce the evidence from their own records—namely, that in the three sections of the country where safety engineering is under way on a port basis you will also find progress in production. Galveston is just employing a safety engineer; San Francisco is well under way; Puget Sound has been at work in this field for three years. It has been noted in the port of Seattle that in the last several years while port tonnage has increased, and payrolls too, the number of longshoremen remains approximately the same. More of the time of the men is spent at the job, less in the hospital. The accident statistics confirm this.

In these several sections of the country the relationship of safety and productivity in port cargo handling is recognized. The safe way is the efficient way.

CHAIRMAN KAIN: Gentlemen, we are open for discussion.

CAPT. EVANS: He is too near right to take much issue.

CAPT. SHERIDAN: Mr. Chairman, would the safety engineers' duties come under a government or a private or an insurance jurisdiction?

A. R. BUSH (Barber Asphalt Co., Maurer, N. J.): Entirely private.

MR. ARKILLS: Out west we have what is known as the Waterfront Employers, who were originally organized to fight the Unions and then they afterward got to dealing with the Unions through Mr. Foisie's plans and now have joint representation.

One of the greatest factors to help out in our safety work in the ports of Seattle and Puget Sound, is the fact that all the ports of Puget Sound are copying to a great extent our means of operation in Seattle and the machinery was well set for safety program there when I was employed. Very little credit is due me for the work that has been done. If there is anything, it is just cooperation in what I might have suggested.

Mr. Foisie's paper deals very largely in generalities and with the studies he has made in connection with the foundation research he has just about completed. In any cases he is shooting over my head to answer questions on his paper, but anything in connection with Seattle's operations, I believe, I could describe. There are about 45 companies, I judge, now in that association. They maintain the Hall; they even have a large room there where they can gather without any expense to themselves and they operate this Hall at an expense somewhere approximating \$25,000 a year. I believe it is all paid back to them in many ways each year through the operation and the increased tonnage we get per man over other ports. I hope that will be shown in Dr. Boris Stern's report. At any rate, I do know that with less men today than we had three years ago, there is more cargo through the port of Seattle. That is borne out by our records and the records of the port.

An Increase in the Productivity of Men

CHAIRMAN KAIN: You made the point that there was more cargo handled with fewer men. Does that mean that the men were handling more cargo per hour or that there are actually fewer men employed and that they work longer each day?

MR. ARKILLS: There are fewer men employed, but more hours worked by the same number of men. Three years ago, if I remember correctly, the average wage in the port was somewhere around \$156 a month for the regular gangs. It has gotten up now for those same regular gangs with an increased number in gang formation, to a point around \$176, which shows that the same men are actually putting in more hours, but not excessive hours. At the time I went to Seattle down on the beach, if you had 44 men working, there were about 10 men standing by to fill the breaches caused by those injured or who lost time incident to accidents. We have reduced that at the last compilation of statistics, to a point where only one man to eleven is necessary to stand by to fill the breaches caused by those injured. So I feel that it is undoubtedly a fact that we have fewer men in the hospitals, fewer men injured and crippled, and they actually have an opportunity to work a reasonable number of hours.

CAPT. EVANS: Will you explain just a little, please, what the Central Hall is used for and how labor is distributed?

MR. ARKILLS: We have, as I said, gangs. We had about 10 regular gangs of 10 men each three years ago. I think we have about 26 now. Those men who are in regular gangs don't need to come to the Hall, unless ordered to come by phone. They call up every noon, and whenever they are told to call next. They are despatched from the Hall and they sometimes are despatched right from their homes. All the stevedores are handled that way, excepting the extra board men who must come to the Hall to get their jobs, and they hang around the Hall in the morning, at noon or

any part of the day they think the ship may start. Instead of lining up at the gate for shaping into gangs, they line up at the Hall and are despatched from the Hall. The truckers are on an entirely different basis. They must all come to the Hall to be despatched. The next man out is the next man under the peg where the last man was despatched from. We have pool tables in the Hall where the men can play for five cents a game, a cigar stand in the corner and a fountain where they can buy soft drinks. The men make it a club room as well as a waiting place for their despatching.

CAPT. EVANS: Do all employers maintain the Hall.

Additional Men Are Available in the Hall

MR. ARKILLS: No, they do not. The Pacific Steamship Co., Admiral Mail, the Alaska Steamship Co. and others of less size have a nucleus of their own men and only procure the added men that are necessary in emergencies. Now, for instance, when the "H. F. Alexander" comes in on Monday morning, it is always necessary to call the Hall for additional truckers, because that ship is running on very fast dispatch and they truck through side ports and handle cargo over the side—a tremendous amount of cargo in a very short space of time. In cases of that sort, they must have their additional men over the 250 they would have at their docks all the time. Other stevedores have no men of their own at all. In that case, they must get all their men from the Hall if they are members of the organization. In fact, that is about the only place in Seattle where they can get men. The I. L. A. headquarters have a small handful of men. Most of those men have at some time or other worked on the waterfront and have either eliminated themselves or have been eliminated for cause.

MR. BUSH: You made the statement that they were working longer hours than previously, but not excessive. What do you mean by that?

MR. ARKILLS: We have an eight-hour shift in Seattle and seldom exceed it, except in emergencies; and if you are working an eight-hour shift, I don't believe you are overworking them in most cases, because we have a full hour at noon and a full hour at dinnertime in the evening. Few of the ships work on Sunday, but in some cases, of course, where quick dispatch is required, they do.

MR. BUSH: Do eight hours constitute your working day?

MR. ARKILLS: It is the unwritten law. We do try to work an eight-hour day as far as possible and we dispatch fresh men in many cases to take the places of those who have been working, because fatigue is one of the causes of accidents.

CHAIRMAN KAIN: Is the port of San Francisco organized along the same lines as Seattle?

Such an Organization in Eastern Ports Will Be Modified

MR. ARKILLS: I believe Mr. Pickard has set up a little different organization there. He of necessity has had to work very strongly through the employers. They haven't a joint organization down there, but I believe they have one representative of the men on their committee. A man who is in a position to know what they are doing in San Francisco said they are doing a very nice piece of work and I believe that Mr. Pickard is entitled to a lot of credit for the work they are doing there. I will say this, that they have not been selfish in the use of printer's ink and their educational program is carried on very vigorously. The accidents have noticeably decreased to the operators, that is, as the operators see them, which to me is a very wholesome condition.

CHAIRMAN KAIN: Do you think it would be possible to organize in the Eastern ports and Great Lakes ports on the Seattle plan?

MR. ARKILLS: I don't believe it would be possible to organize New York City on the Seattle basis. You would have to adopt something more on the order of San Francisco; and I believe if you brought a man in from the labor organization into such an organization, you wouldn't want to bring one in that you had to sell entirely on the safety idea to start with. You would have to find some man to represent them who would know the language you are trying to talk, to start with; so it wouldn't be given a black eye before it got started. I do believe that if you were to organize the port of New York, reaching the heads of the companies operating there by means of a few general meetings—get them sold on what is and what can be done, and then work down through their foremen, which is the real way of reaching stevedoring accidents, and in some way or other create more of an organized form of operation in the way of the gang system—give more authority to your hatch tender or let him form his own gangs; hold him responsible—I believe you could go a long way toward a safe port right in a big city like New York. That is my candid opinion and what I would attempt if I were to go there. I may be all wrong.

CHAIRMAN KAIN: I think this is a very important question because there is a tendency, of course, to say "they can do that in Seattle, but conditions are different in New York and we can't do it that way." Possibly, they couldn't do it the same way, but I think they can get sufficient material and ideas so that something can be done in that port.

MR. ARKILLS: I believe it could be done on the San Francisco plan with some modifications and could be carried on very splendidly.

CHAIRMAN KAIN: Of course, in New York, the men to a large extent do work only in sections of the city. There are certain men who work only on certain steamship piers, so that although it is a large port, it might be possible to organize the port into districts and handle each somewhat as you do the port of Seattle.

MR. ARKILLS: I believe that would be entirely possible.

CHAIRMAN KAIN: I have here in front of me three copies of a rough draft of a code by Mr. Arkills. As was pointed out in this paper by Mr. Foisie, it is quite possible there will be a code formulated in a short time at the instigation of the Federal Compensation Commission. There is obvious danger in that plan as was pointed out yesterday, and I think some of you men probably have had considerable experience in shipping and stevedoring, I would like to have you take one of these copies and go through it for the purpose of making constructive criticism. Mr. Arkills will be very glad to have it and that is the only way these codes can be drafted and made serviceable. When completed they should contain the best opinion and practice of the entire business.

Mr. Bush has just reminded me that we are planning to mimeograph this code as it is now drafted and we have all your names here, I think.

The next paper is by Col. Simmons.

The American Marine Standards Committee—The Relation of Its Work to Accident Prevention

Col. Edward A. Simmons, Chairman of the Executive Board, The American Marine Standards Committee, New York City.

The American Marine Standards Committee was formed November 10, 1922, under the auspices of the American Marine Association, for the purpose of paralleling, in the marine field, the kind of standardization work that has been going on in the railway field in this country for more than half a century. Like railway standardization, the primary object of the American Marine Standards Committee is to attain increased economy and efficiency in building, repairing and operating ships by promulgating uniform, simplified standards applicable

alike, in so far as practicable, to both merchant and naval vessels. On the surface, it would appear that commercial gain only is involved; but as a matter of fact, we have considerable in common with the aim of the National Safety Council, since prevention of accidents is ever present as a factor in solving many of our problems, whether they include the design of ship fittings, equipment or machinery, or the formulation of rules of practice.

The Committee Functioning for Four Years

While the American Marine Standards Committee has been functioning steadily for some four years, the results when measured by quantity alone are not large. However, as Rear Admiral Rock in his paper on "Better Ships for Less Money," read at a recent meeting of the Washington Section of the American Society of Mechanical Engineers, has said: "We must guard against mushroom tendencies, superficial studies and perfunctory action. If my advice were requested, I would say that emphasis should be placed on quality rather than quantity."

For record purposes, I am appending a list of 23 publications issued by the American Marine Standards Committee up to June 1, 1927. You will note that some of the standards, for example the group of fittings for deck and rigging, cargo handling gear, specifications for hose, instructions for operation, care and upkeep of boilers, distinctive markings for piping, list of machinery spare parts, recommended equipment and methods for safety on ships, and specifications for pressure and vacuum gauges, are of interest to this Council, as prevention of accidents is an essential factor in each instance.

Aside from the direct relation between standards and safety, there is an indirect tie which is more than superficial—the immediate understanding of standardized equipment and methods by new personnel on a ship. This would be materially emphasized in the event of war, when the Navy, with which the American Marine Standards Committee in cooperating closely, might be called upon to operate merchant ships. This was recognized by Admiral Rock in the paper to which I have already referred when he cited as an example our standard O No. 19—1926, "Distinctive Markings for Pipe," which show at a glance whether a pipe carries live steam, exhaust steam, salt water or compressed air. The advantage of similar markings on all ships is obvious.

By far the greatest single effort toward increased safety at sea so far made by the American Marine Standards Committee has to do with the stability of ships.

Lack of Stability in Vessels Discussed

Lack of stability in vessels may be either the primary or a contributing cause of more losses than appear on the surface; because a capsizing is a relatively rapid process, so that complete information about just what happened is often lacking. Disasters, such as the capsizing of the "Eastland" at a pier in Chicago, on July 24, 1915, and the recent, but fortunately less disastrous turning over of the small steamer "Favorite" on Lake Michigan on July 28, with the loss of 27 lives, led by evolution to the promulgation of certain rules by the Steamboat Inspection service of the Department of Commerce, now in force, which require a so-called "inclining experiment," or stability test, for any vessel under its jurisdiction, the stability of which the inspectors have any reason to question—which rules, since July 1, 1924, have been applied to all passenger vessels intended to carry over 50 passengers, or one of 500 or more gross tons.

The rules in question, however, are both weak and unjust because of lack

of definiteness. They simply say that "a vessel shall have sufficient stability." Thus the factor of safety is left to individual opinion, which is unsound and sometimes proves onerous and unfair to builder and owner alike, because both are compelled to work in the dark and afterwards stand the light of varying opinions. The situation is analogous to one wherein a man decides to build a structure in a large city, employs a competent architect and contractor and after the building is finished is refused a permit of occupancy without material structural changes or a reduction in rated capacity because of a decision by the Building Department that the stress should have been no more than 5,000 pounds per square inch, whereas the architect had determined 10,000 pounds as ample for safety—the actual difference being that with the city the plans would have been filed and approved in advance and, if complied with, a certificate would follow as a matter of routine.

Special Committee on Loading and Stability

Realizing the gravity of the situation and following an investigation by a special committee made at the suggestion of Rear Admiral John D. Beuret, Chief Constructor of the United States Navy, the chairman of the Executive Board, by authority of the Board given November 15, 1924, designated the following to act as a Special Committee on Loading and Stability:

George H. Uhler—representing the Department of Commerce;
David Arnott—representing the American Bureau of Shipping;
J. R. Gordon—representing the American Steamship Owners' Association;
S. D. McComb—representing the Board of Underwriters of New York;
E. H. Rigg—representing the Atlantic Coast Shipbuilders' Association;
Captain J. F. Milliken—representing the Neptune Association;
James Swan, Secretary—representing the Society of Naval Architects and Marine Engineers;
W. F. Gibbs, Chairman—representing the American Marine Standards Committee.

The result was a very comprehensive report which was tentatively approved by the Executive Board on April 5, 1926, put in type and sent to all naval architects, ship builders, ship owners and others here and abroad for constructive criticism.

A summary of the comments reveals some strenuous opposition to the adoption of the report, due in a large measure to fear of the possible far-reaching effects of more rigid governmental regulation, although the reason given by the opponents is that it is not possible to prescribe a stability formula for use in designing ships that can be followed without unnecessary hardship to the owner. In any event, the Executive Board has expressed its confidence in the very able committee engaged in arriving at a solution and it is believed that the outcome will be a report that can be used as a basis for stabilizing and loading vessels that can be followed by all having to do with designing, building and operating ships, including governmental agencies, and contribute much toward the reduction of loss of life and property due to capsizing.

The Aim of the Committee Has Been Attained

The aim of the committee, which was to provide a means of comparing one vessel with another and to create a standard which could be applied to ships of various types and trades, has been attained in the report. If and when it is adopted as standard by the Executive Board, steps will be taken to insure application to all new vessels only, since it would not be practical to include ships already built.

Right here it might be in order to insert, parenthetically, that the American Marine Standards Committee has no leaning whatever toward compulsory regulation. Like Mr. Hoover, it believes in "more business in government and less government in business"; and, again like him, aims to prove it by example rather than precept. However, when it is plain that only governmental intervention will accomplish a desired end, it is my personal belief that the committee would not hesitate to recommend such a course.

A Part of the National Program, Department of Commerce

While the American Marine Standards Committee was initiated by the American Marine Association, it soon became a part of the national program of the Department of Commerce for elimination of waste in industry and commerce; and the work is being carried on in conjunction with the activities of the Division of Simplified Practice of that department, with the very hearty personal support of Mr. Hoover. The development of standards is, however, in no way directed by the Government; but is accomplished, with full freedom of action, by numerous subject and technical committees, the memberships of which are composed of highly qualified representatives of the various branches of the industry. The marine departments or bureaus of the Government participate in the work as units of the marine industry.

Some of the items, perhaps many of them, in the ultimate program of the committee are of special interest to the National Safety Council; and in their development for the purpose of standardization there will be an ever growing need for close cooperation between the two bodies. Unless and until such cooperation exists, there is an inherent possibility of duplication of effort by reason of the mutuality of interests. This has been guarded against by the committee through contacts made with members of the Council on specific safety problems; but it is believed that a more positive interlocking of the two organizations would be advisable to properly correlate their respective efforts.

The chief functions of the Council are assumed to be the determination of causes of accidents and the issuance of recommendations for their prevention; whereas the aim of the American Marine Standards Committee is to develop projects into standards of practice. From this premise it would seem that there is a fairly well defined line of demarcation between the respective motives of the two bodies; and that on subjects of mutual interest good collective results can best be attained by collaboration along that line.

Protection to Life and Property an Economic Factor

It is being more and more recognized in industry that protection to life and property is an important factor in practical economy; that moderate investments for protection result on the average in appreciable savings in operating costs. It is, in fact, one of the elements of any formula for elimination of waste. The factor of safety is especially important in ship operation because of the many hazards inherent to the industry. It therefore follows that almost any project of standardization for ship construction or operation deserves consideration from the standpoint of accident prevention and that the committee's solution of the problems of economy must involve the factor of safety. It is recognized as a fundamental, that true economy overlaps mere cheapness of unit output.

A number of organizations which have interests in common with the committee have appointed representatives to serve as advisory members of the committee's Executive Board. The latter would welcome the appointment of a representative of the Council in the same capacity. It is believed that such an arrangement would be conducive to a mutual understanding on matters affecting both bodies and the unification of their mutual aims.

APPENDIX

Serial Number	Title of Subject	Standards Number
1.	Glass for Air Ports and Fixed lights.....	H No. 1—1925
2.	Mooring Bitts—Cast Iron	H No. 2—1925
3.	Fixed Lights for Ships.	
	Type A—Pressed Steel Frame.....	H No. 3—1925
	Type B—Cast Brass Frame	H No. 4—1925
	Type C—Cast Brass Finished Frame.....	H No. 5—1925
4.	Rigging Screws for Ships.	
	Rigging Screws with Spliced Rope.....	H No. 6—1926
	Rigging Screws with Sockets.....	H No. 7—1926
5.	Ship Fittings for Decks and Rigging.	
	Chain Plates	H No. 8—1926
	Wire Rope Sockets	H No. 9—1926
	Solid Thimbles for Wire Rope.....	H No. 10—1926
	Open Thimbles for Wire Rope	H No. 11—1926
	Thimbles for Manila Rope	H No. 12—1926
	Pad Eyes and Links	H No. 13—1926
6.	Cargo Handling Gear for Ships.	
	Railroad Iron Sling	H No. 14—1926
	Chain Sling	H No. 15—1926
7.	Kinds and Sizes of Hose for Ship Equipment.....	O No. 1—1926
8.	Specification for $\frac{3}{4}$ " and 2" Flexible Metallic Hose.....	O No. 2—1926
9.	Specifications for 2½" Double-Jacketed Cotton Rubber-Lined Fire Hose	O No. 3—1926
10.	Specifications for 2½" Unlined Linen Fire Hose	O No. 4—1926
11.	Instructions for Care and Maintenance of Steel Hulls.....	O No. 5—1926
12.	General Instructions for Operation, Care and Upkeep of Scotch Type Marine Boilers	O No. 6—1926
13.	Kinds and Sizes of Mattresses and Pillows and Woolen, Linen and Cotton Articles for Ship Equipment.....	O No. 7—1926
14.	Kinds and Sizes of Glassware for Ship Equipment.....	O No. 8—1926
15.	Kinds and Sizes of Silverware for Ship Equipment.....	O No. 9—1926
16.	Distinctive Markings for Piping	O No. 10—1926
17.	Specification for 2½" Single-Jacketed Cotton Rubber-lined Fire Hose	O No. 11—1926
18.	Essential Machinery Spare Parts, Accessories and Supplies for Sea-Going Ships	O No. 12—1926
19.	Equipment and Methods for Safety on Ships.....	O No. 13—1926
20.	General Instructions for Operation, Care and Upkeep of Water Tube Marine Boilers	O No. 14—1927
21.	Condenser Tube Ferrules and Tube Sheets.....	E No. 1—1926
22.	Specifications for Pressure and Vacuum Gauges for Ships.....	E No. 2—1926
23.	Mooring Bitts—Cast Steel	H No. 17—1926

Close Cooperation With All Maritime Nations

COL. SIMMONS: It is my pleasure to deposit with the Council a set of the standards that have already been promulgated and it is our aim to follow this same plan in connection with the numerous other standards now being developed. While this is primarily a national movement, that is, one designed first for America, nevertheless,

we are cooperating very closely with all the maritime nations, for example, with Great Britain, who started the same kind of work four years before we began. Where they have evolved, or had evolved, standards, for instance, for tail shafts, we have almost paralleled their standards, so that ultimately, it is believed, at least hoped, that a ship in need of repairs can be turned around far more quickly when in any of the large ports of the world. In other words, many of these fittings can, you might say, be taken off the shelf and applied to the various vessels. Of course, this is going to be a work of many years, but had we had some such set of standards prior to the Great War, there would have been a very different story in the ship-building industry.

CHAIRMAN KAIN: On behalf of the Marine Section, I want to thank you for your very interesting paper and for the pamphlets.

I might say that yesterday we discussed one of the hazards causing a great many accidents on board ship; namely, the hatches on cargo ships. One of the things which was developed as a result of that discussion was the necessity for some kind of standardization of hatches, their construction and equipment. They are a very fertile source of personal injury and death. There isn't a day when we do not have an accident, and a serious one, and I think the Council could very well cooperate with the Marine Standards Committee.

COL. SIMMONS: I would suggest the Council name someone in New York or Washington. The executive board which finally passes on anything, meets four times a year and it would be gratifying if the council would designate someone who could sit in on our deliberations and help us, and hatches will undoubtedly be taken up. At the last meeting we passed on life-boats. We adopted a standard for life-boats and it is our intention to cover every part of a ship where the factor of safety is involved.

CAPT. EVANS: It is my understanding you have not thus far covered the question of hatches, Colonel.

COL. SIMMONS: No, we have not. The next great question will be bulkheads.

CHAIRMAN KAIN: Are there any further questions? We will go on with the next paper. Mr. Edwards will not be here today and I am going to ask Mr. Bush to read the paper.

"Health Conditions Among Seafaring Men"

R. F. Edwards, The Prudential Insurance Company, Newark, N. J.

One of the most vital problems in the shipping industry is the desirability and the necessity of hiring physically fit seamen. During the last few years considerable attention has been given, particularly in foreign countries, to welfare work among this class. In this country since 1875 seamen have received treatment at reasonable charges in the U. S. Marine hospitals. Prior to the extension of these services, which took place subsequent to the war, there had been an annual average of more than 55,000 seamen treated in these hospitals or in the out-patient departments.

In addition to this, foreign seamen, averaging about 500 per annum, have also taken advantage of these privileges. For American seamen the average number of days of hospital treatment had been 30 while for foreign seamen two or three weeks terminated the length of stay. With the extension of the services the duration of treatment for both American and foreign seamen has increased practically one week.

The Oslo Conference, held during 1926 under the auspices of the League of Red Cross Societies, constituted a distinct advance and promises to be the beginning of a new era for seamen. The conference dealt particularly with the health problems of seamen. Venereal disease prevention and prophylactic treat-

ment were particularly stressed. The League of Nations International Labour Organization, probably the most important of its kind, recently appointed a joint maritime commission which considered not only the question of regulation of hours, wages and other features, but the health of the seamen as well. A number of very important articles pertaining to this subject have recently appeared in the *"World's Health,"* a publication of the League of Red Cross Societies.

Realizing the necessity for a reasonably accurate knowledge of first aid procedure the officers of the United States Public Health Services have instructed candidates for licenses as masters, mates, pilots, or engineers, the intention being to furnish adequate first aid treatment at sea on vessels having no medical officers. In the past many permanent injuries and deaths among seamen have resulted through the lack of medical knowledge on the part of the officers in charge. At the present time there are very few countries having a sea board which do not offer some facilities for the medical treatment of seamen while ashore. In other words, the health of seamen is receiving more consideration at present than at any time during the past.

While the Shipping Act of 1915 has caused much controversy as to its merit, it has proven beneficial to the steamship owners in that it provides that 65 percent of all seamen shipping on American vessels must be able bodied men. This has a decided tendency to decrease the number of compensation cases contracted under Admiralty law. Some of the findings due to medical examinations, will be set forth in the following sections of this article.

Physical Examinations of Seamen by the U. S. Public Health Service.

During a period of 16 years 48,786 pilots had been examined, of whom 1,542 were rejected, or at the ratio of 31.6 per thousand examined. By far the greatest number of defects found were eye conditions, accounting for a ratio of 30.5 per thousand examined. Of these eye rejections, 680 were attributed to color blindness and 795 to defective vision. There were 3 cases of tuberculosis, 7 of deafness, and 16 of heart disease. There were 4 rejections because of poor physique and 7 because of previous injuries.

During the same period, 56,066 seamen of the merchant marine were examined and 5,663, or a ratio of 101 per one thousand examined, were rejected. Among this class we find a much higher ratio of eye defects than among pilots, 3,623 cases or 64.6 per thousand examined. Defective vision was responsible for 2,407 rejections, a ratio of 42.9 and color blindness for 1,118 or 19.9 per thousand. In addition to this 71 were blind in one eye. A total of 633 cases of hernia were rejected, or 11.3 per thousand. Venereal disease was found in 266 examinations; a ratio of 4.8 per one thousand examined. Malaria was comparatively rare, there were, however, 22 cases of rheumatic fever and 41 of tuberculosis; 24 were rejected because of alcoholism, 15 because of kidney disease and 72 or 1.3 per thousand because of previous injury. Of these 72 defects, 26 were of the upper or lower extremities. Poor physique, skin diseases and diseases of the teeth and tonsils were quite prevalent. In addition, 111 rejections, or a ratio of 2.0 per thousand, were made because of arterial diseases, and 212 or 3.8 per thousand for heart conditions. Hemorrhoids were frequently found.

In addition to the foregoing, 5,259 foreign seamen were examined of whom 494 were rejected, representing a ratio of 93.9 per one thousand examined. These require very little comment as health conditions were found to be very similar to those among the American merchant marine. Eye diseases were not quite as prevalent; however, infective diseases, particularly venereal, were twice as frequent among foreign seamen as among American. Tuberculosis was

another condition found to be more frequent among the foreign seamen. Bearing in mind the close relationship between physical debility and the liability to accident, it need scarcely be pointed out that the cost of physical examinations among seamen desiring employment is well worth the expenditure involved.

Disease Incidence Among Seamen

It has been possible to obtain a record of 411,234 cases of diseases or injuries treated within the last decade. Of these 171,217 were treated in the hospital of whom 6,067 died. It is therefore evident that a rather clear conception of the liability of seamen to particular diseases can be obtained. While it is true that some duplication of cases has taken place, due to a seaman reporting more than once during the year for treatment, generally this need not seriously affect the results and conclusions can be safely drawn from these findings.

The largest single group was that of the infective diseases. A total of 218,294 cases were reported, representing a ratio of 257 per one thousand cases.

As has been pointed out before, venereal disease forms the most important problem with which seamen are confronted. In the series at hand 113,627 cases of venereal disease were reported, representing a ratio of 185.8 per one thousand cases treated. Of these, 24,811 were due to syphilis. The far-reaching affect of these diseases upon the health of seamen cannot be too emphatically stressed. There is considerable evidence that, aside from the active cases of venereal disease reported, at least 2 per cent of other conditions can be attributed to the after affects of these diseases.

There seems to be an excessive number of cases of carbuncles and boils.

Typhoid fever was reported in 3,888 cases, or a ratio of 6.4 per one thousand. Of these 3,510 were treated in the hospital and 301 deaths resulted. While the steamship owners are liable for a poor water supply on the ships it must be borne in mind, however, that many of the seamen visit tropical and semi-tropical ports in which the water supplies are far from acceptable. Anti-Typhoid vaccination of seamen is to be commended.

Tuberculosis was responsible for 13,586 cases, or a ratio of 22.2 per thousand. Over 10,000 of these cases received hospital treatment with an immediate mortality of more than 2,000. While in some cases seamen are subject to poorly ventilated living quarters, generally speaking, their exposure to the action of the sun and invigorating winds should tend to build up a bodily resistance. It would therefore seem reasonable to assume that the seaman's duties themselves are not responsible for this high incidence of tuberculosis.

Other Diseases From Infection

Rheumatic fever was responsible for 30,000 cases or a rate of 49.1 per one thousand. Here we have a condition which to a great extent could be attributable to the duties of seamen. It must be borne in mind that rheumatic fever is a very serious condition in that the after affects upon the heart are very far-reaching. The germs causing this condition have an affinity for the valves of the heart. Disability due to rheumatic fever is likely to be of considerable duration. When a seaman contracts this condition he should immediately go to bed and remain there until condition has cleared, otherwise serious heart lesions may result.

Dysentery was present in 1,528 cases. Here again we have a very serious affection. This is contracted from a contaminated water supply not only in tropical countries but also in some of the southern ports of this country. The fatality ratio from amebic dysentery is particularly high due to the fact that

the ameba travel from the intestinal tract to the liver, causing an abscessed condition which usually requires operation.

Aside from the prevalence of tuberculosis there were 45,715 cases of non-tuberculous respiratory diseases with a ratio of 74.6 per thousand. Bronchitis formed by far the greater proportion of these conditions. Pneumonia was not particularly frequent, on the other hand, pleurisy seems to be a rather common condition among seamen.

Diseases of the skin and hair were next in importance with a ratio of 46.3 per thousand cases. Acne seems to be somewhat prevalent, particularly among employees in the engine room and stoke-hold. Abscess and ulcers of the skin were also quite frequently found.

Diseases of the stomach were reported in 19,483 cases—11,000 of which were due to indigestion—7,000 to gastritis and 500 to ulcer. In view of the large number of cases of indigestion and stomach disturbances reported it is very evident that seamen should exercise greater care in the selection of foods. The effect of alcohol upon the stomach should also be borne in mind as the number of cases of gastritis is particularly high.

Nervous conditions were responsible for 18,252 or 29.8 per one thousand.

Diseased conditions of the mind were responsible for 5,334 cases. While this does not represent a very large number in the aggregate, it has particular significance as far as accident liability is concerned.

Neuralgia and neuritis are also found to a considerable extent among seamen.

Diseases of the muscles and fascia were reported in 15,896 cases—15,571 of these were muscular rheumatism. If we combine these with the cases of rheumatic fever we find a large proportion of seamen reported as having had rheumatism in some form. The debilitating effects need not be enlarged upon at this time but they form a serious reason for rejecting the services of seamen.

Diseases of the urinary system were not particularly prevalent, 12,874 cases being reported. There were, however, a large number of bladder and urethral affections indicating the probable after effect of venereal infection.

Diseased tonsils are apparently very frequently found.

Circulatory disease was reported in 10,240 cases of which 6,683 were heart conditions and 3,557 arterial. The large number of cases in which the valves were involved may indicate a previous history of rheumatic fever. Myocarditis and cardiac neuroses are comparatively rare. Aneurism, while not particularly prevalent is very significant in view of the large proportion of cases of syphilis reported.

Hernia was reported in 8,823 cases, representing a ratio of 14.4 per thousand.

Many cases of diseased teeth and gums were reported. A sailor with poor teeth can not properly masticate the food and the effects of this may be reflected somewhat in the large number of stomach conditions found.

Cancer does not seem to be particularly prevalent.

In the foregoing remarks it has only been possible to point out some of the more prevalent conditions affecting the health of seamen. Many other important features are presented by the data which can not be stressed at this time, however, it is felt that sufficient details have been presented to show the desirability of physical examination of seamen before they are shipped.

Principle Causes of Injuries

Injuries were reported in 102,477 cases representing a ratio of 167.7 per thousand cases treated. The organs or parts affected are given in detail. It has also been possible to ascertain, with a fair degree of accuracy, the nature of the injury in all but 29,000 of the cases. As was to be expected, by far the greater

number of injuries, or 41,106 were to the lower extremities and in 23,935 cases the upper extremities were involved. The back was injured in 3,941 cases, chest, ribs or sternum in 4,871, eyes in 2,396, face in 3,667, muscles or ligaments in 1,914, scalp in 3,855 and skin in 4,503. Contusions were responsible for 22,955 cases, sprains or dislocations for 11,698, fractures for 10,971, lacerations for 7,574, burns for 7,326, gunshot wounds for 465 and stabs for 248.

It is significant that fractures, sprains, dislocations, contusions, lacerations, incised wounds and burns were twice as frequent to the upper extremities as to the lower. More than half of the injuries to the chest and ribs were due to fractures. This condition is particularly suggestive because of the probability of a considerable period of disability. Sprains and dislocations are also significant in that they naturally will cause a considerable loss of time. It is very significant that of 336 injuries to the skull, 249 were fractures and of 274 to the spinal cord, 211 were fractures. The seriousness of a fractured skull or spine need scarcely be enlarged upon at this time. Cases of compound fracture of the skull may cause a total disability lasting from 6 to 12 weeks. While in the case of simple fracture the disability may be somewhat shorter. Fractures to the spine are a very serious condition. Disability due to this condition may be permanent. Death frequently intervenes in many of these cases. The number of gunshot and stab wounds indicate somewhat definitely the likelihood of seamen becoming injured in brawls.

The Mortality of Seamen

For a number of years the British Board of Trade has reported the deaths of seamen in considerable detail. While these details are reasonably complete, it is estimated that a number of deaths occurring among seamen are not reported. For practical purposes, however, these form a fairly accurate basis for estimating the mortality among seamen. It should be borne in mind that British vessels visit every port in the world and that there is much more likelihood of British seamen contracting tropical diseases than there is among American crews.

Referring to deaths from diseases only, we find that 14 per cent of the deaths were due to pneumonia; 13.9 per cent to circulatory disease; 8.3 per cent to tuberculosis; 5.7 per cent to malaria, and 5.3 per cent to typhoid fever.

Among other conditions of special significance are the large number of deaths from sun stroke and heat stroke or 3.3 per cent of the deaths from disease.

Alcoholism, while forming a very small proportion of the mortality was directly responsible for a large number of deaths. Forty-five per cent of the deaths for which alcoholism was responsible were among engine room and stoke hold hands; 21 per cent deck hands, and 13 per cent in the stewards department. Of 315 deaths due to alcoholism, 101 were killed or drowned going aboard, 59 drowned in the docks, 28 either fell overboard or through a hatchway and 14 committed suicide. Comparing the mortality of seamen in the merchant services with all occupied males it was shown that seamen were 88 per cent in excess. In view of the admitted inaccuracy of the records it seems safe to assume that the mortality among seamen is twice as high as among occupied males as a whole.

Further Analysis of British Statistics

Analyzing further the statistics provided by the British Board of Trade as pertaining to the causes of death we find that only 7 per cent of the deaths at sea on sailing vessels were due to disease, the balance being attributed to accidents either to the vessels or to the persons, while on steam vessels 48

per cent of the deaths at sea were due to disease. It is therefore very evident that the liability to accident on sailing vessels is much greater than on steam vessels.

Reviewing briefly the experience of the various departments on vessels it is found that among masters and mates, missing vessels were responsible for 26 per cent of the deaths, and suicide for 5.2 per cent among this class. Nineteen per cent fell overboard or were drowned in the docks ashore. This high proportion of deaths from these causes would seemingly indicate that alcoholism played an important part. Practically the same conditions hold true among petty officers. Deck hands, while indicating a large porportion of deaths from the aforementioned causes also show a large number of falls down hatchways and an excess number of deaths from homicide and suicide. Among engine room and stoke hold hands, 8 per cent of the mortality was due to suicide. The proportion of deaths probably connected with the use of alcohol are extremely high in this department. In the stewards department there were also indications of a large number of deaths due to alcoholism and its ultimate effect.

Compensation Statistics

Primarily this Council is interested in accident prevention. The statistics available as a result of the Workmen's Compensation and Employees' Liability Acts of Great Britain are enlightening. Comparing the shipping experience with other branches of industry it is significant to note that the fatality ratio from accident is somewhat higher than that reported for other industries. This ratio per 1,000 employed has remained somewhat constant during the last two decades, varying from 1.1 in 1923 to 2.1 in 1919 and to 1.5 in 1925. The disability ratios show a somewhat uniform increase reaching 33.4 in 1925 or the highest on record. The fatal accident ratio of sailing vessels is generally three times as high as on steam vessels while the disability ratio shows a decided inclination to increase. That for steam vessels, however, remained practically constant during the entire period.

The average claim payments for fatalities on steam vessels during the last five years was \$1,179, as against \$904 for sailing vessels. The disability payments averaged \$118 on steam vessels as against \$111 on sailing. The entire expenditure was \$1,476,959 for fatalities on steam vessels as against \$103,906 on sailing vessels. In addition to this there was over \$3,000,000 paid for disability on steam vessels and \$137,000 for disability on sailing vessels. It should be borne in mind that these amounts do not include legal, medical, administrative and other expenses.

While it has not been possible for the writer to obtain data relative to the duration of compensation payments in this country, the British experience set forth below is significant.

Duration of compensation for accident, exclusive of Lump Sum Payments, Great Britain, 1921-1925

STEAM VESSELS		Per cent Distribution
Under 2 weeks	2554	13.5
2 weeks	3181	16.8
3 weeks	2649	14.0
4-12 weeks	8165	43.2
13-25 weeks	1711	9.1

26 weeks or over	634	3.4
Total	18894	100.0

SAILING VESSELS

Under 2 weeks	107	12.5
2 weeks	159	18.5
3 weeks	132	15.3
4-12 weeks	384	44.7
13-25 weeks	52	6.0
26 weeks or over	26	3.0
Total	860	100.0

SHIPPING

Under 2 weeks	2661	13.5
2 weeks	3340	16.9
3 weeks	2781	14.1
4-12 weeks	8549	43.3
13-25 weeks	1763	8.9
26 weeks or over	660	3.3
Total	19754	100.0

Active Accident Prevention Campaigns Necessary

It will be noticed in the above table that there is in reality very little difference in the duration of disability occurring on sailing or steam vessels. The large numbers of disabilities lasting 4 weeks or more indicate the desirability of active accident prevention campaigns in the maritime industry. It is to be regretted that not more of our shipping interests are members of the National Safety Council and avail themselves of the privileges made accessible by the Council. Very favorable results are being obtained by steamship companies who have instigated extensive accident prevention campaigns.

It does seem that the time has come when all steamship companies should take an active part in this program. In addition to this statistics should be kept which will enable the steamship owners to estimate the value of their accident prevention work as compared to the results obtained by other companies.

CHAIRMAN KAIN: Gentlemen, you have heard the very interesting paper by Mr. Edwards. Is there any comment or criticism?

Particular Value in a Wealth of Statistics

R. E. PROUTY (Aetna Life Insurance Co., New York City): The principal value of Mr. Edwards' paper lies in the fact that he is quoting from very extensive statistics and, naturally, the value of any deduction made will be increased because of the volume of exposure which he has to deal with. His paper is of a character that makes it difficult for us to carry away from here a great deal of what he has had to say and I know you will all be pleased to learn that Mr. Edwards is planning to have his paper multigraphed with a few additional facts in it and distributed to the members at large.

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): Mr. Chairman, there is one item that appeals to me as being something easily corrected. For instance, when I think of the water on a ship, I think of the storage battery. There

is a battery made on the West Coast now into which you can put any water you will drink and it won't injure the battery. The ordinary storage battery required distilled water. It seems to me that the present seaman must come under the classification of that battery made on the West Coast. He can go on and take water we can't stand at all. We sent some men out to work in the stream the other day. They had to drink the water from the ship. Four out of 86 of them were taken sick just drinking water from the ship. This is not an isolated case, but I believe all too often, water that seems pure isn't up to what it should be, and that is something that could easily be corrected with our present methods of distilling sea water, or purifying and cooling water by mechanical and electrical means.

The Marine Hospital Treats Men for Any Disease

CAPT. T. S. SHERIDAN (New York State Nautical School, New York City): In my experience very few seamen have become sick from over-indulgence in water. In that paper, there is one point that might have a little light thrown upon it. He said that at small cost the Marine Hospital Service treats seamen. They are treated free if they present what is known as a master's certificate. If they get a certificate stating they have served on the vessel, the Marine Hospital Service will treat them for any disease.

CHAIRMAN KAIN: I think he referred to the foreign seamen.

CAPT. EVANS: Another point of interest—he referred to seamen having stomach trouble due to food eaten. According to my experience, a seaman has little choice in food.

CAPT. SHERIDAN: I think when the food was much coarser they had very little stomach trouble. Today they overeat, too much rich food and meat and they don't get sufficient physical exercise. I think that has more to do with their trouble than anything else.

CHAIRMAN KAIN: I think that is a pretty safe conclusion. Most people on ships can verify it.

A. M. TODE (Texas Co., New York City): Mr. Chairman, I think that Mr. Edwards' paper is very interesting and it certainly covers a great scope of investigation and research. I think it will be especially interesting for the various companies, to compare their illness experience on the percentage basis in comparison with the large number of cases which Mr. Edwards has compiled. We have done that for some time in the Texas Company and I know that it will be of great interest to me to see how our individual organization of perhaps 1,400 seagoing men compares with the several hundred thousand cases, and therefore, get some basis for us to continue our work.

CHAIRMAN KAIN: Are you keeping records of illness?

MR. TODE: Yes, we do.

An Argument for Physical Examination of Seaman

CAPT. EVANS: Mr. Edwards' paper, I believe, makes a substantial contribution toward the argument for physical examination of seamen which has been stressed at this meeting of the Marine Section.

CHAIRMAN KAIN: I believe that is its outstanding value.

CAPT. EVANS: I think the importance of the paper for distribution among the members to drive home the necessity for such examination is inestimable.

CHAIRMAN KAIN: It even goes farther than that. As you know, there are a great many serious accidents, such as collision between steamers, where there are a large number of passengers and seamen whose lives are endangered. I think there

is no doubt that a great many of those accidents can be attributed to some physical defect of the men on watch while under way at sea. Most of the serious accidents do occur at night, or in fog and at those times usually the number of men on deck is small.

ADJOURNMENT.

Thursday, September 29, 1927

The third session of the Marine Section was called to order at nine-forty o'clock by the chairman, Capt. Wm. P. Kain.

CHAIRMAN KAIN: The meeting will come to order. Our first paper this morning will be read by Capt. Sheridan (New York State Nautical School, New York City) for Commodore C. Williamson (New York State Nautical School, New York City). The Commodore, unfortunately, couldn't get here.

Safety Education in State Nautical Schools

Charles Williamson, Secretary, New York State Nautical School, New York City

Many years before there was a National Safety Council or any concerted effort made to prevent accidents or conserve life in the various activities, the mariner had adopted a safety slogan which was in use wherever men "went down to the sea in ships." This was "One hand for the ship and one for yourself." In the days of sailing ships this was very necessary, as the foot rope of a yard-arm, with the sail slashing around in a gale of wind, was not a very safe place to work, and it required one good hand with which to hold on. Then, as now, men took chances, using both hands for the sail, instead of holding on with one hand, and sometimes they paid for it with their lives.

Since the days of steamships this condition has changed and seamen now do most of their work with both feet on something more substantial than a swaying foot rope, and seldom go aloft. An exception, however, is the case of the State Schoolships, which, while having auxiliary steam power, make most of their annual cruises under sail. The cadets must, therefore, be taught the old slogan for use when aloft. An engineering, as well as deck, course is taught in the Nautical Schools and "Safety" has an important part in the curriculum. As the cadets are being educated as officers for the Merchant Marine, it is very important that they should be trained in the prevention of accidents and the conservation of life, in order that they in turn, when officers, will be qualified to train and instruct men under their charge.

Unfortunately, some accidents and injuries cannot be classified as "preventable." When they do occur it becomes necessary to minimize the effect or allay suffering. Freight ships do not carry doctors as part of their personnel, therefore, one of the officers, usually the Chief Mate, must have the necessary knowledge and skill to care for such injuries as may occur while at sea. Lack of such knowledge on the part of the officer personnel might result in the loss of life or limb, through the inability to check a hemorrhage, or possibly the permanent crippling of a man through lack of intelligent treatment and care. First aid and hygiene, therefore, are included in the curriculum of the State Schoolships, the ship's surgeon carrying on the instruction, and practical demonstrations being given in bandaging, the use of the tourniquet, sutures and splints.

Instruction in practical work, both on deck and below, is closely affiliated with accident prevention at all times. One method of performing a task correctly and safely is always to be preferred to haphazard methods and unsafe practices. When handling boat falls, anchor gear, feeling eccentric straps, lighting up boilers, and the hundreds of other daily tasks on board ship, there is generally one correct and safe way to do the work. The right way and wrong way of doing these various operations is what constitutes practical

shipboard work and is the type of knowledge imparted to the young men on the schoolships.

In consideration of these facts, it is readily appreciated that the young men graduated from one of the State Schoolships become far better equipped Merchant Marine officers than were their predecessors. These men did not have the advantages available to the young man today, but gained their experience in the school of "hard knocks." Properly trained, careful officers undoubtedly have the fewest accidents to their crews, and are instrumental by personal example in preventing many avoidable accidents and injuries.

The Nautical Schools are educating just such types of officers, and, therefore, should receive the support and encouragement of all who are interested in safety and accident prevention, regardless of whether they are affiliated with the Marine Section, or belong a thousand miles from salt water. The instruction which the cadets receive on board the schoolships will undoubtedly mean fewer accidents on shipboard in future; fewer accidents mean reduced operating expense; reduced operating expense means reduced freight rates, which means reduced costs, the desideratum in these days of high cost of living.

A word concerning our State Schoolships. These exist by virtue of an act of Congress passed in 1874, which provided that the Navy Department would loan to any State establishing and maintaining a Marine School a suitable vessel and her apparel. The States of New York, Massachusetts and Pennsylvania took advantage of this legislation, and established schools, which have been graduating young men as officers in the Merchant Marine for many years; in the case of the New York School for 50 years. These young men are the "leaven" that is to "leaven the whole lump" and they have already brought about many changes in conditions on shipboard and will continue to do so in future.

Instruction in Cargo Work

CHAIRMAN KAIN: Are there any questions?

MR. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): I would like to ask a couple of questions in connection with the instruction there. I wonder if there is any instruction on the setting up of a cargo boom to take care of the proper drift of the guy lines and preventers?

CAPT. SHERIDAN: Yes, they get considerable instruction in cargo work and particularly that part which touches on the rigging of the cargo gear. Unfortunately, due to the fact that the only vessels they have for state school ships are antiquated gun boats, they cannot do it on the ship, but they do it by frequent visits to all types of ships in port while working cargo, and, I am sorry to say, the cadets are instructed by observing the wrong way as well as the right way. It is not unusual to go aboard ships and see things rigged in a careless and dangerous manner and it is often quite possible to point out the possibility of accident in the way gear is rigged on board ship in New York harbor or any harbor.

MR. ARKILLS: I wonder if you teach them drafting at all?

CAPT. SHERIDAN: No, it is only touched on because the course is two years; you get boys of three years or more in high school and if they haven't had it there, it is almost impossible to give them any intensive drafting course.

MR. ARKILLS: What I had in mind is that if you do teach drafting you can illustrate by an ideal set-up. I have seen no less than 50 failures of guys, just through their being set up too close to the heel of the boom, which makes an undue column load on the boom and also doubles the stress very rapidly on the guy, and naturally causes them to carry away under what seems to be a very moderate load.

CAPT. SHERIDAN: They have a course of instruction which is an adaptation of physics and mechanics—they, more or less, call it steammanship. In this they illus-

trate the parallelogram of forces. They show the proper and improper way of rigging slings, guys, stays, etc., and how the multiplication of loads through improper guying and leading of supports, can cause greatly increased loads to come upon a weak member. That is all dealt with in the instruction. While it is the best way we have of training officer personnel for the mercantile marine, they labor under several disadvantages. One is, they have to take naval ships. They get antiquated naval gun boats with old-fashioned machinery, quite unsuitable for the purpose. On top of that, the Navy, in lending the ships, enforces the rule that they must now have naval officers in command—retired officers. This makes it difficult to inspire the cadets with any idea of mercantile marine practices. Unfortunately they have to unlearn a good deal due to the fact that a good many of the practices there are of Navy origin.

MR. ARKILLS: I have noticed failures of booms have been brought about by freezing of the gooseneck, as we call it, rusting of the bolt or lower end of the boom fastening where it goes through the pad that goes on to the mast. When that is rusted to a point where you pull the guy strong against it, or you stay it where it is and then get a load that turns it the other way under stress, you put a double bending in that boom which causes its failure, due to the fact that it doesn't oscillate properly on the gooseneck bearing. I am sure there are two failures that can be traced to that one fault. It would be such a simple thing if the proper lubrication of a heavy grease that wouldn't be absorbed by salt water, like a cup grease, were used and forced in. That would take care of that situation entirely.

CAPT. SHERIDAN: I have seen a number of cases of that particular accident you describe. When I was superintendent of the school in the seamanship and steamanship, I very strongly emphasized the necessity for those precautions, frequent inspection—especially lifting the boom, not only oiling it, because sometimes in a cold trade you will find crystallization, and an apparently safe boom will all of a sudden crack. When you put a comparatively small load on and she cracks, it is possibly due to the fact that she freezes up due to sudden snap of cold weather. That part, unfortunately, they can only get theoretically and they have the disadvantage of too much naval technique, in what should be civilian employment.

O. D. MOORE (Pennsylvania Railroad, Philadelphia, Pa.) Captain, is there any other standardization of instruction as between the schoolships of Pennsylvania and New York?

CAPT. SHERIDAN: The only attempted standardization is a more or less informal exchange of views as to curriculum. Of course, education to a certain extent has to be standardized because you have to prepare them to take examinations as deck and engineering officers. In that respect the education is standardized by the results they have to obtain, but in other respects there is no formal standardization at the present time.

CHAIRMAN KAIN: Thank you, Captain, for the very interesting talk. Are there any other questions? We will go ahead with the next paper.

Life and Property Conservation in Railroad Marine Operation

O. D. Moore, Supervisor Marine Risks,
Insurance Department, The Pennsylvania Railroad

In presenting this paper, it is appreciated that my audience is composed mainly of those interested in the operation of large ships. However, as the fundamentals of safety and conservation are universally applicable, it is hoped that a review of the efforts of a railroad may prove to be of general interest.

Obviously, railroad marine operation forges but a few links in the chain of an extensive system of rail transportation where it touches the waterfront.

Nevertheless, there is a surprising variety and amount of equipment engaged in this service, as illustrated by the following tables showing the classes of equipment and the geographical distribution of boats in which the Pennsylvania Railroad and subsidiaries have a vital interest in the conservation of life and property.

Distribution by Class		Distribution by Port	
Type	No. Units	Place	No. Units
Carfloats	114	New York, N. Y.	322
Barges and Lighters	196	Philadelphia, Pa.	32
Tugs and Steam Lighters.....	58	Baltimore, Md.	22
Ferryboats	15	Norfolk, Va.	25
Steamers	20	Chincoteague, Va.	4
Car Ferries	3	Ashtabula, Ohio	1
Miscellaneous	12	St. Ignace, Mich.	2
408		408	

My subject has been divided into two parts, first—personal injury safety; and second—marine property conservation. While these arbitrary divisions of activity overlap somewhat in actual practice, an effort has been made to separate them, and the two topics will be treated in the order named.

The Pennsylvania Railroad, through its operating and insurance departments, has been active in the field of organized safety for many years; recently a special department for the further supervision and encouragement of safety on the railroad has been formed in charge of a superintendent of safety who has long been prominently identified with the Railroad Section of the National Safety Council. The various marine departments have naturally come within the influence of these carefully directed safety programs, and it is possible to allocate definitely those activities which have affected marine operations.

There is first of all a ground-work of statistical data upon which to build. Reports of all fatalities and injuries are forwarded to the insurance department where a card record is prepared and filed. The record contains such pertinent details as cause, nature of injury, occupation, length of disability. From the cards, effective statistical information is quickly secured by means of sorting and tabulating machines, and this data is furnished interested officials to point out the major sources of loss in order that remedies may be applied.

While there has been no very serious personal injury problem in the boat operations, it is, of course, desirable that accidents be further reduced. Since January 1, 1925, a separate record has been kept of all maritime personal injuries occurring to employees of the various fleets, and the accompanying statement indicates the proportion in which the major causes of accidents contributed to the total number of injuries and disability days during the period from January 1, 1925, to June 30, 1927.

During 1926 there was a decrease in the number of injuries as compared with 1925, notwithstanding that the year 1926 required the lighterage of a larger volume of freight. The above outline illustrates the hazards against which preventive activities must be directed. So much for statistics.

Each division superintendent and several other interested officers of the railroad receive a copy of the National Safety News every month. Each division has a general safety committee supplemented by local committees, the members of which are constantly changed. It might prove interesting at this point to describe a typical safety committee meeting.

The particular committee selected as an example functions in an essentially maritime atmosphere; it is composed of men from the forces at Norfolk, Va., which is connected with the railroad only by means of vessels sailing from Cape

Charles to Norfolk across the Chesapeake Bay entrance. Here is a well-rounded marine operation consisting of huge sea-going car-floats, powerful tugboats, and passenger steamers constantly plying the waters between Cape Charles and Cape Henry; there is also harbor transfer equipment.

The local freight agent is chairman, and the entire pier, yard and marine operation is represented, about 15 delegates in all. The committee opens the meeting with discussion of a letter prepared by the insurance department calling attention to the personal injury accidents on various divisions of the System during the year 1926. Then comes a statement from the same source showing the standing of the divisions in a current competition for the award of gold and silver safety banners.

Next on the program is a valuable feature. Each representative presents a detailed report of injuries sustained in his branch of the work since the last

Major Causes of Personal Injuries in Railroad Marine Operation from January 1, 1925, to June 30, 1927

Cause of Injuries	Percentage of Total No. Injured	Percentage of Total Days Disability	Percentage of
Deckmen or Shore Attendants:			
Handling freight	1.5%	3.3%	
Handling lines	7.3%	9.3%	
Handling gangway, closing doors or hatches	5.3%	5.6%	
Slipping or falling	38.5%	27.4%	
Miscellaneous	15.0%	14.4%	
Engine Room Employees:			
Burns or scalds	6.3%	8.4%	
Caught in machinery	7.5%	5.6%	
Slipping or falling	7.1%	12.1%	
Tools slipping	8.6%	7.4%	
Miscellaneous	2.9%	6.5%	
Total	100.0%	100.0%	

meeting; the hazards illustrated by these accidents are carefully considered as well as the steps that might be taken to minimize them. The meeting concludes with the presentation of safety suggestions by members of the committee. Action is generally taken on approved recommendations of a minor character and others of value involving administrative action are referred to the proper authority.

This gives a general idea of the safety committee system. Then there are other activities which place the message forcefully before the employees. Special bulletins are prepared and distributed or posted. National Safety Council posters are generously utilized. A supply of the special Marine Section posters has been secured and furnished to the marine supervisors for appropriate use. In doing this, attention has been given to the character of accidents sustained at various ports, as indicated by the special marine record, and subjects selected which might emphasize the hazards suggested by these accidents.

Another feature is the safety banner. To illustrate its use, every Monday morning a banner is raised high in the air at two points on the Jersey City waterfront where it is readily discernible to railroad equipment operating in the harbor. These banners bear the simple word "Safety." Upon the occurrence of an injury to an employee in the ferry or lighterage work resulting in lost time, down comes the banner until the following week when a new start is made.

The main reliance of the marine management, however, is upon personal persuasion through individual warnings and instruction, particularly where a lack of caution is demonstrated. This influence passes on down the line through captains and engineers to the deckmen, bargemen, and firemen. Personal interest in the subject is no idle boast; some 380 men out of a total of 1,000 employed in one marine department signed a testimonial to the effect that during the month of March alone they had been individually addressed on some phase of safety by supervisors, safety committeemen, or others.

Precautions Are Taken in Employment of New Men

Then too, precautions are taken in the employment of new men in marine work which are believed to be advantageous to safety. Certain classes of applicants must pass a medical examination, with special attention to eyesight, hearing and the existence of dangerous disease. In New York, where the greatest number of men are employed in a single marine department, each recruit before going on duty is handed a paper prepared by the toastmaster containing specific precautions in order to avoid injury in his work. First aid instruction is given at convenient opportunities, and railroad doctors are readily accessible to the marine operations.

The management is sympathetic toward any reasonable improvement in physical conditions designed to discourage personal injury accidents. It is apparent, however, that these happenings cannot be eliminated by physical changes, and it is for this reason emphasis is laid upon publicity efforts and personal leadership in the building of the safety policy.

Passing now to a consideration of maritime property conservation in railroad operation, it is obvious that efforts in this direction should also have a favorable influence upon the personal injury situation. Careful attention is given to the causes of marine losses and their prevention. Such accidents are reported to the insurance department, and in case of serious or unusual losses, such as fires, sinkings or strandings, a representative is dispatched to the vessel in trouble in order to determine that effective salvage efforts are in progress, or to make arrangements for the employment of wrecking equipment; also to investigate the circumstances. The salvage and disposition of damaged cargoes is given special attention. Likewise, when reports of losses or investigations of the marine inspectors develop possible means to minimize or prevent similar occurrences in the future, the matter is given special consideration.

In addition to specific comment on individual cases, statements are compiled annually from the marine insurance loss records analyzing the major causes of the marine damages that have occurred in each fleet during the year. This information frequently reveals consistent sources of loss and is forwarded to the interested officials with appropriate comment.

New York Has a Marine Accident Investigator

In New York, there is a marine accident investigator—a practical marine man—who devotes his entire time to the development of facts regarding marine losses arising in the harbor. Another unique feature is the marine diver and wreckmaster who has been a regular employee of the railroad at New York for several years; a special crew has been trained to tend the air pumps and do other marine wrecking work, and these men are diverted from their regular employment immediately an accident occurs. Railroad derrick barges are utilized in this work whenever possible. Much property has been saved in this way. The diver also has other duties such as the removal of obstructions from propellers, slips and outlets.

A general inspection of the self-propelled vessels from an insurance standpoint is made annually. Owing to limitations of time and operating convenience no attempt is made to go into this feature so exhaustively as the United States Steamboat Inspection Service which thoroughly covers the technical requirements; nevertheless, fire equipment is tested, life saving equipment is examined, and special attention is given to general order and cleanliness, sub-standard electrical installations, personal injury hazards, and possible improvements in equipment. Reports covering these inspections are prepared and advice regarding the action taken is furnished the insurance department.

These inspections afford an opportunity to discuss the causes of recent accidents with the supervisory forces and boat crews; in fact, that some central agency, in addition to the local personnel, displays an interest in such matters, has a certain valuable moral effect. Then, too, much information pertaining to physical and operating conditions is obtained that would not be available if the work was conducted solely from an office, and a more intelligent handling of marine loss problems results.

A Periodical Report on Fire and Life Boat Drills

A form prepared by the insurance department covering a periodical report of fire and lifeboat drills and inspection of equipment, and containing some 50 questions on the drills and also such matters as condition of steering gear, bulkheads, and alarm systems, is in general use.

Another item affecting property conservation is the equipment of 47 of the 58 tugs and steam lighters with powerful fire and wrecking pumps; these boats have rendered service of incalculable value in fighting wharf and vessel fires, and in saving craft from sinking. They furnish this protection in the harbors of New York, Philadelphia and Norfolk.

There are naval architects, marine engineers and surveyors who plan and supervise the construction of new vessels and the maintenance and repair of the equipment in service. There is a well appointed marine shop at Hoboken, N. J., where all forms of marine work is done excepting that which requires dry docking. There are also small marine repair shops at Camden, Long Island City, Baltimore and Cape Charles.

Up to this point no conclusions have been drawn and no moral cited; the treatise has been a recital of those general activities in railroad marine operation that are calculated to have a favorable influence upon the prevention of marine accidents. Owing to the breadth and diversification of the field, it has been necessary to confine the discussion to general factors. It has been impracticable to relate interesting details encountered in the work, or to analyze the important psychological differences that exist between the rail and marine worker. It is obvious, however, that when a man prepares to step aboard floating equipment he sacrifices a certain degree of safety and places himself at the mercy of the elements; whether this exposure tends to make him more reckless or more careful depends in large measure upon the individual.

Two Fundamental Factors in the Program

It would seem that there are two fundamental factors to the establishment of a life and property conservation program in a marine organization.

In the first place, a definite responsibility should be placed upon some individual, department or agency to record, investigate and publish information regarding accidents and to consider ways and means to reduce or prevent them. In a small organization this might readily be a part-time duty. The effort should not be one of isolated "campaigns," but should constitute a steady and consistent check. Personnel engaged in such work should, of course, be familiar with the nomenclature of the waterfront, and have a practical appre-

ciation of the difficulties faced by the marine worker in the discharge of duty.

The second requirement is a sympathetic attitude toward the activities of the safety agency, demonstrated by a practical interest in its efforts on the part of the supervisory personnel.

The railroad welcomes the assistance and cooperation of the Marine Section of the National Safety Council in its very helpful deliberations and activities, and it is hoped that the efforts toward life and property conservation in Pennsylvania Railroad marine operation may aid the general maritime safety movement.

Accidents Differ Little as to Size of the Vessel

CHAIRMAN KAIN: That is a very interesting paper, Mr. Moore. Are there any comments?

A. M. TODE (Texas Company, New York City): I feel that Mr. Moore's paper is a very valuable contribution to the articles of the Marine Section, especially so as about 15 per cent of the membership of the Marine Section is composed of railroads operating floating equipment. I think that, sometimes, steamship companies and men engaged in steamship affairs, who operate only larger ships, lose sight of the great amount of floating equipment which the railroads do handle in the harbors and the large amount of accident prevention work which some of these railroads do.

I hope that Mr. Moore will contribute some further definite facts regarding the floating equipment in accident prevention work in the future, as I feel that a large number of our members would welcome that.

There was one other point which I was interested to observe which showed that as far as the accidents occurring on their small fleet are concerned, they differ very little from large ships and that the most prevalent type of accident is falls. I believe Mr. Moore's figure is something like 38 per cent of the accidents for falls. Combining our accident statistics of the Marine Department of the Texas Company over a period of six years, the largest number of accidents was also due to falls, both in the engine room and in the deck department, considering the small fleet and the large fleet.

R. E. PROUTY (Aetna Life Insurance Co., New York City): I should like to ask Mr. Moore what he uses for an exposure factor in making his comparative accident statistics, the number of men employed, or the day's work or hour's work?

MR. MOORE: The usual basis for ratios in railroad employment accident statistics, is the rate per one thousand in service. There has been some discussion here regarding the correct exposure upon which to base the ratio of marine accidents. One contention was that it should be based upon the legal provisions and complicated records kept of the exact number of hours that each man worked, which may or may not be practicable. It occurred to me that seamen in ocean and coastwise vessels have constant exposure to certain hazards of the profession for twenty-four hours of the day and that if it would be found statistically correct, it certainly would be theoretically correct, I would think, to use the man-days as the basis for such statistics and it would be a great deal more simple than an attempt to calculate the number of hours.

Question of Deck Pads for the Barges

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): I would like to ask the speaker how he equips his barges with deck pads, or whether they do equip them with deck pads. We have had one or two accidents and barring these, there is tremendous time lost by trying to make fast the lines that secure the barge to the ship while they try to lash them around posts and stanchions that are permanently attached to the barges. This happens mostly in connection with handling lumber. I would say there ought to be some sort of a deck pad on account of the height. There should be something that would hold up and down lines as well as

horizontal ones. The height is so great, it will unwind, come loose and be adrift and the man will think he is close to the ship. When he turns around, he isn't close to the ship at all.

MR. MOORE: I know of no special equipment to increase the height of the posts.

J. S. HUNTER (Atlantic Refining Co., Philadelphia, Pa.): Your barges are equipped with cleats?

MR. MOORE: Yes, I wasn't quite clear about what he meant by pads.

MR. ARKILLS: We find in the Washington Tug and Barge Co. many of the barges have no available cleats, they are either loaded and covered or something of that sort.

Unsecured Hatch Covers Cause Accidents

MR. MOORE: These barges all have cleats.

MR. ARKILLS: Then there is another point. We have had four hatch cover accidents on barges. We find that the hatch covers are not properly secured with chains and in transit they wash overboard and are lost and the men working on the barge temporarily forgetting the hatch is open, will fall in and be injured. It isn't a great fall, but at least they break a leg or an arm. Have you had any accidents of that nature?

MR. MOORE: Practically all of our barge work in New York is handled on deck, either on an open or house barge. Such hatchways as it may be necessary to open are only small ones to get down into the hold.

MR. ARKILLS: They are the ones I have reference to.

MR. MOORE: On the house barges they are located outside of the cargo house and the instructions are very strict that the covers are to be kept on at all times. Of course, it doesn't work out 100 per cent in actual practice.

CAPT. SHERIDAN: Some time ago in discussing the question of accidents with the superintendent of railway marine property, he told me it cost something like \$30,000 in accidents before one of their tugboat captains attained the rating of normal competency. Have you any figures on that?

MR. MOORE: No, sir; I couldn't offer any comments. I should think that would be a very difficult calculation to arrive at, due to the constant shifting of men that occurs and the fact that each tug in our service has three different crews every day.

DR. F. X. CRAWFORD (United Fruit Co., Boston, Mass.): I think it is interesting to note that of the fatalities five were due to gross carelessness on the part of the individual. Another one was due to an error of judgment. I think a big proportion of the deaths are due to errors of the men, errors of gross carelessness and are not attributable to the working plant.

MR. MOORE: That was my object in reviewing them, to get any comments there might be.

Most Maritime Accidents May Be Avoided

MR. TODE: It is an old saying, "Dead men tell no tales," but that percentage of about 87½, being avoidable, merely corroborates what statistics have proven in the maritime industry generally, that from 75 to 85 per cent of all maritime accidents are avoidable. I think we could have no better concrete example than that one here. Our figures confirm that also.

W. P. MOUNTFORD (Pennsylvania Railroad, Philadelphia, Pa.): I would like to stress the thought that in directing your safety committees, you direct your members to bring in practices rather than conditions. In railroad work, 85 per cent of our accidents are attributable to practices and not conditions. This gentleman makes a

similar statement here, I believe; six fatalities could be traced to the same cause. In directing our work on the Pennsylvania Railroad as straight railroad work, we emphasize the necessity for men going out during the course of a month, observing practices and taking remediable measures to correct them rather than bringing in conditions. I believe that is a big factor of marine accident work.

CHAIRMAN KAIN: I think we could learn a great deal from the operation of the railroads.

CAPT. SHERIDAN: Along that line, I might invite attention to the fact that sometimes your additional accident prevention material is ineffective, because on account of the peculiar psychology of the men who follow the sea, it only means that if you put more safety devices there, they take more chances. In the same way, many ships have all kinds of accident prevention devices, and because they have those devices, the people on them take more chances, and cut down their factor of safety just that much.

CHAIRMAN KAIN: If there are no further comments, we will go on with the next paper.

Radio's Contribution to Safety of Life at Sea

Geo. E. Cole, Superintendent, Great Lakes Division, Radio Corporation of America, Cleveland, Ohio

It is particularly appropriate that marine radio should receive a moment's consideration in this Safety Congress, as probably no single agency has served, as it has, to make water travel everywhere safer for lives and property. Radio as a means of communication, education and entertainment is doing a big and growing job, but its service in widening the factor of safety wherever water travel is concerned is fundamental and the primary excuse for its existence.

Radio's contribution to safety at sea began with the first commercial marine station erected by Marconi, in 1897, at the Needles, Isle of Wight, England, and this station had a working radius of about 14 miles. Prior to that, for 70 years back to 1827, we find scientists making vague references to the possibility of "electric conduction" and the vision of radio as we know it today was constantly in the minds of these early workers. In 1882 one applicant for a United States patent made so bold as to say, "Electrical communication, using this apparatus, might be established between points certainly more than one half mile apart."

It remained for Marconi, however, to evolve a system of wireless telegraphy which was at once commercially practical and capable of reliable communication, and naturally its application to marine use claimed first attention. By 1903 a sufficient number of ship and shore stations were in operation to make some sort of regulation necessary; and as a result, the first International Radiotelegraph Conference was held in Berlin. In 1906 the second International Convention was held in the same city, with a majority of the principal countries of the world signatory.

In January, 1909, the practical value of marine radio was probably first brought home forcibly to the world when the "S. S. Republic" collided with the "S. S. Florida" off Nantucket and, through assistance called by wireless, all passengers and crew were removed and saved before the vessel sank. Largely as a result, an Act was approved by the United States Government in June, 1910, requiring radio telegraph equipment and operators on certain vessels, which Act was amended and extended in 1912 and remained in effect until February of this year, when the Federal Radio Commission was enacted into office. Also in 1912 the Third International Radiotelegraph Convention was concluded in Lon-

don with the United States one of the 42 signatory countries. This convention is effective today, but a conference has been called for this year in Washington, to formulate new regulations and standards covering the requirements of present practice and almost wholly changed conditions in every phase of the art.

Just as the "Republic" disaster brought to marine radio recognition and proper regulation; so it is true that the tragedy of the "Titanic," in April, 1912, taught lessons in the use of radio for safety purposes which were given appropriate consideration in the International Conference on Safety of Life at Sea concluded in London in 1914. The importance of these international understandings should not be underestimated as bearing directly on the primary function and duty of radio—the safety of life and property at sea by giving warning of approaching danger and bringing assistance when it may be most needed. Regardless of nationality, type of apparatus or location in the seven seas, the marine radio speaks a universal language and functions its operating methods and procedure on the same fundamental rules, all conceived on and protecting its primary use as an agent of safety.

Marine Radio Equipment Has Developed Rapidly

The development of marine radio equipment has moved rapidly in the last few years as a result of continued research in vacuum tube construction and operation and the commercial application of radio devices more or less perfected under the stress of war-time necessity. Today it is not unusual for vessels in the English Channel to communicate direct with the American coast and for ships in the China Sea to work direct to San Francisco. The record long distance ship exchange by radio was effected January 14, 1926, when the "S. S. Carinthia" of the Cunard Line, on a world cruise, worked direct with the Radio Corporation station at Riverhead, L. I., about 100 miles east of New York City. The vessel reported her position as 10,600 nautical miles distant, off Cape Leeuwin—the southwestern extremity of Australia—or almost exactly opposite on the globe. This distance can hardly be exceeded for surface ships.

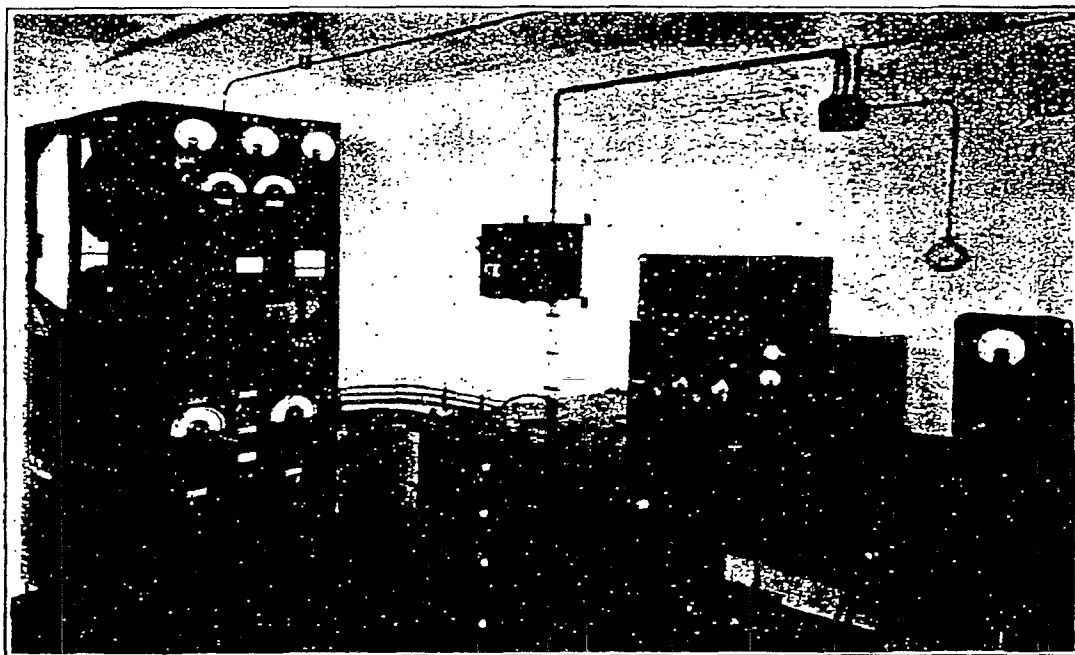
This effective development and use of vacuum tube high frequency transmitters in marine service has worked a silent revolution in radio communication practice. Spark type transmitters are no longer manufactured and those remaining in Government and private service are being replaced as rapidly as economically feasible. The entire fleet of the United Fruit Company, among others, recently refitted with tube equipment, and the Radio Corporation is now completing the change from spark to tube on the hundreds of vessels under its radio operating control. The practical value of this large job is radio's contribution to safer sea travel in exactly the same sense as the automobile of today provides more reliable, safer and longer distance transportation than the car of 15 years ago.

The net result is that because of this constant effort to widen the field of radio's service to the mariner, it is impossible for a ship with modern radio telegraph equipment to be out of touch with shore or another vessel. The resources of governments in their military establishments have combined with those of commercial organizations to this end and there is no let-up in the effort to apply every proven principle to make marine work and travel safer or better.

Forgetting, for a moment, the necessity of being ever ready to transmit the universal call for help—S O S—with, as the United States Law phrases it, "a maximum of radiation with a maximum of interference," let us review briefly (for time will not permit more) some other ways in which radio is being utilized to promote safety at sea and as an aid to the navigator.

As a means for personal and business communication thousands of messages

are handled every day to and from ships at sea with the regularity and dispatch of land-line telegraphs. The "Leviathan," for example, on a single five day voyage will handle hundreds of private radiograms in addition to thousands of words of press, weather, hydrographic and service messages. The humble tramp with three or four messages to shore on a two weeks' trip receives the same attention at the coast stations which are generally duplexed, such as in the case of the Radio Corporation's station at Chatham, Mass., which is able to communicate simultaneously with seven vessels without mutual interference. A few of the larger liners are fitted with automatic high speed transmitters and recorders, permitting the movement of radio traffic at 100 words or more a minute as compared to not more than 30 words a minute by manual operation; and few



Modern Radio telegraph installation aboard the "S. S. Gulfpride"

operators can maintain that speed with accuracy. Radiophone broadcast programs are received aboard many ships for entertainment purposes. Four ships of the Grace Line, for instance, have been fitted with unique broadcast receivers, and passengers have danced to music from a New York night club, when steaming through the Caribbean Sea and even off the west coast of South America.

The United States radio law requires that vessels of American registry carrying 50 or more people 200 miles or more, be fitted with radio telegraph equipment with a range of at least 100 miles, and shall carry two or more licensed operators. An auxiliary source of power supply is required, and this, usually storage batteries, is placed on or above the main deck where they will function if the fire rooms or engine rooms become flooded. About 1,950 American vessels, exclusive of naval and Government ships, carry radio telegraph equipment out

of approximately 3,050 of 1,000 gross tons or over, and a large percentage of these are voluntarily equipped as not coming under the Law's requirements. All British vessels of 1,600 tons or over are required to carry radio and most foreign countries base compulsory ship radio equipment on tonnage rather than length of run or number of people aboard.

The dissemination of weather information by radio is world wide and generally standardized by use of universal procedure in observations and codes. These bulletins consist of a weather report and forecast for a given locality, storm, gale

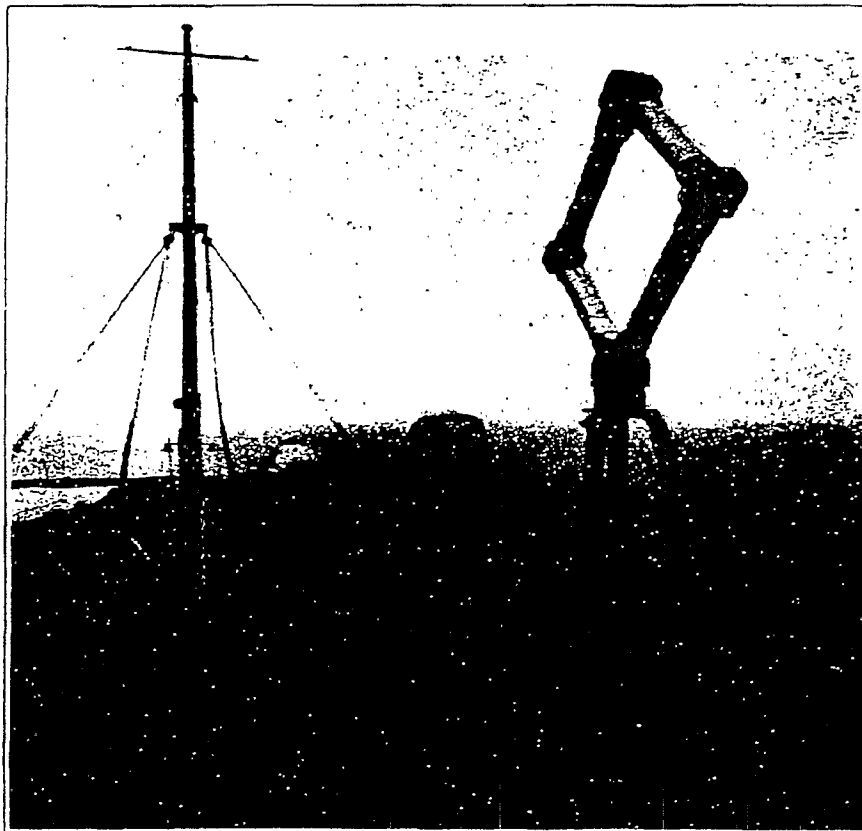


Radio direction finder, control, indicator and receiver

or special warnings when indicated. In order to enable navigators to predict storm movements and weather likely to be experienced, a code known as the Synoptic Data System is available for the transmission by radio of weather observations. This information and system is so complete that the navigator may prepare his own daily weather map at sea on base charts provided free by the Weather Bureau.

The facility with which pictures may now be transmitted by radio, makes possible the radio transmission of weather maps to ships at sea, based on information received ashore from many ships by radio, and experiments on this are under way. Under laboratory conditions it is possible to transmit a picture or printed sheet in less than 30 seconds as compared to 20 or 30 minutes; and, incidentally, as this speed of transmission is stepped up, the possibility of "radio movies" becomes correspondingly greater.

The International Ice Patrol, operated by the United States Coast Guard under provisions of the International Conference on Safety of Life at Sea, is a service of vital importance contributing directly to the safety of shipping in the North Atlantic steamer lanes; and radio alone makes it so effective. In paying a tribute to this service someone has said, "The 'Titanic' disaster would probably never have happened, had the ice patrol been in existence."



Typical American type radio direction finder (external loop structure)

The collection and transmission of hydrographic information and navigational warnings by radio is a service which functions quietly, but effectively and constantly. - Damaged or misplaced aids to navigation, floating derelicts or obstructions, or unusual conditions encountered at sea are reported and retransmitted by high power radio for the benefit of any and all ships concerned. The International radio safety signal—groups of three dashes—is second only to the S O S of distress in commanding instant attention and radio silence whenever heard. This signal precedes warnings of an urgent character sent out by radio

from coast stations with advice such as cyclones, derelicts, sudden changes in fixed obstructions or landmarks. The radio transmission of ice and hydrographic information is obligatory. Weather reports are optional.

Several years ago the Seamen's Church Institute of New York inaugurated a service intended to give medical advice by radio to vessels in New York harbor in cases of physical emergency to seamen. With the cooperation of the large radio operating companies and the United States Public Health Service, these facilities were extended and organized; several foreign countries through their appropriate official departments instituted similar service so that the handling of free medical advice is an established humanitarian function of radio. The so-called "Medico" message has right of way—a surgeon of the Public Health service with a knowledge of available medical facilities aboard ship, indicates procedure for relief based on the nature of the accident or illness and symptoms described, and almost invariably the patient is receiving the benefit of this advice by competent authority within a few minutes. Scores of cases of immediate relief are matters of record and undoubtedly it has been the means of saving many lives.

The transmission of standard time signals by radio under Government supervision, for the adjustment of chronometers is world wide. In most cases the transmission is automatic in connection with a standard chronometer at an observatory and absolute reliance may be placed on the signal; the average lag in the United States signal from Arlington being something less than nine hundredths of a second.

Television Is a Development on the Way

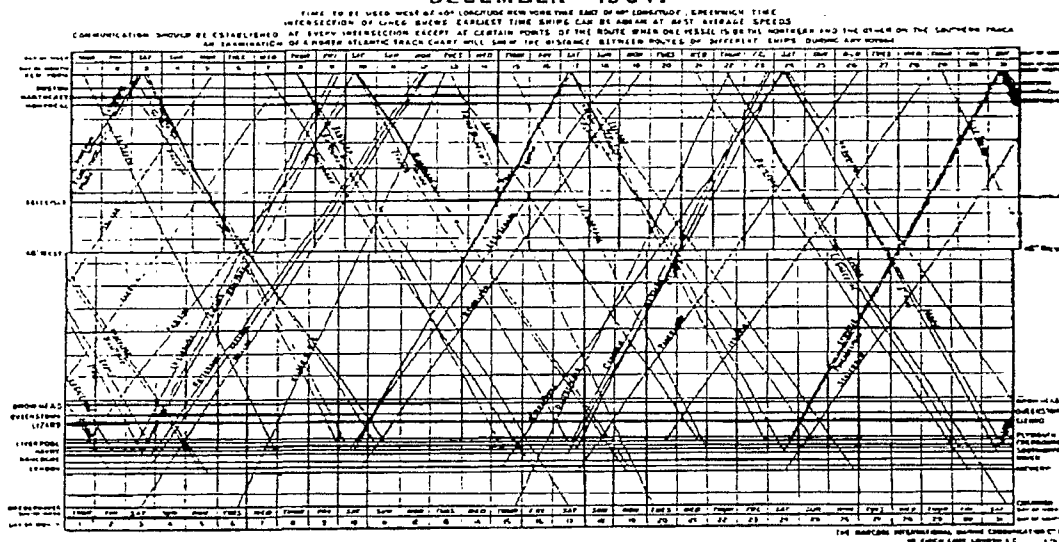
The application of television, or seeing as well as hearing by radio, as it may be applied to the promotion of safety at sea remains to be seen. It is, however, an accomplished fact and who will deny that some day the navigator will be enabled to see his way through fog by radio, as well as get his position and bearing which he now does?

The directional properties of radio waves have lent themselves to several devices designed to give the navigator his position or bearing in thick weather or conditions of low visibility; and this development is of great value when making a land-fall after a prolonged period of sailing by dead reckoning. In a single recent month the radio compass stations operated by the United States Navy gave without charge over 21,000 radio bearings to ships that requested them. In some foreign countries a charge is made for each bearing given by radio.

The radio direction finder aboard ship, operated by the navigating officers themselves and taking bearings on radio beacons established for the purpose—ashore or on lightships—is rapidly becoming a standard item of equipment and is in use on hundreds of vessels with the number rapidly increasing. By use of this instrument the navigator can approach the coast in the thickest fog with an assurance of his position. He can, if necessary keep track of a vessel's movements which may be in his path and the location of a ship in distress is relatively a simple matter. The radio direction finder is purely an instrument to promote safer navigation and is doing it well. Something of a record in connection with the installation of these instruments was set up on the Great Lakes last winter and spring when the Radio Corporation installed and calibrated 135 in 99 working days. Slightly over 200 direction finders are in service on the Great Lakes alone.

The Bureau of Standards in cooperation with the Lighthouse Service have conducted tests with a fixed radio beam for the guidance of vessels through

**MARCONI TELEGRAPH
COMMUNICATION CHART.
DECEMBER 1904.**



An early radio communication chart for the North Atlantic

Comparatively few passengers on the large liners realize that radio is on duty in some of the life-boats with suitable batteries for power supply. Yet such is the case on several vessels and it is reassuring to know that if the emergency comes the rescue ship can be called by radio, and with her radio direction finder locate the stricken vessel without search; or a single lifeboat if it is afloat, regardless of night or fog.

A striking example of radio's value as an aid and safety agency was demonstrated last spring when the large "S. S. Malolo" was in collision in fog during her trial run off the New England coast. By use of her radio direction finder the ship's exact position was fixed in the fog and broadcast, and by its use five

vessels, in addition to tugs, were given by radio telegraph courses to steer which brought them directly through the fog to the disabled ship. One of the tugs detected by the direction finder was found to be passing the "Malolo" several miles away and was quickly given a new course to steer which brought her alongside. A few minutes after the collision the ship's dynamos were put out of commission and the emergency radio transmitter (as powerful as the average ship's main set) was started up with power supplied by a 25 kw. Diesel driven machine installed on the main deck for such an emergency. This machine was operated continuously for nearly 72 hours, supplying power for the radio and emergency lights, and it was not necessary to use the storage battery reserve which the ship carries in addition.

The Best Engineering Minds Baffled by Static

Static is radio's greatest enemy and the best radio engineering minds are today unable to eliminate or control it and still preserve unimpaired the signal or effect desired. It is known, however, that the strength of static bears a definite relation to the rate of change in barometric pressure, and to quote Commander C. S. Hooper, U. S. N., "It is a known fact that the static emanating from an intense cyclonic area is greatest at or near its center." This means that if static cannot be eliminated it is going to be put to useful work until it can be, and Commander Hooper recently published an interesting article showing how storm areas have been definitely traced by means of static impulses received on a radio direction finder and recorded by a pen on a rotating cylinder. This has not only told the direction from which a storm may be expected to break, but its approximate intensity. The center of disturbance in the Miami hurricane of a year ago was definitely located and followed by a device of this character aboard the "U. S. S. Kittery."

The successful application of marine radio telegraphy is largely dependent on the human element—the radio operator. Although usually without the individual background of tradition and service, we have the word of a Government official that the records show no single failure in an emergency of an operator to stand by his instruments, and the names of 24 on a monument in Battery Park, New York City, who have lost their lives at sea bear eloquent testimony to this fact.

The steering of a ship entirely by radio control from shore or from another ship is more of a stunt, or military maneuver, but it has been and can be done. Radio communication, position and direction finding, is not confined to surface ships, but is equally applicable to submarines and aircraft. With the continued development of vacuum tubes and high frequency radio transmission and a better understanding of their laws and tremendous possibilities it is difficult to draw the line between that which is possible of accomplishment and that which is impossible, and we can easily visualize the navigator of the future more and more dependent on his radio devices for information, control and safety.

The Direction Finder Effective Up to 100 Miles

A. M. TODE (Texas Co., New York City): I should like to ask Mr. Cole, of these 21,000 messages which were given to the radio direction finders, about what was the average distance off shore of the vessels?

MR. COLE: I couldn't tell you about that. I can say that out of 1,400 observations taken on the Great Lakes last summer, the average distance was something like 65 miles. The direction finder, itself, is effective up to 100 or over. The average distance we found to be 65 miles.

MR. TODE: How much error would that give you?

MR. COLE: They have an accuracy of a degree or less. If we find two degrees we look for trouble.

MR. TODE: We had one case where our master reported getting a signal at 265 miles and, I believe, it was between one and one-half at 265 miles.

MR. COLE: On the Lakes the distances are much shorter. That is what I am immediately concerned with now.

CAPT. T. W. SHERIDAN (New York State Nautical School, New York City): Do you find the radio direction finder is affected very materially in a ship with steel booms when the booms are lifted up just before going into port?

MR. COLE: That is all compensated out.

CAPT. SHERIDAN: Can a captain of an ordinary ship himself swing, for instance, off Ambrose Channel and make up a table of errors which would be reliable?

MR. COLE: Of course, when it is done by the radio man, he makes the mechanical adjustment in the machine.

CAPT. SHERIDAN: Do you issue any warning against trusting to the compass when the booms are in a different position?

MR. COLE: Yes, that is all in the books.

CAPT. SHERIDAN: I noticed several instances where inaccuracy was reported on the part of the compass. I thought it was probably due more to the change of the disposition of the rig than otherwise.

MR. COLE: To illustrate that point, I had a case this year on the Lakes where a compass was put on, and it worked fine. All of a sudden, the captain reported two point errors and when he looked around, found he had strung an awning over the so-called observation deck and the awning support wire threw that compass out that way. As a rule, those things occur very seldom and are all compensated.

CAPT. SHERIDAN: Will steel have the same effect?

MR. COLE: It depends on what the relation of that is to the loop.

CAPT. SHERIDAN: Between the two methods, have they both the same effect?

MR. COLE: Yes, but there is no magnetic effect.

CHAIRMAN KAIN: Are there any other questions or discussions? We will go on with the next paper.

The Relation of Gyroscopic Equipment to Maritime Safety

O. B. Whitaker, Sales Division, The Sperry Gyroscope Company Brooklyn, N. Y.

"Come in, Paul, what is it?" called Mr. Charles M. to his secretary who had momentarily appeared at his office door during one of those business hour visits with his old friend John B.

"A cablegram, sir," answered Paul. The friendly atmosphere changed to suspense as Charles opened the envelope and read its contents.

"Thank Heavens they have arrived safely," Charles exclaimed. "You know, the folks sailed on the 18th and—they say they have arrived Southampton safe and sound."

Charles apologized to John for so rudely interrupting his visit, but he could not help being elated over this good news. John, who had not seemed to enter into the spirit of rejoicing, leaned forward in his chair, "Charles" he said "I cannot, for the life of me, see why people rush to the nearest cable office upon arrival in a foreign port and hurry a cable off to the folks back home telling them that they have arrived safe and sound—always sound—just as though they have escaped from the clutches of some terrible plague, when, to be exact, they have completed a trip or voyage by one of the safest modes of transportation on earth.

Now if they would have just told you that they arrived on time after a wonderful voyage, good food, good air and a great time or something to that effect, their cable would have been newsy and interesting to me also."

Charles' "folks" acted upon an impulse that was engendered before the day of the large, fast, ocean liner with its modern construction, strong, reliable engines, greatly improved navigational, fire detecting, fire extinguishing, life boat and radio equipment. To comprehend what this all means, just review the major ocean casualties since say, 1905. The vast improvements which have taken place since that time may be divided into two general classes—those coming under Assurance and those coming under Insurance. The former covers all equipment which assures a safe passage while the latter covers all equipment for the saving of life in the remote case of disaster finding a vital spot in the bulwark of the former. It is in the former that great strides have been made, and rightly so—for if it could be brought to perfection the latter could be forgotten.

The Vessel Captain Is No Longer Isolated

We all realize that it has not been so many years since the captain of a vessel was master of his own destiny, barring the acts of nature. He was provided with a sextant, chronometer and a compass subject to innumerable whims and started on voyages to remote parts of the earth without further assistance from those ashore until land was again sighted.

Science has wrought great changes in these things as well as in our every day existence ashore. The captain of a ship is now not as isolated from the rest of the world as residents of our rural districts. He is also provided with modern equipment for the safe and efficient conduct of his ship from one port to another just as the up-to-date industrial plant provides for the safe and speedy output of its products. His compass has been changed from one responding to almost every thing and condition about it, to one steady and accurate under all conditions; and now his ship is even directed accurately and safely over her course by machinery.

The gyro-compass is responsible for much progress in the safety of ship operation. It has given the navigator an accurate indication of his heading or of bearings based on the true North. It differs widely from the magnetic compass, taking its directive force from the earth's rotation and gravity, both unvarying forces.

Any general statements regarding the many ways in which the gyro-compass increases the safety of ship operation, however, are almost meaningless unless made by comparison. A brief study of the magnetic compass makes us really marvel at the fact that the seas casualty list has not been greater. We must bear in mind that the compass is the ship's guide, on cloudy nights, and especially in fog, it guides the ship blindly. An error of only one degree in heading places a ship one mile off her course for only fifty-seven miles run. With these facts in mind, picture the navigation of a large vessel across the Atlantic with two thousand or more souls on board and with an instrument to guide them that is subject to errors from at least six different causes, every one of which is variable and liable to change without warning.

Idiosyncrasies of the Magnetic Compass

The two principal errors found in the magnetic compass are generally termed "variation" and "deviation." The former is due to the irregularities in the direction of the earth's magnetic field and causes errors up to 50 and more degrees in some parts of the world where there are navigable waters. There is a difference of over 48 degrees in the magnetic meridians within the borders of the United States. The amount of error from this cause is known for different localities and

its rate of change is fairly constant but, on a vessel traversing these lines of varying magnetic variation, corrections have to be frequently made in the course by compass. As an example of this the magnetic error in New York harbor is 11 degrees and this is increasing at the rate of six minutes yearly. In leaving New York and heading down the coast the error is reduced until off the coast of Georgia where it falls to zero and then takes up an increasing error in the opposite direction. If it were possible of accomplishment, a vessel started from New York and headed down along the coast on a proper initial course, but no allowance subsequently made for changes in variation, would, roughly speaking, pass through Atlanta, several hundred miles inland from the coast—not a good place for a sea-going craft to be. Deviation is the effect of the ship's hull on the magnetic compass as it takes up various headings; the ship not being a symmetrical mass, it has greater distracting forces on some headings than on others. The effects of this error are partially compensated for and partly overcome by allowing for whatever value this error may have on a given heading.

Subject Also to the Listing of the Vessel

The earth's magnetic field is also subject to a diurnal change in some localities of over seven minutes. The magnetic compass is also affected by listing of the vessel, as the compass card remains practically level while the horizontal and vertical disturbing elements in the ship's structure change their relation to the card. The compass card is also, and from the same cause, moved backward and forward as the ship rolls. Electrical storms which are not always apparent to the navigator have been known in many cases to affect so seriously the earth's magnetism as to render the magnetic compass almost, if not wholly, useless. Many instances are also on record where vessels have been struck by lightning, completely disabling the compass. Then there is the cargo—rails and other steel or iron products set up such a powerful magnetic field of their own that the earth's field reaching the compass is too feeble to retain any accuracy. Such cargoes, when handled with a magnetic crane often render the magnetic useless.

Now with a picture in our mind of the difficulties faced with the magnetic compass let us turn to the gyro-compass, and study its contributions to the safety of ship operation.

Contributions of the Gyro-Compass

As has been pointed out, the gyro-compass depends upon the unchanging phenomena—stability of the gyro in space, precession of the gyro wheel, gravity and the rotational motion of the earth. With these combined and employed as they are in the gyro-compass and as I shall demonstrate, the result is a true North indicating machine which is undisturbed by magnetic influence and which indicates the true North with a directive force of 160 times that of the magnetic compass and without the application of corrections; thus giving the navigator accurately and directly that which he has had to previously obtain indirectly and then with none too certain results. The safety of navigation is therefore very greatly increased by the introduction of the gyro-compass. This does not mean that the magnetic compass has or ever will be entirely replaced, as it will always prove an excellent emergency compass for it is self contained and does not depend upon any other of the ship's machinery. Navigators tell us that with their gyro-compass they are better able to keep their magnetic compasses in condition for emergency use since they have an accurate and direct check on them all of the time.

The construction of the gyro-compass lends itself readily to the transmittal of its readings to points isolated from the master compass thus making it not only possible, but desirable to mount it in some clean and dry location away from the

bridge. Repeating compasses called "Repeaters" are then mounted wherever a compass indication may be desired. These repeaters are adapted to any kind of a desirable mounting, making it possible to swing them in gimbals for use with an alidade attachment for taking azimuths or bearings, to mount them rigidly as a steering compass or to mount them under the radio direction finder to facilitate the operation of that very useful, modern aid to navigation. The motors used for operating the repeaters are also used for other purposes such as in the course recorder which makes a graphic record of the ship's course and time, and in the gyro-pilot which steers the vessel automatically. The gyro-compass equipment therefore becomes something comparable to a nerve center in the human body, in fact same call it the soul of the modern ship.

A Trip Aboard the Sailing Vessel

With an understanding of the gyro-compass and its principles we will visit a vessel and see for ourselves what this all means. It is about one hour before sailing. We go on board and up to the bridge, and ask the navigating officer to show us about. We are ushered out to the port bridge wing where we find a gyro-compass repeater mounted in a tall stand. "This is called the 'port pelorous,'—we have one in a corresponding location on the starboard wing, as you can see. We use these to obtain bearings," said the officer.

We naturally inquire if the compass is running and are informed that it has been running for several hours and that bearings have been taken to insure its accuracy and that it is ready for sea. We are then told that this is one of the valuable points of the gyro-compass; it can be as readily checked against the dock as at sea, which is not possible with the magnetic, and that this very materially increases the safety of their navigation.

From the bridge wing we are escorted to the wheelhouse where the gyro-pilot, or automatic steering machines, does its work. "A repeater is mounted on top of it for checking while steering automatically and for the use of the wheelman when steering manually," explained our guide who tells us that this machine holds the ship to her course with an accuracy and consistency that are not equalled by any wheelman; some men can equal it for short periods, but sooner or later they tire and lose their alertness, but the machine does not tire or have to be relieved." Our guide further explained that, "because of the accuracy of its steering our dead. Reckoning navigation is very greatly increased."

The Interesting Chart Room

We are then shown into the chart room where our attention is called to the course recorder. "That device," explains our guide, "makes a record of the ship's course, you see we are lying at the dock now and holding a fixed heading so the recorder shows a straight line; as we leave the dock it will show which way we turn, the time we left and, in fact, every turn or course change we make till we reach our destination. These records are valuable for obtaining an accurate check on the course steered, whether or not course changes were made on time, and if necessary to alter course for another vessel or for any other reason, this shows us exactly how long and by what amount we were off our course so that proper allowance can be made for it. Also in case of collision we have a graphic, unbiased record of everything we did to avoid it." We were then shown the engine telegraphs, electric whistle pulls and other equipment about the bridge.

During a subsequent voyage we were permitted to spend some time on the bridge and watch these many things of which this navigating officer had told us, unfold themselves in actual life and we could not help but comment on the marvels of our

time and the fertility of the minds that were so generously contributing to the safety and swiftness of our voyage.

By increasing the accuracy of navigation by decreasing the liability of error, in that all important instrument the compass, by holding the vessel more nearly to her proper course and by making a graph of the ship's heading and time, the gyroscope in the form of the gyro-compass has contributed greatly to the safety of ocean travel.

Example of the Gyro's Resistive Power

A. C. WARFEL (Hartford Accident & Indemnity Co., St. Louis, Mo.): As an example of the resistive power in the gyro, I remember a high school physics demonstration given by a professor who came to lecture us. He had a bicycle wheel so rigged with handles and a little pulley, that by giving the string a pull it would revolve at high speed. He had himself standing on a sort of turntable and after he got that wheel going, he asked some of the students to turn him around. You couldn't do it.

MR. WHITAKER: We had an example of that in our own factory some two or three years ago. One type of compasses we make has a wheel which revolves. We have known them to revolve as long as 18 hours after the current is taken off. In this one instance the compass had to be shipped in a hurry and was put in a shipping crate and sent to the shipping department. One of the men in the shipping department was told to take that crate out and place it on a truck. In doing so, he would necessarily have to make several turns. He picked up the box and all went well until he started to make the turn. The box kept coming up at him. The fellow set it down, said somebody else could have the job, he guessed there was a ghost in there.

CAPT. T. W. SHERIDAN (New York State Nautical School, New York City): Along that line, it might be of interest to everybody to remember that the pendulum has some of the properties of the gyro. Read the account of how Galileo discovered the fact that the earth revolves on its axis, only that was a graphical demonstration of what he saw instead of what he felt, the same way as the man lifting the box. Galileo discovered this accidentally by observing one of those incense containers in a cathedral.

A Single Nail Affected the Course of the Ship

One point, if I may invite attention to it, the disadvantage of having the master compass at a great distance from the repeaters, is the fact that accidents occur to the directional contact wires. In 1913 I had command of a ship. We were going to take President Harding up from South America and they made some alterations in the staterooms to make a presidential suite. Somebody drove a wire nail in through the compass cable and the compass was out for a long time before they could discover what was the cause of the disarrangement. The vibration of the ship would bring the bare wire up against the nail and for some time we had all sorts of investigations. It may be a disadvantage to have the master compass at too great a distance from the repeater.

MR. WHITAKER: That is a very good point. We always point it out to steamship officials. I might say, however, that such a difficulty does not affect the gyro-compass. It affects the indicating instrument on the bridge.

CAPT. SHERIDAN: Another point that I would like to develop; in the nautical school—the cadets just before graduating are sent over to the gyroscope school to

take the course. Now, the question is, is it better to have them go to the gyroscope school or would it be better to offer some sort of a gyroscopic course?

MR. WHITAKER: We have been inclined to offer the latter. We have offered the school the loan of gyroscopic equipment for the summer cruise. I don't believe all year round it would mean a great deal because their time is taken up by other work, but if they could have a machine during the cruise, they would be able to gain valuable information from it.

MR. WARFEL: I might make another suggestion on that particular point. It might not be a bad idea, if the boys, some time during the course were taken through the gyroscope factory.

Students Aboard Ship Visit the Plant

MR. WHITAKER: They are, they spend pretty nearly a week there. The school ship usually comes into the Brooklyn Navy Yard for a few days each year for its annual overhauling and repairs. That is only about ten minutes walk from our factory, so they are given opportunity to go through the plant. I might say in that connection, we maintain a school at our factory from which, in the last three years, we have graduated 1,000 merchant officers, naval officers and men. The naval officers who are assigned to Columbia University always finish their post-graduate work at our plant.

M. E. ARKILLS (Waterfront Employers of Seattle, Seattle, Wash.): I would like to ask the speaker what effect a resisting bearing would have in the mounting of the rotor in the compass, one that would be a bad bearing or dry, or furnish heavy resistance.

MR. WHITAKER: It would slow your rotor down. That would give you difficulty in the compass. It would naturally show itself first as an error in your repeating instruments on the bridge and that is why I say the gyro-compass should be as carefully watched as the magnetic, because the gyro, as we all know, is a piece of machinery and is subject to ailments. Although we believe the present design has gone a long way toward reducing those to a minimum, yet we urge all captains and navigating officers to keep a careful watch on their gyro-compass. We use ball bearings throughout for guide bearings. They are special. They are all annular bearings. Some are of our own manufacture and we really gather those from about five or six different manufacturers because each bearing has certain requirements made on it and different types suit those requirements better.

Compasses Cleaned About Every Two Years

MR. ARKILLS: Naturally, you use very light oil in those.

MR. WHITAKER: We use quite a light oil.

CAPT. SHERIDAN: I think it might be of interest to explain to Mr. Arkills the repeater compasses are not moved by the energy in the gyroscope itself, but the gyroscope directs another electrical motor which does that so that there is comparatively little resistance against the directional force of the gyro, itself. It is known as a phantom ring.

MR. ARKILLS: I wasn't thinking about the remote resources, I was thinking of just the resistance to accuracy in itself.

MR. WHITAKER: It has been worked out so that now we figure every two years, no oftener, a compass should be taken down and the bearings cleaned. That has been reduced to possibly a day's work on the compass once every two years to clean bearings and thoroughly oil them and make it good for another two years. That, we believe, gets the gyro-compass down to a point where it requires less attention

than the magnetic, because most ships must have the magnetic compasses compensated at least once a year.

J. S. HUNTER (Atlantic Refining Co., Philadelphia, Pa.): May I ask about what percentage of our merchant marine are equipped with them?

MR. WHITAKER: I should say, roughly, of the ships on the Great Lakes there are about 30 per cent fitted with the gyro-compass. On deep water, I should judge about 20 percent.

A. M. TODE (The Texas Co., New York City): It has been my understanding that the gyro-compass for many years has been direct current driven and only recently have you been manufacturing alternating current machines.

Closing Moments of the Session

MR. WHITAKER: I might say we started out first with the alternating current machine, the original navy type, in 1920 or 1921. Our reason for going to alternating current was because of the high velocity. We could not get good commutation to drive the gyro wheel by direct current until 1920, and then we found the velocity, very much higher than we required, had been very successfully worked out in industrial work and that encouraged us to go ahead with the direct current wheel, which eliminated the necessity of a motor generator.

Then we brought out our direct current type which we still manufacture and we also manufacture a similar compass for alternating current where it is desired to have an alternating current machine. We find some ship owners don't like a direct current machine.

In most of the salt water work, they are getting alternating current. On the Great Lakes, practically all are direct current. Those few ships which had the alternating current type have been replaced. The alternating current type has a great deal more equipment and naturally requires maintenance and special care during the winter when the ships are laid up. With the direct current type, they simply cover the machine up, lock the room, come back next spring and start it up.

CHAIRMAN KAIN: Are there any more questions?

That concludes our program so far as the papers are concerned.

(After discussion it was)

RESOLVED that the Marine Section does not favor the passing of a recommendation to the Council with reference to the convention city for the coming year, but that we do express our appreciation of the splendidly arranged convention now in session.

CHAIRMAN KAIN: Gentlemen, I think that concludes the program of the Marine Section for the present year. The new officers for the Marine Section have been elected for the coming year. These gentlemen are not new to the affairs of the section. They have had a great deal of experience in safety work and particularly in the work of the Marine Section. I believe that the wonderful record made by the Marine Section last year, both with respect to membership and accident prevention, is largely due to these gentlemen who are going to take over its management for the coming year. I think the Marine Section is most fortunate in having command of their services. They certainly have been very unselfish in giving their time and energy to the work of the National Safety Council.

As chairman of the Marine Section for the past year, I want to express my appreciation on behalf of the section and on my own account for the wonderful support I have received from these gentlemen.

We stand adjourned then for this year. I hope you will all be present next year. We have a very large membership now as compared with last year, and if we do as well this coming year, we will have a very large percentage of the American

Merchant Marine in this section. I don't know of any industry that needs safety more than the shipping business.

MR. TODE: Mr. Bush, unfortunately, was called out of the hotel. He had expected to be here. In his absence, I would like to express my appreciation and, I feel, the appreciation of all our sectional members for the work of our chairman, Capt. Kain, for the past year, and I move that we extend to him a general vote of thanks for his efforts and for the work of the Marine Section during the year 1927.

ADJOURNMENT

SIXTEENTH ANNUAL SAFETY CONGRESS NATIONAL SAFETY COUNCIL



Metals Section

New Section Officers

Chairman, J. A. NORTHWOOD, Bethlehem Steel Company, Johnstown, Pa.
Vice-Chairman, E. G. QUESNEL, Commonwealth Steel Company, Granite City, Ill.
Secretary and News-Letter Editor, JOHN P. EIB, Illinois Steel Company, Joliet, Ill.
Program Committee Chairman, E. F. BLANK, Jones and Laughlin Steel Corporation, Pittsburgh, Pa.
Poster Committee Chairman, C. L. PEAKE, American Radiator Company, Buffalo, N. Y.
Membership Committee Chairman, W. E. MEGRAW, H. H. Robertson Company, Ambridge, Pa.
Publicity Committee Chairman, J. A. VOSS, Central Alloy Steel Corporation, Massillon, Ohio.
Slide Committee Chairman, JOHN A. OARTEL, Carnegie Steel Company, Pittsburgh, Pa.
Engineering Representative, W. H. WINANS, Union Carbide Company, New York City.
Statistics Committee Chairman, H. G. HENSEL, The Youngstown Sheet and Tube Company, Chicago, Ill.
Executive Committee: THE OFFICERS AND—
F. G. BENNETT, The Buckeye Steel Castings Company, Columbus, Ohio.
T. H. MCKENNEY, Illinois Steel Company, South Chicago, Ill.
J. E. CULLINEY, Bethlehem Steel Company, Bethlehem, Pa.
J. M. WOLTZ, The Youngstown Sheet and Tube Company, Youngstown, Ohio.
JOHN P. MUDD, The Midvale Company, Nicetown, Philadelphia, Pa.
E. R. ROSE, Republic Iron and Steel Company, Youngstown, Ohio.

Retiring Officers

Chairman, F. G. BENNETT, The Buckeye Steel Castings Co., Columbus, Ohio; *Vice-Chairman*, J. A. NORTHWOOD, Bethlehem Steel Co., Johnstown, Pa.; *Secretary*, E. G. QUESNEL, Commonwealth Steel Co., Granite City, Ill. *Committee Chairmen: Program*, JOHN P. EIB, Illinois Steel Co., Joliet, Ill.; *Poster*, FRANK H. ROWE, Wheeling Steel Corporation, Portsmouth, Ohio; *Membership*, H. G. HENSEL, The Youngstown Sheet & Tube Co., Chicago, Ill.; *Engineering Representative*, EARL F. BLANK, Jones & Laughlin Steel Corp., Pittsburgh, Pa.; *Executive Committee*, THE OFFICERS and A. C. GIBSON, Spang, Chalfont & Co., Pittsburgh, Pa.; T. H. MCKENNEY, Illinois Steel Co., South Chicago, Ill.; JOHN A. OARTEL, Carnegie Steel Co., Pittsburgh, Pa.; J. M. WOLTZ, The Youngstown Sheet & Tube Co., Youngstown, Ohio.

Tuesday, September 27, 1927

F. G. BENNETT, Chairman

Safety Director, The Buckeye Steel Castings Company, Columbus, Ohio

The first session of the Metals Section of the National Safety Council, was called to order at nine-forty o'clock by the chairman, F. G. Bennett, safety director, The Buckeye Steel Castings Company, Columbus, Ohio.

CHAIRMAN BENNETT: The first order of business of the Metals Section will be the reading of the reports of the officers and in the order of these reports, the present chairman's is to come first.

If I were to go into detail on the activities of the Metals Section during the past year, I know I would steal the ammunition and thunder of the various officers, because, as chairman of the committees, they have really performed the work.

I will say this, however, that we have held three meetings of the executive committee and that each time these meetings have been held, they have been arranged so that we could meet with the executive committee of the national organization. We found that to be quite an advantage because we could take up matters with the various officers and work them out to the advantage of the section.

There is one thing we are quite pleased with this year and that is the interchange of ideas between members. There has been a lot of that, mostly through correspondence, and I think our News Letter has aided materially. I am sure the report of the secretary will not say enough about the News Letter, as Mr. Quesnel is entitled to a lot of credit for the excellent work that he has done in this connection.

I know that has helped our section and there has been a large demand for the News Letters, some of the plants using many copies to distribute among their foremen and men.

I will now call upon the secretary, Mr. Quesnel, for a report and also something about the News Letter.

E. G. QUESNEL (Safety Engineer, Commonwealth Steel Company, Granite City, Illinois): I think the secretary's report could be better left unsaid. The secretary's job is just to interpret the ideas of the various members and pass on information, and I hope I have done that properly this year.

As far as the News Letter is concerned, I don't take any credit at all for that. If that was a success, it was due to the members themselves. I do feel very grateful, though, for the contributions that came in and the prompt response to inquiries sent out. We got in touch with more new industries this year, I believe, than ever before in the history of our section. As a matter of fact, we received inquiries from men in California, Oregon, New Orleans and on the Atlantic Seaboard, writing in to us for information, we referring them to others, which established a means of communication that has been very valuable; and I hope that next year you gentlemen will take advantage of the News Letter and use it as a means of broadening your acquaintanceship, securing information that cannot be secured in any other way, and building up a greater correspondence in your safety organization that will be national.

CHAIRMAN BENNETT: The section's next committee to report will be the chairman of the Membership Committee, Mr. H. G. Hensel. Mr. Hensel is attending another session at this time, so assigned on the program, I will ask Mr. John Eib to read his report.

JOHN EIB (Illinois Steel Co., Joliet, Ill.): I personally regret very much that Harvey Hensel is not here to read his own report because he is entitled to a lot of consideration for his extremely interested and successful work.

Report of the Membership Committee

During the past year, the Membership Committee had a personnel of 34 members, and this personnel was selected from the Members of the Metals Section in as many different states of the United States as possible. I want to take advantage of the opportunity offered at this time to thank each and every member of the committee for the efforts they have put forth during the past year in this membership work. I have had the hearty cooperation of our committee, and I am told that the number of new members for our section, secured during the past year, is greater than that of any other section. It is a fact, however, that cancellations during the past year were rather high, and this especially among the smaller plants in the metals industry.

The record at the National Safety Council headquarters, with reference to the members in this section, is as follows:

From October 6, 1926 to September 13, 1927

Number of members in Metals Section, October 6, 1926.....	745
New memberships during the year.....	90
Memberships cancelled during the year.....	60
Total number of members in Metals Section to date.....	775

I have two suggestions to offer at this time in connection with future membership work in the Metals Section:

First: I am pretty well convinced that the new policy adopted by the National Safety Council of arranging for personal solicitation in districts where a member of the staff of the Council can be sent to call on prospectives with a local safety man, who is well acquainted in the district, is one of the best ways of securing new members. It seems to be easier for a member of the National Safety Council's staff to interest a prospect in membership than it is for someone whose training has not been as extensive in selling memberships as this member of the staff has had. The usual procedure is for a member of the Membership Committee to arrange with a member of the National Safety Council's staff at a time convenient to both and to give up about one day's time to this work in that particular district.

Second: The other suggestion is that the Membership Committee be formed at the Congress or as soon as possible thereafter so that the drive for memberships can be started immediately after this Congress adjourns.

CHAIRMAN BENNETT: If there is a report on the Program Committee, Mr. Eib (that is his real job) have you anything to say on that?

JOHN EIB: Here it is and I hope it goes over good.

CHAIRMAN BENNETT: Thank you very much, John. You did a good job. The suggestions made on this report of the Membership Committee by Mr. Hensel are very good. I have not seen the report prior to its reading, but I imagine that it will be referred to the incoming officers for their consideration. Mr. Hensel has worked hard on this and accomplished a lot of good.

Mr. Frank Rowe has done some very fine work in connection with posters, and I would like to hear the report of the Poster Committee.

FRANK H. ROWE (Safety Director, Wheeling Steel Corp., Portsmouth Works, Portsmouth, Ohio): My report isn't very long this morning. I will read it to you.

Report of the Poster Committee

This report completes another year of service to the membership of the Metals Section and I wish to take this opportunity to thank all those who have helped by submitting posters for use of our Section during the past year. Particularly do I wish to thank the members of the Poster Committee, E. F. Blank of the Jones and Laughlin Steel Corporation, Pittsburgh, and H. P. Shields of the Carnegie Steel Company. The report of the chairman of this committee would not be complete were it not to mention the fine service and help rendered the chairman by Lee H. Gardiner, Director of the Poster Division at the Council Headquarters. His advice and counsel have certainly been of great help to the committee in arranging the posters for the Metals Section. We have furnished two posters every month for the Section.

To the incoming chairman of this committee, we are turning over all correspondence for the past year in hopes that it may be of some assistance in solving the bulletin problem of our section. We have tried to give you the best that we had.

Our experience this year has been the same as in previous years and that is the obtaining of suggestions from the membership on bulletin material. We have tried through correspondence and visits to obtain bulletin material, but without success. We sincerely hope that the membership during the coming year will take a greater interest in bulletins and furnish the Poster Committee with subject material so that they will be able to furnish timely and instructive bulletins to the membership.

Respectfully submitted,

FRANK H. ROWE, Chairman.

MR. ROWE: I thank everyone for their cooperation during the past year.

CHAIRMAN BENNETT: Someone remarked that in looking over the posters there are a lot which show the committee has been doing some good work.

We have one other officer in the section who may have something to say. Mr. Blank is our engineering representative. Do you have any report to make?

E. F. BLANK (Jones & Laughlin Steel Corporation, Pittsburgh, Pa.): You know, Mr. Chairman, I have no formal report, but for the benefit of the members, to show what the engineering representatives is supposed to do, I might state that this job is just short of a day-long job.

Some of the Engineering Section and the Metals Section members might be interested to know, that at the present time, a research is being conducted under the auspices of the S. A. E. Probably most of you are aware of the fact that there has been no research. There is nothing authentic to show at what temperature chains are best annealed. The research is to be conducted for that purpose to find out what the best temperatures are for the different sizes of chains, steel chains and wrought iron chains. This research will probably be conducted by the Carnegie Institute of Technology in Pittsburgh and we hope, for the next Congress, we will have a very complete report on this subject.

You have attended some of the engineering sessions where chain annealing has been discussed and you are aware that one expert will say that 900 degrees is the proper temperature to anneal a chain, another 1,400, and another 1,700. Our research is to determine, through laboratory tests just what the proper temperature of annealing is and this work is about ready to start.

CHAIRMAN BENNETT: Are there any other persons connected with the committees who desire to make a report or have anything to say at this time? If not, I desire to state, as you have all read your News Letters, the Nominating Committee is composed of Mr. J. M. Woltz, Mr. C. L. Peake and Mr. Ed Culliney, and, that, I think, takes care of the reports of committees of this section. So we can now get into the active part of our program which is scheduled for this morning and

entitled "Inspirational." The Program Committee felt it was a good way to start the session off with a good inspirational talk.

It gives me the greatest pleasure, at this time, to present to you, Mr. Charles R. Hook, Vice-President, American Rolling Mill Company, Middletown, Ohio.

Safety in American Industry

**Charles R. Hook, Vice-President, The American Rolling Mill Company
Middletown, Ohio.**

It is my great pleasure, as well as a very decided privilege, to be again with this group who are doing so much to safeguard life and limb. I asked your chairman whether I might have the privilege of just talking to you. I don't believe you want to listen to a speech. I don't think I have one in my portfolio, nor at my command. However, I do think there are a number of things which we can discuss with mutual helpfulness.

Naturally, I would talk to you particularly with respect to those things which interest management; or should interest management; and my tendency would be to talk at very great length, we are so much interested in the subject. We feel that it is such a very vital problem, with respect to production, on which we could talk for hours.

I would like to pause just a moment to pay my respects and to again present my most sincere congratulations to that fine group of fellows, members of the Association of Iron and Steel Electrical Engineers, who at Milwaukee in 1911, gave birth to this great movement for organized accident prevention.

It seems to me that not a session of the National Safety Congress should go by without someone calling attention of those who have later come in to this great movement, to the fact that that group of far-seeing, fine-visioned men, realizing their responsibility, accepted the opportunity to start a very great work. A tremendous amount of work has been done and most wonderful results have been accomplished for the National Safety Council, and I take my hat off to all those men, past president and officers and workers in this movement, who have brought not only happiness to the home through the safeguarding of the wage earner, but also have brought to industry increased efficiency, economy and reductions in the cost sheet.

Just for a moment may we pause to read a few statistics, simply for the purpose of impressing upon ourselves the importance of this program and the extent to which it has grown.

One in Thirteen Was Injured Seriously

In 1926, for instance, the last available figures, there were 1,725 plants reported in which there were employed 1,221,094 men and 3,933,416,031 hours were worked. With what result? One out of every 13 workers suffered a disabling or lost-time accident. Each accident averaged a loss of 78 actual and computed days and an average of six days was lost for every one of the 1,221,094 men employed. To be accurate, the computed days lost for deaths and permanent disabilities, plus the actual days lost, totaled 7,588,852 or 20,791 work years; and for every 140 non-fatal cases there was a fatality.

Is that not a challenge to the industrial manager of today? Does that not give our industrial leaders an opportunity to assist not only in a very great economic problem but a very great humanitarian problem?

While the reduction in lost-time accidents over the past several years has been very remarkable, yet there is much left to be done. I would like to stop for just a second to call your attention to the dollar side of safety. We can't argue with respect to the

humanitarian aspect of this problem. Nobody would dare get up and question the advisability of carrying on this program of accident prevention; but there may be in our group those who are so busy with their every day problems that they may be termed "hard-boiled," and the more "hard-boiled" they are the more they can be appealed to on the dollar side of safety by an actual presentation of the facts.

In looking over some of the things the other day which were in my accident prevention folder, I ran across a few things which we said several years ago and I was very pleased to find that today we don't have to take a thing back that we said ten years ago.

I have before me a statement made six years ago and I am going to read it, in order to show you that we were thinking with respect to the dollar side of safety at that time and that it is just as outstanding a factor in your program today as it was then. It asks this question:

"Is a billion dollars worth saving? Leaving aside considerations of humanity in industrial accident prevention, let us look at the authenticated fact that, in the United States, industrial accidents cause a direct economic loss of more than one billion dollars each year, and besides this, and just as important, an indirect loss through decreased efficiency and production of several billions more.

"Looked at solely from the standpoint of good business economics, accident prevention is of tremendous importance.

"Not so many years ago accidents were 'all in the day's work.' Employers, executives, foremen and workmen alike took this attitude. Men took pride in their scars and boasted of narrow escapes. In shop, mill, factory and shipyard the man who was not willing to take a chance was looked upon as a coward.

Accidents No Longer An Accepted Evil

"But there came a day when the 'all in the day's work' attitude toward accidents came under the cold, calculating scrutiny of a few men—business executives and engineers—who saw a big opportunity not only to save human life but at the same time to wipe out an enormous economic loss. They analyzed the situation and found that, when accidents were considered an unavoidable part of the day's work, a full day's work was never done. They found also that 75 per cent of the accidents could be prevented, and that often as an incidental result efficiency was increased from 10 to 100 per cent. And so for both economic and humanitarian reasons the old attitude toward accidents was discarded and a new era of safety and efficiency dawned in thousands of progressive industrial organizations, large and small. Today the prevention of accidents has become a most important and an inherent part of the day's work in the modern industrial plant. The day's work now means a day's work.

"Any employer or person in an executive position whose company has had to pay compensation or damages to injured workmen will easily realize the heavy, direct monetary cost of accidents. But there are thousands of executives who have as yet failed to see the deepest and most serious economic significance of the accident problem—the indirect loss of efficiency.

"The greatest economic significance of accidents lies in the fact that every accident is a red flag indicating an inefficiency somewhere. When an accident occurs it means not only the direct loss occasioned by that accident, but it points out the fact that there has been a constant leakage of efficiency, a steady loss of time and money."

We said that six years ago. We repeat it today. There is no question about it. In support of that statement, in 1913 we asked our department of accident prevention to present to the management some facts which would conclusively show that the introduction of some safety device or some improvement in methods made a more safe method and could be actually shown to have been reflected in the cost sheet. I have here in my hand that report. You can see the number of pages. All of those inci-

dents are actual cases which were proved and where it was shown that the introduction of a safeguard or a safer method of operation brought with it increased efficiency and a reduction in cost.

Right at the top, let's read one just to show the kind of things that take place. Open-hearth tap holes are burnt out with an oxygen flame. This was in March, 1923. Many explosions have occurred in the use of oxygen. One of the latest reported was in our Columbus plant where a man's hand was fractured.

The safety and maintenance department undertook to make the operation safe and did so. Incidentally, they reduced the amount of oxygen used so that now one bottle does the work of three. As about 125 bottles per month were used, this has been reduced to between 40 and 45. The saving is quite an item.

Safety, Increased Efficiency and Lowered Costs

I could go on and read you case after case showing that with the introduction of accident prevention methods and equipment along with it went increased efficiency and reduction in cost. Just as a matter of illustration, anybody that gets up today and talks about accident prevention and what can be accomplished, must have before him the actual facts. So, if you will pardon a reference to our own records, I will present a few, simply as an illustration of what can be accomplished when those who are interested in the program get behind it wholeheartedly.

At Middletown, in 1916, we had 880 lost-time accidents in the year with 3,500 men employed. In 1920 that had been reduced to 108 with 4,200 men employed; and in 1926 it has been reduced to 75 with 3,830 men employed.

In 1922, on the first of January, we took over a new plant at Ashland, Kentucky. I remember very well that after we had had the plant for some six months, in August of that year, we had 34 lost-time accidents. We had started a program of accident prevention, of course, but it was in full sway; by the following February, with a very large increase in number of men employed and increase in tonnage, the lost-time accidents had been reduced to four.

At our Columbus blast furnace in 1923, we had 50 major accidents or lost-time accidents; in 1925, 20; in 1926, 9, and so far this year they have gone the entire year to date (September 27, 1927) without a lost-time accident in that blast furnace plant.

I don't need the accounting department to bring me a cost sheet to know that money was saved, as well as earnings to those who were employed in that plant. It is self-evident. The very fact that a blast furnace plant can run so far, say over almost nine months, without a lost-time accident is evidence of increased efficiency and of savings in dollars and cents.

Accident Prevention Calls for Intensive Effort

Now, what does it mean? A tremendous amount of work, naturally, has to be done. Everybody from top to bottom must be interested in the program if it is going to be successful. The same thing has happened in all of our other plants and I won't bore you with further details with the exception of calling to your attention a plant which we have just taken over as of August first, at Butler, Pa.

When we got hold of their records, Mr. Adair found that they had 108 major accidents in the first six months, or at the rate of 216 for the year, in a plant employing approximately 1,000 men. Now, they had a safety organization there, supposedly, but what was lacking? There was spirit lacking. But now there is determination from top to bottom to get behind the movement and work constructively all the way along the line and if we don't reduce that frequency rate up there by two-thirds in the year 1928, I'll be very much disappointed indeed and there will be a conference probably in the general management's office some time in January of '29, so we will know why.

Take a situation such as this. Here's an electrical construction gang that for ten years has gone without a lost-time accident. Do you mean to tell me that we are not saving money, as well as wages to those who are employed?

Such examples simply give us courage to go on and to fight for further interest and further accomplishment. And how are we going to do it? It seems to me that we have got to start it off. I don't see how we can expect those who are interested in our program of accident-prevention out in the plant to put forth their best efforts unless they know that their general management is sincerely interested and behind them; and I want to say to you executive officers of companies who are here today, that I don't think you can hold your departments organized for accident prevention responsible for improvement in that program unless you show, by personal interest, that you are backing that program and that you are interested in it—and I don't mean to show that interest second-handed.

The Influence of Executive Interest

You know that you have an entirely different appreciation of an automobile, no matter how new it is, if it is second-hand. If somebody were to hand you a brand new car that had never been run, had never been owned by anybody else, that is one thing. But if the car has been run only four or five miles and then it is brought to you as a second-hand car, you have a different appreciation of it. I think the same thing happens in the plant when the interest of the major executives is handed down through others. I think that an entirely different spirit is engendered when the head of the institution makes his personal appearance at various times and tells the organization personally that he is behind this program. Then they know it. When you meet a man face to face and you look in his eyes and he tells you, "I am behind this thing, I believe in it and I am going to support it," then you know that that is a fact; but if he writes it to you, or if he sends somebody to tell you, there is always just a little doubt about it.

Now, last year our president made a swing around the circle of our various plants, discussing with the organization policy problems of various kinds and at least half of his talk at every one of these sessions was devoted to the subject of accident prevention. I wonder how many of you executives take the opportunity when you hear of some particularly good work in some department to pick up the telephone and call up Bill Jones and say, "Bill, this is Mr. Greene"—and immediately Bill picks up his ears. "Why, the general manager is talking to me; or "The president is talking to me, I wonder what he has got to say?" And when he hears on the other end, "Why, Bill, that was a remarkably fine record you made last week; we are tremendously pleased with the action you are taking in the accident prevention program. We want you to know the general management knows about it and we are watching your actions and you are being given proper credit back in the general office." Why, can't you just feel the spirit of enthusiasm warming the whole frame of that individual? I think so.

The Executive Should See the Accident Record

I wonder whether we executives have a program so that the monthly accident record of our plants comes across our desks and if we haven't time ourselves to analyze it carefully to pick out the high spots, do we have somebody perform that job for us and bring it to us boiled down. If we don't, we are losing a great opportunity and are passing up an obligation. At home we take a great deal of interest in this monthly report which shows the standing of the various departments, and our secretaries are instructed to go through that report and if there is some high spot, point it out so that we may have the privilege—I say privilege—and the

opportunity of getting in touch with this, that or the other department, or the head of that department, and let them know that we appreciate that record.

In 1920, it was my privilege to discuss accident prevention work before a conference of the Illinois Manufacturers' Association in this city; and I took as my subject, "Accident Prevention Work and the College Spirit in the Plant." Now, I never went to college; unfortunately I have had to spend a good many hours at night in hard work, trying to accumulate some of the information which I would have otherwise gotten had I had the privilege of going to college; but I have stood on the side lines and I have seen exhibited that thing which we call "college spirit," which we can't describe but which we can feel, that thing which makes fellows go into the game and risk life and limb for the old school. I know that this same spirit can be put into the plant. That same love of the institution can be engendered if we go about it properly. But all those of us who are members of the institution must be playing the game together.

Have we an organization, or have we a team? I can put Babe Ruth and Ty Cobb and Tris Speaker in the outfield and Py Trainor on third and Bancroft at short and somebody else at second and another fellow at first and a star pitcher in the box and the best man behind the bag, and I have got an organization; but I haven't got a team necessarily. Now, what is it with games? It is not only ability but it is the coordination of that ability. It is the spirit possibility and coordination; that is what we have got to have in this program of accident prevention, and it requires that management take advantage of every opportunity it has to show its interest.

Take a Real Personal Interest in Safety

Do we occasionally attend conferences of superintendents and foremen? Maybe they are going to have a banquet. Do we just drop in and say we'd like to attend that meeting to show our interest—not especially invited? Do we take the opportunity to drop in and do those things voluntarily which will impress our interest upon the minds of those who are carrying on this work? If we don't we should. No question about that.

Well, you know there are a lot of men, it seems to me, who go through life with a viewpoint with respect to this movement and are represented somewhat by a mule I heard about one time. A fellow sold a mule to another fellow and the next day the fellow came back with the mule. He said: "I want my money back." The other fellow said: "Why, what do you want your money back for." He said: "Why, you cheated me." The other fellow said: "No, I didn't cheat you." "Yes, you did." "Why I didn't any such thing; that mule is right. I sold you a good mule." "No he isn't. He is blind. I took him home yesterday afternoon, unhitched him, let him loose in the barnyard, and the darn fool walked right over and butted his head into a tree. I want my money back." He said: "My friend that mule is all right, he isn't blind, he just don't give a damn."

Now, there are a good many people just the same way, they are not blind, they just don't give a damn. It is time they were waking up.

I could go on indefinitely pointing out things which the management can do and should do. I am absolutely convinced that the inspiration must come from the top. But in conclusion, may I say a few words to you men who are responsible for the daily carrying out of the work in connection with this program? Are you selling yourself to the boss? What are you doing to make the boss interested in this program? Are you taking advantage of opportunity to send him information about this and the other thing that might awaken a latent interest? If you are not doing it, you are falling down on the job. Are you taking the position that, "Well, darn it, I told him about a particularly fine record in a certain department two months

ago and I didn't get any comeback at all." "Oh, Hell, he isn't interested. What's the use?" Believe me, gentlemen, you men have a job that requires great enthusiasm. I say courage, unusual courage. You have to get into the thick of the fight, with the possibility of getting darn little credit for what you do. You have got to be in love with your work and see a great opportunity; and in order to put the program over, you have got to study the boss just like the boss is supposed to study organization. And you have got to be a darn good salesman. You have got to know how to sell your wares to the boss. Stop and think about it.

Sometimes you will say, "Well, how will I get at that bird?" Have you ever done that? You seem discouraged and don't think there is much chance. Do you give up? Do you quit? If you do, you're not the man for the job. No. You will never get any place that way. You have got to keep at it.

Edgar Guest Put the Thing Forcefully

It seems to me that Eddie Guest (I think it was Eddie), wrote a little poem that rather illustrates the point I would like to make:

When things go wrong, as they sometimes will,
And you want to smile, but you have to sigh;
When the funds are low and the debts are high,
When the road you're trudging seems all uphill;
When care is pressing you down a bit—
Rest if you must, but don't quit.

Life is queer with its twists and turns,
As everyone of us sometime learns;
And many a failure turns about
When he might have won, had he stuck it out.
Don't give up, though the pace seems slow—
You may succeed with another blow.

Often the goal is nearer than
It seems to faint and faltering man;
Often the struggle has been given up,
The runner has lost the Victor's cup,
And he learned too late, when the light was down,
How close he was to the golden crown.

Success is failure turned inside out—
The silver tint of the clouds of doubt,
And you can never tell how close you are;
It may be near when it seems so far.
So stick to the fight when you're hardest hit—
It's when things seem worst that you must not quit.

Do you have an opportunity, in your position as supervisor of this program of "Accident Prevention," to exhibit qualifications? I'll say you do. You have to exhibit real qualities of leadership and executive management if you're going to put your program over. What makes me think so? Let me give you two illustrations that have happened within the last five years in our own organization.

In January, 1922, we took over a plant, the physical assets of which, at the present moment, are valued at about \$25,000,000. It was necessary to appoint a works manager over that particular division. Now, I presume that like a good many others, you may think that we naturally would pick out a department operating

superintendent. You wouldn't think of anybody else. Who got the job? Why, the director of employment, a staff man, back in the general office. Why? Well, he had been a department superintendent at one time before he was appointed a staff director of employment, and in his contact with the departments in trying to find out how and where to get the man who would best fit in this, that and the other job, thereby assisting the general management, he had picked up a tremendous amount of information with respect to the operation of several of the departments. He hadn't been idle. He studied the processes because, in order to fit men to that particular process, he had to show what kind of a man was needed; and how would he know what kind of a man was needed unless he understood the process?

So he was taken out of the personal service division and made works manager of that very important production division.

A Safety Man Is Often a Good Manager

Recently, we acquired properties of three companies, with something over 15 million dollars involved in the plant values alone. It was necessary again to place a man in charge of the works, a vice-president in charge of operations of this new holding. Whom did we pick? Why, we picked Mr. Lewis, who was the director of the personal service division, under which operates our accident prevention staff division, the employment mutual interest, health and so forth. Again a man who by his wide contact with all the departments, knowledge of company policies, company methods, could best represent the general management in general charge of operations.

Is there an opportunity for you men who seem to be at times stuck to some one place? I'll say there is a tremendous opportunity if you make the most of these chances as they come to you. I offer it to you as an encouragement, as an incentive, as safety men, accident prevention men, that while you are studying ways and means of improving your accident prevention record, to be most successful, you must understand the processes of the several departments. What are you trying to accomplish? What are the production problems?

Then you can truly act in an advisory capacity in a way to secure the wholehearted support, not only of the production managers, but of the general management who are back in the general office watching the general results.

I want to call your attention to one characteristic which seems to me tremendously important, and that is the characteristic of diplomacy. May I illustrate that by telling you something that happened several months ago that I happened to know of.

A Gentle Hint to the Company President

The president of a corporation who handled a hundred million dollars, dropped into the plant. His mind was on many things, no doubt, and he was taking some visitors through a mill. He drove rapidly across the track. He didn't know there was an engine approaching, his mind was on a thousand and one things, and I am told that the engine came pretty near hitting him. It didn't miss him very far. It put on the brakes and stopped. The engineer was on his job. Now, he knew it wouldn't do for him to go up and call the president down. In fact, he didn't know the president was in the car until after he stopped his engine and followed that car and they got the description and the license number as the occupants got out and went into the mill, and then they saw who occupied the car. But they made their report just the same and when that report came to the general manager it was very clearly worded. It said that at a certain time and place a car occupied by two gentlemen and three ladies passed over the track and was almost hit by a locomotive. A complete description of the near-accident was contained in the report without reference to the names of the occupants. I say, that was a

rather delicate way of having the information passed on to the chief executive of the company without hurting his feelings particularly, but yet getting the news there.

There are many times when, in order to win the support of those whose support is very greatly needed, you can follow these characteristics of diplomacy. They are very necessary, indeed, and while it is true that an individual ought to be interested in this thing which you are so much interested in, yet you must realize that it takes a long time to sell some men on this ideal. Some of them still think that it is a sort of frill, a sort of welfare work. Gentlemen, I hate that name. It don't like to hear the word "welfare." We never use it in our organization. It isn't welfare work. This is a great economic problem that you are working with and you are cutting the costs and increasing the efficiency of industry as you reduce your lost-time accidents—whether they are lost-time or not, I may add.

The Compensation for the Safety Worker

Now, in conclusion, what is your compensation? Lots of times I assume that you get very discouraged and say, "Oh, well, what's the use? Where am I going? Where am I getting?" and it seems to me that to do your best work you must get your greatest reward from knowledge of the greater service which you are performing. Unless we go about this proposition in that way and then take those financial rewards when they come to us, why we are apt to lose heart. And I say to you very sincerely, that when I think of the work that you men are doing unto the thousands and thousands of children who today are happy and who have the guidance, help and support of a dad who would have been lost to them without your devotion to this great program, I think of Edward Guest's poem, in which he refers to the children as the burden bearers; and I offer it to you as sincere evidence of my feeling that, regardless of what compensation you may receive, you must secure a tremendous amount of comfort in the knowledge that you are contributing so much to the happiness of thousands of children who would otherwise be in sorrow:

The children bring us laughter, and the children bring us tears;
They string our joys, like jewels bright, upon the thread of years;
They bring the bitterest cares we know, their mother's sharpest pain,
Then smile our world to loveliness, like sunshine after rain.

For children are the furnace fires of life kept blazing high;
For children, on the battle fields, are soldiers pleased to die;
In every place where humans toil, in every dream and plan,
The laughter of the children shapes the destiny of man.

Oh, my shoulders grow aweary of the burdens I am bearin',
And I grumble when I'm footsore at the rough road I am farin',
But I strap my knapsack tighter till I feel the leather bind me,
And I'm glad to bear the burdens for the ones who come behind me.
It's for them that I am plodding, for the children coming after;
I would strew their path with roses and would fill their days with laughter.

CHAIRMAN BENNETT: Mr. Hook, we all appreciate very much the excellent inspirational address which you have given us and I am sure that it is going to do a lot of good. We have made no mistakes in calling this session "Inspirational," but at the same time it is quite practical and there is a lot of good we can take home with us.

Mr. Chauncey L. Baker desires to make an announcement.

CHAUNCEY L. BAKER (Association of Iron and Steel Electrical Engineers): I am glad that I have been called on at this minute. The "Inspirational" talk by Mr. Hook was certainly a pleasure to all this morning. I don't know when I have heard anything that was more impressive.

I'm always glad of the opportunity to say just a word of encouragement to the men at the head of the safety work in the iron, steel and metal industries. I do want to bring to you this morning officially from the Association of Iron and Steel Electrical Engineers, their good wishes for a successful meeting. Those fellows back in our engineering association are always greatly interested in the success, particularly of the Metals Section of the National Safety Council; and I want to assure this section that they will, this coming year, as in the past, have the hearty cooperation of the electrical engineers throughout the iron and steel industry of this country.

The steel industry has always been, and I firmly believe always will be, the leader in accident prevention.

CHAIRMAN BENNETT: Thank you very much, Mr. Baker. I am sure that we all appreciate this greeting.

In arranging our program, the thought has been before the section for several years, that it would be beneficial to know the up-to-the-minute news of the metal industry throughout the country in relation to accidents. We do get wonderful reports from the United States Department of Labor, but it has been quite a favor, quite a contribution, to the metals industry throughout the United States to have at our annual meeting each year a person who does get up these statistics and give them to us almost up-to-the-minute. So it gives me great pleasure to bring before this section this morning Dr. Lucian W. Chaney, of the United States Bureau of Labor Statistics, who will give us the record of progress in metal industries practically up-to-date.

The Record of Progress in the Metal Industries

Dr. Lucian W. Chaney, U. S. Bureau of Labor Statistics, Washington, D. C.

The program makers have slightly enlarged the original title of this paper. It is unfortunate that we do not have precise figures regarding all branches of the Metal Industries and so must confine our presentation to that portion comprised under the designation "iron and steel."

There has been much recent discussion regarding the supposed increase in accidents which has apparently occurred in recent years. There can be no doubt that accident *costs* have been rising so far as the insurance companies are concerned. That this rising cost is to be attributed to increasing hazard is by no means clear. There are a number of other factors which may be of importance in bringing about advancing costs.

The assertion in many quarters that "accidents are increasing" makes of particular interest any bit of positive evidence which may be found in the records of accident experience.

Since 1913 the U. S. Bureau of Labor Statistics has been following a selected group of plants in the iron and steel industry which have given serious and vigorous attention to their accident problems. These plants were pioneers in safety activities and have maintained a leading position to the present time.

The records were in such form as to make possible their consideration from two important points of view. First, the accidents could be classified in accordance with the product which the plants produced. Second, the accidents were

classifiable by causes. Each of these classifications is important in forming a judgment regarding the course of accident experience.

Attention will first be given to the changes which have occurred in this group of plants during the years 1925 and 1926.

The frequency rates for the different product groups for these years are as follows: fabricated products change from 27.4 to 24.3; sheets from 11.4 to 9.4; wire products from 4.2 to 3.9; tubes from 4.0 to 3.6; miscellaneous steel products, Group A, from 9.8 to 6.6; Group B from 3.7 to 3.8; the entire group from 8.2 to 6.8.

The Spread of Frequency Rates Over the Years

It will be noted that in only a single instance is the 1926 rate higher than the 1925. The difference is so slight as to be without material significance.

It is desirable to consider this matter from another point of view. Records of accident frequency have been maintained for the plants under consideration since 1913. It will be instructive to consider the spread of the frequency rates over the years from 1913 to 1926. The changes of rate over this period are as follows: fabricated products from 100.3 to 24.3, 75 per cent; sheets from 61.6 to 9.4, 85 per cent; wire products 59.3 to 3.9, 93 per cent; tubes from 27.2 to 3.6, 87 per cent; steel, Group A, from 70.9 to 6.6, 77 per cent; Group B, 41.3 to 3.8, 91 per cent; all plants, 60.3 to 6.8, 89 per cent. These figures are of interest since they represent the results attainable by prolonged and unremitting effort. Since the selected plants constitute between one-third and one-half of the industry and have in 1926 a rate of 6.8 and the rate for the entire industry is 25.3, the other portion of the industry not included in this special group must have a rate not far from 35.

It is now pertinent to consider this body of data from the standpoint of accident causes.

The changes which have occurred from 1913 to 1926 are as follows: machinery from 7.3 to 1.5, power vehicles from 2.3 to .3, hot substances from 5.4 to .5, falls of person from 4.5 to 1.0, falling material 1.2 to .1; handling 26.7 to 2.9, miscellaneous 12.9 to .4.

It must be remembered that these rates represent the experience of plants which have all the different phases of iron and steel manufacture.

It is noticeable that these declines are distributed over the various causes in a very even manner. This indicates that the influences by which the declines have been brought about have been very pervasive. The various causes have been modified to a strikingly uniform degree.

The rates show that machinery is still a considerable factor in accident causation.

Educational Effort Vs. Safeguarding

There has been from the beginning more or less controversy regarding the relative importance of safeguarding and educational effort. This discussion is rather futile. It does not matter very much which form of effort is of greater efficacy since the safety director who neglects either of them will fail to accomplish all that ought to be accomplished.

It remains true that the accidents arising in connection with the operation of machinery average of greater severity than those due to other causes. For this reason such accidents should receive a liberal share of attention.

The above gives an idea of the course of events in those plants which have for the longest time and in the most painstaking manner carried on in accident prevention.

To complete the picture it is necessary to consider the average experience of the industry. Such results as those recorded in the preceding paragraphs are perfectly attainable by all plants which are ready to invest time, effort and money with the same degree of liberality. It cannot be expected that those who have more recently undertaken accident prevention will immediately be able to show such results. It is fair, however, to urge that the average experience of the industry is a reasonable standard of attainment.

A steady effort on the part of all concerned will as steadily advance the standard with a constantly lessened spread until that time which is now fairly in view when the occurrence of industrial accident shall be as surprising as its absence now is.

The Average Experience of Iron and Steel

Beginning with 1910 the Bureau of Labor Statistics has been able, by your cooperation, to maintain a fairly complete record of accident occurrence in iron and steel.

For each of the five-year periods included in this interval the frequency and severity rates have been computed and give a better idea of what has happened than do the annual figures. It is to be understood that these figures are not complete but do represent a sufficiently large majority of the plants to give reliable rates.

The Industry

The industry shows frequency rates 1910-1914, 59.2; 1915-1919, 41.6; 1920-1924, 32.6. Severity rates 1910-1914, 4.1; 1915-1919, 3.6; 1920-1924, 2.8.

The year 1925 registers a slight decline in both frequency and severity, while 1926 showed a further decline in frequency but a slight rise in severity.

Blast Furnaces

Blast furnaces frequency rates 1910-1914, 62.3; 1915-1919, 39.0; 1920-1924, 30.7. Severity rates 1910-1914, 7.8; 1915-1919, 6.1; 1920-1924, 4.5.

In 1925 both rates show further decline while 1926 registers a rise in both rates.

Open Heards

Frequency rates 1910-1914, 73.0; 1915-1919, 50.3; 1920-1924, 32.9. Severity rates 1910-1914, 6.6; 1915-1919, 6.5; 1920-1924, 4.2.

In 1925 there is decline in both rates and in 1926 frequency declines while severity has a rather pronounced rise.

Foundries

Frequency rates 1910-1914, 63.6; 1915-1919, 61.0; 1920-1924, 62.7. Severity rates 1910-1914, 3.6; 1915-1919, 3.4; 1920-1924, 2.8.

In 1925 both rates rise somewhat and in 1926 again decline.

On the whole, foundries are disappointing in that no substantial decline in the rates has occurred since 1907. The frequency rates, which reflect the condition in minor injury, are high as compared with other naturally more hazardous departments. That this is not necessary is demonstrated by the experience of some important foundry organizations which show satisfactory reductions.

Heavy Rolling

Frequency rates 1910-1914, 46.1; 1915-1919, 32.4; 1920-1924, 21.2. Severity rates 1910-1914, 3.6, 1915-1919, 3.9, 1920-1924, 2.8.

In 1925 frequency again declined but severity slightly rose. In 1926 both rates declined.

Tube Mills

Frequency rates 1910-1914, 40.5; 1915-1919, 22.4; 1920-1924, 22.7. Severity rates 1910-1914, 2.2; 1915-1919, 1.8; 1920-1924, 1.9.

In 1925 both rates declined. In 1926 both rates again declined.

The tube mills show somewhat irregular changes but with a pronounced downward trend.

Fabricating Shops

Frequency rates 1910-1914, 79.9; 1915-1919, 55.2; 1920-1924, 52.7. Severity rates 1910-1914, 3.4; 1915-1919, 2.6; 1920-1924, 2.4.

In 1925 both frequency and severity declined while in 1926 a further decline in frequency was accompanied by a rising severity.

These shops deal with large beams and other fabricated structures which require the use of cranes and hoists. There is always a considerable degree of hazard in the operation of such apparatus so that the results which have been attained are distinctly creditable.

Wire Drawing

Frequency rates 1910-1914, 65.7; 1915-1919, 45.8; 1920-1924, 24.0. Severity rates 1910-1914, 3.2; 1915-1919, 2.6; 1920-1924, 2.3.

In 1925 there was a slight rise in frequency but severity declined. In 1926 both rates declined.

Wire Drawing Severity Rates Are High

Wire drawing is peculiar in that its severity rates for permanent disability are and always have been higher than those for death. This is largely due to the hazard of being entangled in the wire as it is drawn toward the block. A hand so caught is exceedingly liable to be taken off. The rates for permanent disability for the three 5-year periods are 1.9, 1.6, 1.5, reflecting undoubtedly an improved condition due to the replacement of older types of apparatus with newer and safer types.

Electrical Department

Frequency rates 1910-1914, 47.1; 1915-1919, 40.3; 1920-1924, 20.5. Severity rates 1910-1914, 6.3; 1915-1919, 7.2; 1920-1924, 3.0.

In 1925 both rates declined and a further decline took place in 1926.

The high but declining severity in this department is related on the one hand to the danger always present in dealing with electricity and on the other to many improvements in method and equipment which have been made in recent years.

Mechanical Department

Frequency rates 1910-1914, 62.7; 1915-1919, 41.3; 1920-1924, 23.7. Severity rates 1910-1914, 4.0; 1915-1919, 3.5; 1920-1924, 2.8.

In the year 1925 both rates declined. In 1926 frequency increased slightly and severity declined.

Yards

Frequency rates 1910-1914, 50.8; 1915-1919, 37.5; 1920-1924, 24.4. Severity rates 1910-1914, 6.0; 1915-1919, 6.1; 1920-1924, 4.1.

In 1925 both rates increased and in 1926 both declined.

Severity rates in this department are almost as serious as in the blast furnace which is readily recognized as a place of danger. The same difficulty is encountered in the internal transportation of plants which is now being met on our streets and highways and in railway service. The power-driven vehicle

is everywhere a menace. The experience of the yards indicates that however difficult the problem of safeguarding the situation it is not entirely hopeless.

Erection of Structural Steel

Frequency rates 1910-1914, 121.7; 1915-1919, 107.2; 1920-1924, 97.5. Severity rates 1910-1914, 31.4; 1915-1919, 22.3; 1920-1924, 19.9.

In 1925 both rates declined and in 1926 both rose.

The group of steel erectors which it has been possible to follow since 1912 is so small that positive conclusions must be drawn with great caution. However, the results are so uniform as to indicate clearly that this is a very hazardous occupation, probably the most hazardous in which man engages. The indications thus far are that the hazard has lessened only slightly in the course of time.

Two Noteworthy Points of Deduction

It has been necessary in presenting this picture to use a somewhat confusing array of figures but there emerges from them a clear demonstration of two points. (1) The iron and steel industry has accomplished noteworthy results in accident prevention. (2) While the rate of progress has slowed down considerably there is still possibility of further progress.

CHAIRMAN BENNETT: I know we have time yet for some discussion on both of these subjects. I think it is quite fortunate that both sort of tie-up, Mr. Hooks' address and also Dr. Chaney's report.

To open this discussion, I am going to ask the gentlemen present just to give their ideas on the general thought that has been brought out and I am going to call on Mr. Morey, general manager, Commonwealth Steel Company, to give a little summary.

A. T. Morey (Commonwealth Steel Co., Granite City, Ill.): I think Mr. Hook presented the right idea from the standpoint of management and also from the standpoint of a safety matter. He brought out the humanitarian side and also the dollar side. When we started safety work at the Commonwealth Steel Company, our compensation rate was two and one-sixteenth per cent. Mr. Quesnel has advised me that our rate for the first six months of this year is one per cent. That is a tremendous difference, and when that is translated into the difference in the happiness of little children and of the home it really means something.

I am mindful of a story I remember reading in my primer at school about Julius Brand. He was an optimist, who was seeking to learn how to transmute base metals into gold, and in the process of experiment he discovered phosphorous and was really the one who gave us the idea of the match. But I don't know of any more wonderful alchemy than the transmutation of accidents into the beautiful activities of this modern industrial program.

The Advantage Went to the Fellowship Department

While we have made a tremendous saving, that hasn't gone to our stockholders, but has gone to take care of the expense of what we call our "fellowship department." I don't like the word "welfare" either, so we thought the word "fellowship" would be warmer and mean more, and we now have a wonderful school. We have had an apprentice school for many years. It commenced with mechanical drawing and by adding history and English and physics and a few other things, we put on an actual high school program in our plant for the boys who had to leave school to go to work; and last year we had over 90 boys taking this high school course. Sixteen graduated and they were given the diploma from the Uptown High School platform along with the others boys and girls from the local high school.

Some of the men had to quit school in the sixth grade and asked if they couldn't have some help to get up to the eighth, so they could take this high school work. So last year we had 16 in the night class and the superintendent of instruction at Granite City, where our plant is part of the St. Louis industrial district, had a little dinner one night and presented eight diplomas to these men who finished the eighth grade course, and this year they can take the high school course.

It has been this transmutation in the loss and waste of industrial accidents that is an alchemy far finer, I think, than old Julius Brand tried to discover.

I am somewhat concerned with Dr. Chaney's figures with regard to ourselves as a steel foundry. I felt some comfort when he said that there were individual plants which had shown progress. I do think we have. However, I hope I am not partial. I like Dr. Chaney's thought that among hazards the steel foundry is not greater than the hazard of the rolling mill.

In our plant we have some 26 overhead cranes. There is a great deal of material moving overhead. A steel foundry is not quite so amenable to the constructive processes that the rolls permit. I really don't know for sure. What do you think, Dr. Chaney? Does this mean less hazard in the foundries or have they a more hazardous problem?

DR. CHANEY: It is probably not more hazardous than the blast furnace. Let me say, if I am permitted, that the Commonwealth Steel Company belongs to the progressive class. Let us admit, however, foundry men, that the problem is greater.

MR. MOREY: Doesn't that call, as Mr. Hook said, for a greater challenge to a greater hazard? Doesn't it simply mean, the finer the organization, the more intensive the study of accident prevention?

We have divided our plant into 35 divisions for safety purposes. It is very evident that the laboratory has less of a problem than the foundry and there was some little feeling that credits were not being given out wisely. Here is a superintendent who has a tremendously hazardous problem, and this other man hasn't; when the figures are read out of the record pattern book, for instance, for a small number of lost-time accidents, he feels it isn't a rightful comparison.

Long Records in Accident Prevention

The pipe fitters' squad has gone over four years without a lost-time accident. During that period they put up 62 miles, placed end to end, of steam pipes and now have the entire plant steam heated.

The wood pattern shop has gone two years without a single lost-time accident; and the whole shop has gone one year without a lost-time accident.

When these instances were read, these men said we were hardly fair, because their problems were greater. So we thought about it and we have come to this conclusion. When the problem is greater it calls for more intelligent supervising, planning, thinking about the problems and taking them by units. We came to the conclusion that there was no difference. Just because a group was smaller, that was no reason why a larger group should have more accidents. The larger groups had to be divided into units; and getting down to the unit idea, we felt the credit should be confined to the units, and I think we have met that condition in that way.

When a man says he has 200 men and another fellow says he has only 20, all right, divide your 200 into so many units of 20 each and then get your organizing ability to work. I think we can meet that problem in that manner.

Isn't it a wonderful movement to be connected with? Can't we be happy? I was one of that number in 1912 in Milwaukee, when the Iron and Steel Electrical Engineers under Mr. Palmer gave us that invitation for a safety section, and we met and organized a council. What a wonderful thing it is and I am surely thankful from the bottom of my heart for all the splendid cooperation and that we have been participants in this marvelous and gratifying work. I congratulate you.

CHAIRMAN BENNETT: The meeting is now open for discussion. We have considerable time left and I know that Dr. Chaney will be glad to answer any questions and also Mr. Hook. I am also glad that Mr. Morey mentioned foundries. I happen to represent a foundry myself. I was rather uncomfortable sitting over here.

JOHN A. OARTEL (Carnegie Steel Co., Pittsburgh, Pa.): I rise in the capacity of an old timer who has worked in the mills and has seen a very remarkable change. I have seen changes in processes, mechanical, electrical and chemical.

Last June it was my privilege and very great pleasure to stand in the motor room in our Homestead Plant in a crowd of a thousand men from the Association of Iron and Steel Electrical Engineers. They stood there expectant and waiting because the late Judge Gary, down in New York City, had been asked to pass his hand over a contrivance that would start that mill, and we saw the motor begin to turn. That was an event in a lifetime, to see a thing like that.

A Bigger and Better Change Came with Safety

That is just one of the changes that have come into our steel mill. Yet there is a bigger and a better change which has come with safety, and safety has helped to bring it—a better feeling, better production, as Mr. Hook says.

Six or eight months ago, it was my privilege to eat lunch at a Rotary Club with the superintendent of a large industrial railroad that brings in the ore, coke and limestone for a large group of steel mills in Pittsburgh, and they had been doing some mighty fine safety work recently. I got the superintendent of this railroad to talk about safety. He said, "Do you know, since this railroad of mine has been doing so much fine safety work, there is a better feeling all around? We are moving more cars since we have been doing such fine safety work."

So, when Mr. Hook says that it is a good thing all around, I want to add my testimony to that.

I want to welcome Mr. Hook and his American Rolling Mills. We need them and we are sure they have this mighty mind and spirit and that we are going to have better safety in Western Pennsylvania, and we are pretty much up to date in safety there now.

The Foundry Superintendent Also Got Busy

N. W. BRADFIELD (Industrial Works, Bay City, Mich.): I don't believe the foundry offers a problem that we can stop. Up at our plant we had the same condition. All other units seemed to be entirely satisfactory but the problem was something that I couldn't handle. I solicited the aid of the plant superintendent and of the managers. The matter of the foundry came up. The foundry superintendent was called to his office and was told, "Every other unit in this plant is entirely satisfactory. The foundry is not. It appears that you lack entirely the ability to take hold of this lost-time accident situation and I want you to do better. I want you to go for a month without a lost-time accident." He went over that month and for several months, and from that time on we haven't had a lost-time accident. I think the foundry problem is just due to lack of interest on the part of the foundry men to take hold of the different parts of the plan.

G. H. McCLAIN (Jones & Laughlin Steel Co., Pittsburgh, Pa.): Since our meeting is turning into a bit of an experience meeting, I want to say that Mr. Hook said something that I have been trying to find expression for for a long time. That is the introduction of that idea of the college spirit in the plant. If he has any doubt about whether or not his little trip up here has been a success, I would like to assure him that it has, because I am one of those safety engineers that he has been talking about and talking to this morning. I received a great inspiration from what he said.

In our jobs, we have a few knock-downs, and we get defeated now and then; and we get into a little narrow place and forget about the other fellow. There is a tendency to go back and lose heart.

You know we have to go to church every now and then in order to keep our religious level up to where our chances will be pretty good on the last great call. It seems to be a sort of habit with us and if we don't go for a long time because we have had too much Sunday work (I'm speaking of the steel men now exclusively), then it is all the easier to keep on staying away from church, and perhaps that is why our morals are not quite up to snuff.

Now, when we come to these meetings and hear such things as Mr. Hook and Mr. Morey have given us this morning, why we go back all rejuvenated; and we are just boiling over and ready to deal with any emergency that arises. I would like to say that I appreciate very much everything which Mr. Hook said and he was talking directly to me. If there had been no one else in the hall but him and me, his speech would have been a success.

CHAIRMAN BENNETT: I remember Mr. Bush, our president, one time saying that there is never a talk or argument but what someone gets good out of it. I know Mr. Hook was talking to me and a lot of us fellows this morning.

The Backbone of Safety Lies with the Executives

J. A. VOSS (Central Alloy Steel Corporation, Massillon, Ohio): We have heard some wonderful expressions this morning from executives along the lines of safety. Every safety man will agree that the backbone of the safety movement starts in the executive offices. We all know that. We know that if our executives back us up, we are going to get real results.

I think that before we adjourn we should pay, as safety men, our tribute to the executives who have made this safety work so successful; and I suggest that we do a rising vote of thanks to all these executives.

(A rising vote of thanks was extended to the executives.)

FRANK LAMB (Industrial Commission of Columbus, Ohio): I think that was a splendid tribute to Mr. Hook and Mr. Morey and these other executives, who have all contributed to better life in our American industry; and I feel that the meeting would not be complete if the same tribute were not rendered to another who has contributed so nobly and so well to advancement of safety in the iron and steel industry. I refer to Dr. Chaney; and I would like to make a motion that this meeting, by a standing vote, approve and thank Dr. Chaney for the wonderful work he has done in building up accident prevention and helping to make a safer iron and steel industry.

(The motion was seconded and a rising vote was extended to Dr. Chaney.)

CHAIRMAN BENNETT: I know we would like to hear just a few words from one of the men who had a lot to do with this success and we are glad to have him here. He is Mr. Tom McKenney.

T. H. MCKENNEY (Illinois Steel Co., Chicago, Ill.): Unfortunately, I was unable to get here early today. That is one of the disadvantages of holding a convention in your home town. Everybody tries to hook you at the time you want to be away.

I didn't hear the address of Mr. Hook and only got the latter part of Dr. Chaney's, but I have had the privilege of listening to them on a few occasions and whatever they said I know was all right.

I don't know that I have a great deal to say, when they call the foundry the most hazardous occupation. When we first started into safety movement, all departments were the most hazardous. The open hearth with its high accidents was the

most hazardous. The blast furnace was the most hazardous. There is no such thing in safety work today as the most hazardous.

I believe one of the speakers brought out the point that if you have a hazardous department you have got to put a little more work in there and bring it out. I don't think we should allow anybody to bring up an excuse and say, "I have the most hazardous work."

CHARLES W. HANKO (Pittsburgh Steel Co., Monessen, Pa.): Before my present connection, I was with the Department of Labor and I used to get into quite a number of the foundries in that district and I found it the same as in every other industry; wherever there wasn't a concentrated effort put onto safety, the records were not so good. I think the trouble with the foundry today is that there are too many men of the old school who are not so interested in safety as they are in production, and the result is that there are more accidents occurring in the foundry.

The Plant With a Bad Accident Record

I recall one plant in particular where their accident record was rather bad, and I talked to their superintendent, who was lukewarm on the subject. I had to go so far as to threaten to have the law onto him. The result was he came along; and I met him after leaving the State Department and he thanked me for making that threat, for he had accomplished what I had asked him to do and the results were wonderful. I think in the foundry a more concentrated effort should be put on safety work.

Another thing is your modern machinery in the foundry, where you have an unskilled man on a machine and then ask him (in some cases, not in all), to rush through the work. I think before an unskilled man is put on a machine he should be given further instructions along the safety line. Foundry lost-time accidents, with the greatest of effort, won't be more than a small percentage of the total.

Mr. H. H. Harris, Master Mechanic, Fairbanks, La., speaking of the accident record of the plant of which he was superintendent, said, "I don't agree with both of the speakers. I don't agree with either of them, about the same thing with which I do not exactly agree."

There are many activities in the foundry that have to do with safety. But there is a part of it which cannot come under the heading of safety. I happen to have a title a part of which is "welfare."

At almost every safety meeting which I have had the privilege of attending, some gentleman has gotten up and said that he didn't like the word "welfare." Some of these days some bold fellow is going to get up and say he doesn't like the word "safety" and we are going to have to get some other name under which to carry on this great work. In the organization which I have the pleasure of representing we do a great deal of so-called welfare work and I want to say to you that we need no other name for it. It is welfare work, pure and simple, and our men understand it as such; and, I, for one, would like to have them quit picking on that welfare word and leave the name as it is. It is a grand and glorious work and rivals the so-called safety work in which I am also vitally interested.

The Word "Welfare" May Be Misunderstood

MR. MOREY: I would like to apologize, Mr. Harris. I think in the early days the word "welfare" was used in some connections where there was a great deal of paternalism and I think I got a little prejudiced along that line. You have established a beautiful idea, so I graciously apologize.

MR. HOOK: May I likewise accept my spanking graciously and cheerfully? There is undoubtedly a prejudice which arose on the part of a good many of us as a result of the old time so-called "welfare" work when it was very paternal. We feel that

really all this work is what we term "mutual interest work," in other words, we are mutually benefited.

One of the great corporations that we know of originally started "welfare" and I remember with very disastrous results. I remember that the president said that in order for his men to be fit and ready for their jobs they should go to bed early, they should rise early in the morning; they had to do this and they had to do that, and he was giving them this great opportunity. He was doing this for them and he was doing that for them. Well, they were doing a lot for him, too, believe me. There isn't any executive today, especially in the large corporations, who can get very far by himself. We can sit down at our little table and plan and scheme, but after the scheme is passed on, unless we get the wholehearted cooperation of all those down the line, believe me, our scheme is apt to go up in the air; and so it seems to us that this is all mutual interest work. We are mutually interested in it; we are mutually benefited by it. The man on the job is getting no more out of it than the company is getting out of it and that is the thought we had in mind doing away with that word "welfare" because we thought it referred to the old plan, the old scheme.

The Outline of One Plant's Improvement

H. HENRY (The Mansfield Sheet & Tin Plate Co., Mansfield, Ohio): I want to say that both speakers this morning have been of great benefit to me. I heard an inspirational address about ten years ago and this is the first of its kind since that time.

In the face of a rising accident record from a period back in 1921, we engaged in the usual procedure and were spending a vast amount of money on education we found that our accidents were constantly increasing year by year. In 1924 we had an average of 35 lost-time accidents a month and up until October 1, 1925, we had 28 lost-time accidents per month.

Our president came up there and he got up and gave us a little talking to, saying he was very much surprised at us and thought it was a natural thing for any superintendent or foreman to take his men and speak to them of safety and accident prevention.

He wanted me to prove this, so I sent out a questionnaire as to the proper method of instruction and he found that we had approximately the same ratio of lost-time accidents. There were only 26 or 27 reported and they were worse than ourselves, and he wondered what he should do. He got up and told them he was interested in accident prevention work around the plant. He told them he wanted a personal report on every lost-time accident; he was going to hold the foreman responsible; he wanted to know what means were used to prevent a recurrence.

Due to the combined efforts of management and men, lost-time accidents immediately dropped. The average lost-time accidents per month in 1925 had been 28. We had 12 in October, three in November and two in December. In 1926 they were cut to six and one-half, or a decrease of 69 per cent in one year, and in two years, 79 per cent.

CHAIRMAN BENNETT: It is getting close to the time for adjournment, but in conclusion, I think, Dr. Chaney, you have been impressed somewhat with the remarks. They show that the statistics help; that they are using them.

It want to ask this one question, Doctor. Are you getting a better response in your department from the industries in the way of returning your blanks and forms which you have always requested and asked for? Has it been improving? I mean the frequency rate of reports.

DR. CHANEY: It happens that we got in on the game at a very fortunate moment in regard to history, so we have the great majority of the plants in the industry.

We have had over the entire period practically everything that they had. We are managing to add, from year to year, concerns which haven't cooperated with us before so that there is a very definite improvement in the returns.

We could ask, I think, with some earnestness, that they be sent more promptly. As I remarked in the course of my paper, we have just gotten to the point of sending to the press the report for 1926. I think that is about six months late, as we ought to be able to catch up things at least six months earlier than we are. The difficulty lies in the fact that just a few plants fail to respond, which holds the thing back, although all the rest of them may have sent in their responses. We want to get everything in and we feel that it is more important to include everything which is ordinarily being sent to us than it is to hasten the completion of the report. So we do feel that those who are charged with the responsibility of making reports could be a little more prompt than they are and it would help us a great deal.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session was called to order at nine-forty o'clock by the chairman, F. G. Bennett.

CHAIRMAN BENNETT: The first order of business will be to proceed with the election of the officers and get a report of the Nominating Committee. Mr. J. M. Woltz, the chairman, was called home on account of a death in the family and turned the report over to me to read.

Report of the Nominating Committee

At a meeting of your Nominating Committee held at the Hotel Traymore, Atlantic City, July 16th, 1927, the following persons were selected for nomination as officers of the Metals Section of the National Safety Council for 1928:

Chairman, J. A. Northwood, Bethlehem Steel Company, Johnstown, Pa.; Vice Chairman, E. G. Quesnel, Commonwealth Steel Company, Granite City, Ill.; Secretary, John P. Eib, Illinois Steel Company, Joliet, Ill.

In accordance with the resolutions passed by the Executive Committee of the National Safety Council, your committee, and through consultation with the present and proposed officers and executive committee, further recommend the following persons for the positions set forth:

Chairman Membership Committee, Frank H. Rowe, Wheeling Steel Corporation, Portsmouth, Ohio; Chairman Poster Committee, C. L. Peake, American Radiator Company, Buffalo, N. Y.; Chairman Publicity Committee, Jos. A. Voss, Central Alloy Steel Company, Massillon, Ohio; Chairman Statistics Committee, H. G. Hensel, The Youngstown Sheet & Tube Company, Chicago, Ill.; Chairman Slide Committee, John A. Oartel, Carnegie Steel Company, Pittsburgh, Pa.; Chairman Program Committee, E. F. Blank, Jones & Laughlin Steel Corporation, Pittsburgh, Pa.; Editor News Letter, Secretary John P. Eib, Illinois Steel Company, Joliet, Ill.; Engineering Representative, J. T. MacBain, Electro-Metallurgical Co., New York City.

Executive Committee—Retiring Chairman, F. G. Bennett, Buckeye Steel Castings Company, Columbus, Ohio; Ex-officio Chairman, J. A. Northwood, Bethlehem Steel Company, Johnstown, Pa.; Vice Chairman, E. G. Quesnel, Commonwealth Steel Company, Granite City, Ill.; Secretary, John P. Eib, Illinois Steel Company, Joliet, Ill.; Past Chairman, T. H. McKinney, Illinois Steel Company, South Chicago, Ill.; Past Chairman, John A. Oartel, Carnegie Steel Company, Pittsburgh, Pa.; Past Chairman, J. M. Woltz, Youngstown Sheet & Tube Company, Youngstown, Ohio; J. E. Culliney, Bethlehem Steel Corporation, Bethlehem, Pa.; John P. Mudd, Midvale Steel Company, Nicetown, Philadelphia, Pa., and E. R. Rose, Republic Iron and Steel Co., Youngstown, O.

We have interviewed those gentlemen whom we have recommended as your officers and have their consent to serve.

We have been very careful in our recommendations to consult as fully with the membership as our opportunities permitted and herewith submit our report for your consideration.

J. M. Woltz, Chairman.
J. E. Culliney.
C. L. Peake.

CHAIRMAN BENNETT: That is the new committee which was recommended by the National Council Executive Committee.

JOHN A. OARTEL (Carnegie Steel Co., Pittsburgh, Pa.): I move the nominations be adopted unanimously and the secretary cast the ballot.

A. W. BANNER (Carnegie Steel Works, Pittsburgh, Pa.): I second the motion.

CHAIRMAN BENNETT: You have heard the motion duly made and seconded that the report of the Nominating Committee be unanimously accepted and the secretary cast the ballot for the persons nominated. Are there any remarks? If not, the question has been called.

(The motion was voted upon and carried.)

CHAIRMAN BENNETT: It is my plan tomorrow, at a portion of the session to present the incoming officers of the Section and have Mr. Northwood take charge of at least the latter part of the program. I think it is well for the incoming officers to get acquainted with the members of the Section for they need their cooperation for the coming year.

E. G. QUESNEL (Commonwealth Steel Co., Granite City, Ill.): The ballot has been officially cast as ordered.

CHAIRMAN BENNETT: Our first talk this morning will be under the general group of talks direct from the shops. It is quite appropriate and we will now hear from Mr. Al Jaco, foreman, Commonwealth Steel Company, Granite City, Ill.

Safety as a Foreman Sees It

Alvin Jaco, Foreman,
Commonwealth Steel Company, Granite City, Ill.

I have been asked to discuss shop impressions of safety as a foreman sees it. Being a foreman, myself, I hope you will appreciate my position and realize that I am looking out from a situation that most of you are looking in on. Therefore, if we, as foremen, sometimes seem indifferent or apparently non-responsive, please do not criticize us too severely, for we may not have the same perspective of safety.

I am sure we all agree that close, friendly contact must be maintained between the management, safety department and the shop. This contact should be so elastic and practical that it is just as effective during the rush period as when the shop is running normally or even a little slack.

A good approach is essential in presenting safety and generally assures fair consideration. In this connection, let us not forget that things are accepted and done in most shops in a matter-of-fact sort of way. Work is more or less routine and most men have their minds pretty well made up as to what they are going to do and how they think it best to do it. This means that safety suggestions that are intended in any way to change this routine are often received with a certain amount of reservation, unless they in some way appeal to the practical side of the employee. Safety suggestions that succeed are those that are plain, practical and definite. They should carry with them the atmosphere of the shop and never cause resentment. A simple request accompanied by a reason for it goes much farther than an order without an explanation. Poorly thought out instructions often fall short. This is to be avoided. A good foreman will guard against such a situation.

Foremen do not like rules in the shop which are obsolete, impractical, and only effective once in a while. To wink at a safety rule and allow it to be disregarded is a dangerous practice. Besides, it hurts the morale of the shop, causing a certain amount of disrespect in the minds of the men for other rules. If a rule is not operative or practical and is not to be enforced—get rid of it. It is better to have a few rules that are operative than a lot of them that are not. We would like to see our safety rule books revised fre-

quently, and would like to know that when we give them to our men that every rule in the book is to be enforced. This gives us confidence in carrying out instructions, removes the chance for argument, as well as eliminates doubt from the minds of our men as to which rules are to be obeyed and which are to be disregarded.

At the Commonwealth, with our some 3,000 men, we like to think of safety as the right and orderly way of doing things. This makes it a necessary part of our operation and a very material aid to our shop efficiency.

Safety being an operative problem, every foreman must consider accidents in his department as an indication that something has gone wrong. This makes him feel a personal responsibility for the safety of his men. He must also realize that accidents are a heavy burden on shop costs as well as affecting the morals of his force.

If we, as foremen, are to maintain a no-accident record in our department, we surely must have all our men sold on the safety idea and see that they are satisfied, for usually a satisfied workman makes for safe workmen. Our job as foremen, therefore, is to keep in close touch with our men, think with them and work with them, being always ready to give counsel and advice but slow to criticize. In our plant we try to lead our men by practicing fellowship at all times for we have found that most men are splendid fellows when we know and understand them.

Good Housekeeping Pleases the Employee

The average employee today is keenly interested in a good, orderly place to work, modern machinery and a foreman who is not only friendly, but looks out for his interest and gives him a square deal. Let us be sure, however, not to confuse friendliness with familiarity. No foreman can long maintain his prestige if he becomes familiar with his men. He must safeguard the dignity of his position, maintain discipline, be impartial, and demand of even his best friends the best that they can do. In fact, this is the only way he can help his men succeed. No progress was ever made by accepting an indifferent effort. If a foreman discovers that some rule is being violated or work is being carelessly done, he should not make the mistake of correcting his men too strongly in the presence of others. It is much better to call him aside, thus avoiding any chance of humiliating the man. Nine times out of ten, an employee will show his appreciation by correcting the fault.

The safety department should feel that the foreman is one of their representatives in the shop, acting in the capacity of a safety director over his particular group, for safety among his men is usually in proportion to the foreman's ability to interpret it correctly for them. The men interpret the management's sincerity in their behalf through their foreman, for what the workman thinks of the foreman, he also thinks of his company. Is he just or unjust, friendly or unfriendly, interested in safety or indifferent to it? As the foreman, so the workman.

What will make men stop being careless and begin to be careful? My answer would be—a good foreman, one who is sold on the safety idea and knows how to interpret it to his men. He will spare no effort to see that men thoroughly understand their work, their machines, and their company. He will point out the hazards to be avoided, safe ways to do their work, how to wear their clothing, and insist on their reporting to him at once any hazardous conditions discovered.

The greatest asset a foreman has is the men in his department who are careful and efficient. All others are liabilities and it is his job to convert

these liabilities into assets—if he cannot do so, to have such men transferred or replaced. If he makes no effort to do either, is indifferent to the human side of his job, he is not a good foreman, and his department accident and production record will show it.

I was talking to a colored man not long ago about his shoes, as he seemed to be having a hard time getting around, and discovered that he had allowed his heels to wear very badly on one side. I suggested to him that probably if he would keep his heels level he would find walking more comfortable. He had never thought of this and said he would try it. A few weeks later he said to me, "Boss, you shore done me a good turn. Ah got them heels fixed and mah feet are all right now." So we don't know sometimes, just what a little interest in our men will do.

Inefficiency May Be Caused by Defective Sight

At another time, we noted that one of our men was not bringing his work up to standard and after watching him closely for a few days, discovered it was not caused by lack of interest. He seemed to be trying but stopped frequently to rub his hands over his forehead. The thought occurred to us, that perhaps he had headaches, so he was sent to the doctor for examination. It was found that his eyes were weak. He was fitted with proper glasses and from that time on his work has been entirely satisfactory. Without studying this case, this man might have been discharged without being given a fair chance to make good. I mention these two instances to bring out the point of how essential it is to be close enough to your men to understand them.

Men are apt to lose interest and become careless in doing work they do not like, caused generally by lack of necessary qualifications for that particular job. This creates a hazard. A wide awake foreman will be quick to discover the trouble, and use his influence in having such men reclassified and placed on more suitable work. For instance, we place on our heat crane only men who are quick to think and to act, so that if any emergency occurs they may be depended upon to do the right thing at the right time.

When all these things have been done, we find that we have eliminated most of our major accidents; however, we have remaining the things that seem to be the least important which are causing the greatest number of men to lose time. These types of accidents are much the same in the steel foundry, paper mills, or in the merchant marine, and are familiar to every one of us: dropping material on hands and feet, not keeping hands and feet in the clear, taking unnecessary chance with the eyes, etc. The only way we are going to stop this class of accidents is to train our men to keep their minds on what they are doing. Our job as foremen is to interpret the best thoughts that can be secured on safety from our own safety department and other sources, in such a way, that our men will not only understand them, but will carry them out.

I have purposely said little about the inspirational approach of safety, feeling that we are all in accord in reference to the importance of this approach. Also, that this phase of safety will be more ably covered by other speakers at this Congress, they being better qualified than I to present it to you.

My thought, as foreman, is that inspirational appeals should be tactfully made. Most men are very receptive to the human side of life and to reach them effectively, a time must be selected when they are at ease and can safely divert their thoughts from their work. An approach through their home, plant magazine, safety meetings, or personal counsel in private, is the most effective way to reach them, for they at such times have a better perspective, not only of their work, but of other problems of life. I think that is why many

of us fall down in handling men is because we do not pay enough attention to the psychological effect of our remarks. They should be timely made and in the proper place. In other words, put the sugar in your coffee and the salt in your soup; each is fine when properly used, but what a mistake when they are not.

In closing, I leave with you the thought that the foreman has a very important place in the safety organization of any plant. He should consider himself a part of it and, being on the receiving end, should be sure that he correctly understands instructions before passing them on to his men. He should keep the thought constantly before him that human life is a precious thing, and like a flower, needs care, protection and training in order to develop and grow in service.

The foreman who sets his heart and mind to the prevention of accidents and has the humility to be guided by wisdom and truth will not only be a success, but will be honored and respected by both his company and his men.

CHAIRMAN BENNETT: We will hold our discussion until the end of the program so as to get our papers all before you first and then we can take the time that is left for the discussion of all the papers.

Our next paper will be one that should be of interest to a great many of us dealing with one of the specific operations of our metals section, blast furnaces. The subject is "Safe Practices at the Blast Furnace" by Lawrence H. Underwood, superintendent, coke plant and blast furnaces, Youngstown Sheet & Tube Company, East Chicago, Ind.

Accident Prevention at Blast Furnaces

Lawrence H. Underwood, Superintendent, Coke Plant and Blast Furnaces, Youngstown Sheet & Tube Co., East Chicago, Ind.

It is a far cry from the primitive blast furnace—where the native trod a goat skin to produce blast, the semi-molten mass inside a small mound of clay was allowed to cool and the front of the furnace torn out to recover the lump of iron—to the modern blast furnace.

As late a book as John Percy's "Metallurgy of Iron," written in 1864, describes a blast furnace accident of the 1830's, in which a dwelling house and a blast furnace had a common stone wall and an entire family was asphyxiated one night, no doubt by a crack developing in this common wall and allowing gas to enter the house.

A blast furnace plant consisting of even a single stack, offers possibly the largest chance for "mass accidents" of any metallurgical operation. I believe it is quite safe to say that we have passed the high accident peak in blast furnace operation and that this peak is now about fifteen years behind us.

In enumerating possible causes of blast furnace accidents, many weaknesses of design and operation must necessarily be touched upon, which have been remedied in many of our more modern plants, but which still exist in others.

We will first consider accident possibilities resulting from weak or poor design. The hearth, or crucible, of a furnace is that part which lies below the tuyeres. The slag and iron continually being made, accumulate in this part until the proper time for withdrawing them. In furnaces making 800 tons of iron in twenty-four hours and casting at six-hour intervals, the average cast would be approximately 200 tons. The cinder, or slag is tapped generally two or three times between casts, but a large amount is in the furnace just prior to the cast. The danger can readily be realized, if even a part of this accumulation of molten materials fails to be confined until the proper period of withdrawal.

Hearth accidents may occur in a number of ways. First, by the iron working down and coming out underneath the hearth jacket and column base ring. One serious accident of this kind occurred in 1921 with loss of lives, where the explosion resulting from iron working its way down and coming in contact with water, tore a large hole completely under the column base and then up through the cast house floor. I visited this plant shortly after and stood on the top of the wooden piling on the center line of the furnace some thirty feet below the tuyere. It is very general now to put considerably more brickwork between the concrete foundation and the bottom of the hearth and also to put a heavy girdle, either of steel plate, bands or reinforced concrete outside of the column base and down to the concrete foundation. Incidentally warning should be given against using a limestone aggregate in the concrete foundations under the furnace.

The Iron Escaped Through the Furnace Bottom

At another plant, within the past year, a new furnace lost its iron through the bottom for a period of two or three casts. The furnace was shut down for several days and no damage resulted, except the loss of product and the lost iron was never visible at any point. In this connection, it has been thought that, with the advent of large hearth furnaces, it might be wise to eliminate the horizontal joints in brickwork up to the bottom of the hearth, because of the possibility of floating the layers of brick, when laid with horizontal joints. While this idea seems logical, peculiarly enough, this method was employed in the last mentioned case.

The next class of hearth trouble is a breakout through the hearth walls and jacket. This should be remedied generally by the proper type of jacket. One type which has been successful, is very heavy cast iron sections, with steel pipe cast in for the cooling water. Another type, is the same jacket with a lining inside of cooling staves, which are narrow cast iron sections of sufficient thickness to permit steel pipe to be cast in. Another type has a very heavy steel plate jacket with the cast iron cooling staves inside of it. In some localities, where there is a large amount of slag handled per ton of iron produced, they are experimenting with a special very highly refractory fused Alumina brick for hearth lining. It is essential, that whatever hearth protection is used, external bands of heavy steel or reinforced concrete must hold the hearth jacket and lining from expanding and permitting cracks to develop.

It was customary, some years ago, to have a ditch around the hearth with water in it. The writer had the experience one time of looking down into such a ditch and seeing a red spot at the bottom. It took but a split second to see it growing, to realize it was molten iron coming up, and then to depart. Peculiarly the iron chilled and there was no explosion. I believe there should be no ditch nor water around the hearth jacket, and only the shallowest trench, which drains immediately, for taking away water incidental to a turned down tuyere, or that put on the outside of a burned tuyere, blow pipe, etc. It may seem that a good deal of time has been devoted to the bottom of the furnace, but when it is realized that weakness and accident here are very apt to cause heavy casualties as well as possibilities of putting a furnace entirely out of business, it behooves every management to spare no expense at this point.

Around the tuyere zone there are always numerous cooling plates which protect this region very well, if a suitable jacket encloses this section. The strongest and simplest construction is a heavy rolled plate jacket and this is also, I believe, the safest, for it lends itself readily to a cast steel tuyere cooler holder. This holder has two large lugs cast on it, which receive "L" shaped forgings which will prevent the cooler from blowing out, but which can easily be removed when necessary. Unfortunately, many safety measures have not resulted from a visualization of possible accidents, but are developments brought about by trying to

prevent a repetition of some fatal accident. Such was the circumstances which led to the design by the writer, of the safety lugs on this cooler holder. The lives of two men, one a very experienced general foreman, were lost by a violent tuyere explosion which blew the tuyere and a tuyere cooler, weighing 500 pounds, across the cast house floor. The hook end of the bridle was straightened out and the tuyere stock was pushed back to allow the passage of the cooler through the air.

A fatal accident occurred within the past two years, due to the failure of tuyere stock hangers, and at this plant they have provided a third hanger for further safety. This accident will be referred to later under operation.

The bands on the bosh, which is that section of the furnace between the tyeres, and the mantle, have been increased in size, exceptionally in the past 10 or 15 years. There was a very bad mass accident in the Pittsburgh district about 13 years ago, in which a heavy slip broke out a large section of bosh and killed a number of men. The extra expense of very heavy bands over light ones is negligible, and no scrimping at this point should be tolerated.

Likewise the shells of the furnaces today, in this country, have been strenghtened to a point which was almost undreamed of 25 years ago. A very serious accident occurred within the past two years, when a furnace was being blown out and the shell gave way a short distance above the mantle and a number of men were killed and many injured. This would be improbable with shells of most modern construction.

An Efficient Distributing Top Is Important

A most important item, having a bearing upon the safe and smooth operation of a blast furnace, is an efficient distributing top which gives a uniform distribution of coarse and fine materials entering the top of the furnace. I believe that, while a distributing top is not a panacea for blast furnace troubles, a great many accidents to furnace employees have been caused, indirectly, by poor distribution of coke, stone, ore and other material charged.

Guarding against falling materials is an important part of accident prevention around a blast furnace. A type of bleeder valve, which permits only dust and quite small particles from the stock column to be thrown out when a slip occurs, is in quite extensive use. Covering the underside of a skip incline to prevent material falling upon men passing under the skip is very desirable.

Under the term accessibility will come a number of items, which in the past have been sadly neglected. Some years ago, a new furnace was put into operation with no means of getting to the top, except by a vertical ladder without back guard on the side of one of the stoves, or by going up on a skip. After a foreman was killed riding the skip, a stairway was erected. At some plants, elevators are now installed and I believe they can be classed, partly at least, as a safety measure. If a man gets hurt or gassed on top, it provides quick means for help to get on top and also a quick and safer way to get the injured man down. Some men become very wild under the effect of carbon monoxide gas and it is not the safest thing for others to take such a man down, even a well designed stairway. Where gas is apt to be present, I believe every effort should be made to provide stairways instead of ladders.

Under this heading would also come proper stairways to the top of the bustle pipe, and, if cooling plates are used above the mantle, to the platforms above the mantle. Also under this heading would come proper and safe means of descending into skip pits. All pits have to be cleaned, most of them daily. Yet the provisions for getting into some of them, would lead one to think the designer expected them to be used about once a year.

Proper handrailings, where the tops of large mains are used for walkways would

seem to require no mention, but a fatality occurred within the past three years on a supposedly modern plant, because of the lack of such protection. A large gas main which required fairly frequent cleaning by means of a water jet, introduced through small holes on top, was being so cleaned. One of the men got enough gas to cause him to fall to the ground. There was no handrailing along this main, but men were supposed to wear life belts. Proper handrailings have since been installed.

The use of water seals in gas mains have long been in vogue, for operation purposes and no doubt have been at times relied upon to protect men working in mains beyond. This is absolutely unsafe. Nothing less than a positive shut off should be relied upon, the safest of these being a steel plate, in some form of goggle valve. There are now on the market different forms of mechanically operated goggle valves which afford a quick shut off.

Self cleaning platforms around the bleeders on top of the furnace and the various walkways necessary on top, are much safer than the type which hold material thrown out of the top of the furnace. The latter become filled to overflowing and it frequently becomes necessary for men to use them before they can be cleaned. Parallel flat bars, laid with edge up and a proper distance apart are very satisfactory for this purpose.

Lubrication By Leading Pipes

In the stockhouse where drums are used in the bin system, lubrication of the bearings is most safely done by leading pipes down near enough to the floor or platform, with alemite or similar connections, so the oilers need not get near the moving machinery. This also is very applicable to moving parts on top of the furnace.

We will now lay aside safety in construction and devote a short time to accidents of operation and possibilities of preventing them. The writer of a paper, such as this, is confronted by the problem of having, as hearers and readers, not only men who have had a life time of experience in blast furnace work, but men who have had very little direct contact with this phase of metallurgical operations. A treatise on accident prevention may cover a great multitude of accidents and ways to prevent them, which would present very little new information to the skilled furnace operators, but which may be a guide to men of indirect contact with, or possibly about to be connected with, blast furnace work. The writer does not believe it is desirable in this paper to try to cover the usual safe practices, but rather to try to dwell upon a few items that may possibly be new to some operators and to some safety directors, in the hope that possibly someone of the items may be the cause of steps being taken, which will prevent accidents.

The Youngstown Sheet and Tube Company, at its Indiana Harbor Works, Blast Furnace Department, has completed in the past year a central oxygen station. In the past, as was customary in most blast furnace plants, we took all oxygen cylinders to the cast houses. The new central station is located half way between the furnaces and at the yard level. There is a brick house with substantial concrete roof, in which is located a manifold, to which ten oxygen tanks are connected at all times. This manifold is divided by suitable valves, so that five tanks are open on the lines going to the blast furnaces and five full tanks are in reserve. It takes only a moment to throw the five full tanks on the line when the other five tanks are exhausted. The exhausted tanks are removed and five full tanks connected and are then ready for use when needed. The lines from this central house to the cast houses are extra heavy pipe and were very carefully freed from oil before being used. The pipe lines are carried in well protected locations and there are three outlets in each cast house. Suitable signs are placed in the central station and at the various outlets, worded, "Compressed Oxygen, do not use any oil or grease." In the central house,

on each manifold, are suitable regulating valves which maintain a constant safe pressure.

We believe that this is a much safer way to use oxygen at blast furnaces, than having the oxygen cylinders in the cast houses, where there is always a chance for metal, slag or flames to come in contact with them. It is also a labor saver, eliminating the lifting of tanks to the cast house floors. With the central station, there is a minimum of handling, as the tanks can be delivered by truck from the storehouse to the station, all at yard level. Many plants have no pressure regulators on the individual tanks used at the cast houses and this practice is avoided by the central station. In some emergencies, a continuous flow of more than one tank capacity is very desirable and valuable time is often lost changing to a full tank, which gives another advantage to the central station.

The crossing of iron and cinder runners by cast house men is a hazard, when the runners are full of iron or cinder. Sometimes these runners are crossed by men who are not regular or skilled cast house men, and in this case the hazard is greater. We have provided safety crossings at our furnaces and believe that it is very advisable, especially when the crossing has to be made in front of the iron hole or cinder notch. I presume many blast furnace operators have seen, at different times, a sudden dislodgment of accumulation in the tapping hole, which resulted in a shower of hot coke and sparks down a considerable part of the cast house. A man crossing a runner in front of the iron hole at such a time would be in great danger. I once saw a man attempt to cross an iron runner and land one foot on the far side of the runner. His foot slipped and was immersed in the molten iron. Of course, many will say that there should be a rule against crossing a runner with iron or cinder in it, but I believe in establishing well protected, safe crossings, rather than depending upon enforcing a rule which is apt to be violated, especially in times of emergency.

Another safety feature which is not universally adopted is that of lifting the iron or cinder runner gates by means of cables from a remote and protected spot.

The snort lever for relieving the blast pressure on the furnace should not be in a line with, and close to the furnace tuyeres. This is a particularly unsafe location and should be at a distance and protected.

A Practice Which Cost the Life of a Man

Another unsafe practice which resulted about two years ago in the death of two men, one a furnace foreman, is that of driving up keys on a tuyere stock, with the blast on the furnace. Naturally it is the aim of blast furnace operators to gain all the time possible after delays, but there should be an imperative rule against the practice of driving tuyere stock keys with blast pressure on the furnace. A third tuyere stock hanger is an extra precautionary measure. I do not know of its adoption at any other plants than the one mentioned and very probably many furnace operators believe the usual two hangers are sufficient, if properly used.

In opening the iron hole there are three general methods. It formerly was the universal custom, and may be to a certain extent still, for the cast house crew to line up on each side of a drill, each man with one foot in the iron trough and the other leg resting on a knee outside. When the keeper judged they were fairly close to the iron, they drove a tapping bar. Sometimes they drilled into the iron and the men scrambled out of the trough. This practice, we believe, has very generally been superseded by other methods, as follows: One of the methods, is to drill through the clay in the outer hole with an electric or air drill, which drives a bit through the softer clay, as far as possible, and then to drive the tapping bar with sledges. This operation is varied at some plants by driving a tapping bar with a heavy air hammer. At other plants they regularly burn the hole out with oxygen, instead of driving a tapping bar. The operation of drilling the softer material out of the hole with a

suitable drill is quite safe. The men stand on each side of the iron trough and guide the drill and are in no particular danger.

The method of burning the hole with oxygen seems to be safer than driving a tapping bar, either by hand or machine, providing the oxygen is from a central station. There is only one man actually engaged in this operation and he is generally further from the hole when iron comes, than the men who drive tapping bars. There is still another method of opening an iron hole and that is by a specially built tapping machine which is swung into position and drills, not only through the clay, but the skull at the base of the hole. It is thus a combined drill and tapping machine. The whole operation is controlled by one man at a distance from the furnace, including the swinging of the machine out of the way when the iron is finally tapped.

The closing of the iron hole has long been accomplished with the well known clay gun. A recent innovation adds another clay barrel, and makes it unnecessary for a man, when closing the hole, to stand close to the gun and throw balls of clay into the clay barrel at each successive stroke of the piston.

Another Unusual Type of Accident

An unusual accident happened at one blast furnace plant, where men were changing tuyeres at the same time the iron hole was being stopped. The hole was not taking the clay very freely and some water was introduced into the clay barrel and as the plunger went forward, a violent kick threw flames and hot coke out over the men changing tuyeres. One man was killed and another seriously burned. It is our custom to close the hole completely and stop for tuyere changes afterward.

The handling of gas has presented little real danger since the advent of introducing steam into the gas mains, to prevent a mixture of gas and air in the mains, dust catchers, etc. This practice is so well established that I believe no further comment is needed.

The blowing in of a blast furnace is also made much safer by the use of steam to fill the mains, until the proper time comes for taking the gas down from the top of the furnace. After the blowing out of a furnace, I believe it is very common practice to rope off the cast house and keep employees away from the furnace for 24 hours. After the wind is off, the liberal use of steam on all mains, dust catchers, downcomers, etc., is part of this operation. The operation of a furnace with a weak shell, after the brick is pretty well gone, is hazardous, and the blowing out of such a furnace is certainly dangerous, as evidenced by a serious accident recently. I believe there are circumstances that justify digging out some of the stock in the furnace, rather than attempting to blow it clear down. Particular attention should be paid to positive means of preventing any accumulation of water on the large bell when blowing out.

When cinder ladles are used, a roof over the ladles to prevent water getting into them, is a proper safeguard. The danger when water and molten iron come together, is so well known, it would seem to require no comment. Yet only recently, there was an accident when a ladle of cinder exploded after it was almost full. Fortunately it did no damage beyond wrecking the ladle.

Every blast furnace plant should have apparatus to protect men when necessary for them to get into a gaseous atmosphere. This should include the hose mask, the mask with canister for removing light concentrations of carbon monoxide, oxygen inhalators, and self contained apparatus, which will permit the wearers to go into practically any atmosphere for a period of an hour or more.

Of course, when wearing no protective apparatus, great care should be exercised in going into mains or other apparatus which have held gas, to be sure the gas has been thoroughly expelled.

One source of danger is allowing gas to back up in the cold blast lines and to the

blowing engines. Even if an explosion does not result, a very disastrous fire may ensue from the oil in the cold blast mains. A regular gate valve, in addition to the butterfly valve in the cold air mixer line, and steam connections in the cold blast mains are wise precautions, even assuming the usual safe operating practices.

In conclusion I have only a few words to add. It is true that many accidents are results of "Careless Practice." Many of these accidents might just as easily have occurred at the steel department, for example. In other words, there is no special departmental risk in many of them. On the other hand there are always many sources of danger, peculiar to a certain line of work. It is the latter with which I have tried to deal.

CHAIRMAN BENNETT: I am sure there will be a bit of time for discussion and comments on this last paper as it is quite comprehensive. We will reserve the discussion until after the other papers have been read.

The next subject will be one that deals with foundries and I certainly hope the speaker will try to average somewhat what Dr. Chaney told us yesterday about the foundries. I am sure that we can take care of this subject in a nice manner. It gives me great pleasure to introduce C. L. Peake, director, industrial relations, American Radiator Company, Buffalo, N. Y.

Common Hazards in Foundries

C. L. Peake, Director, Industrial Relations, American Radiator Company,
Buffalo, N. Y.

Yesterday morning Dr. Chaney made a review of the findings which the Department of Labor annually makes with reference to the iron and steel industry and its accidents in the United States. You will remember how he pointed out that accidents in the iron and steel industry have been continually reduced over the period of the last 16 or 17 years. Each period of five years has shown almost a constant reduction. That, in itself, is a very encouraging indication.

On the other hand, it seems to me and to some of the rest of us that the most striking thing which Dr. Chaney had to say was that the single large classification within the iron and steel industry which has not shown such an improvement, was the foundry division. Here last year and again this year, instead of being an improvement, the curve remains mainly upon a level and indeed, from time to time, seems to be going up, and for that reason I am particularly glad to speak on the subject of foundry hazards.

In doing this I will divide the subject into two general divisions, as a large number of the foundries are still manually operated. Machinery is being introduced only gradually in some, but the hazards in this particular group are much the same as they are in the general group.

As soon as we think of foundry hazards, almost at once we think of iron burning; and yet, with reference to iron burns, this is perhaps the most encouraging with reference to the accidents. A large insurance company made a survey of about 14,000 cases of accidents in the foundry and it was found of these cases about a little more than 28 per cent of the lost-time was due to burns.

Knowing that this was the case, when the company I am connected with attacked safety work rather intensively, a number of years ago, one of the first steps it took was to introduce, as one of the company's own safeguards against burns in foundries, the use of leggings; and it was encouraging to note that last year the percentage of lost-time accidents in the American Radiator Company due to burns was only a little over nine per cent as compared with 28 and 29 per cent in the industry as a whole. If this was due to leggings, we believe we are justified in saying that we have made a step forward in accident prevention.

In checking up on the wearing of safety shoes, it was not very marked clear on down the scale until we compared that 27 per cent rate with larger foundries and in all these four foundries the loss of time due to burns ranged only from four to six per cent. This, we believe, is an encouraging indication that lost-time due to burns can and is being reduced in certain localities.

Now, you say it is one thing to talk about wearing leggings and another getting the men to wear them. That is perfectly true, but the wearing of foundry clothing is much the same problem as that with reference to goggles. The first thing is to find a legging which is reasonably comfortable and still efficient.

I notice that most of the leggings on exhibition here in the foundry exhibition are the spring type legging principle. Our condition is a little different from that of a man who is only working for twenty minutes with leggings and then takes them off. He puts them on at 8 or 9 o'clock and wears them continually, only taking them off during his lunch hour and again at 4 or 5 o'clock in the afternoon. We have found under these conditions that the spring type of legging becomes very uncomfortable, chafes a man right below the knee where the grip is and again at the ankle. Another objection is in case the spring flaps open it goes to the back of the leg and comes out and the hazard is just as great, and sometimes greater, than if he did not have leggings on at all.

For this reason, we have introduced a legging which has just one piece of steel on one side. It fits into a slot at the bottom and has a quick removable leather catch at the top. The leggings can be removed at once and we believe they are considerably more comfortable.

Selling Men on the Use of Leggings

It is one thing to suggest the wearing of leggings, but it is something else to get men to wear them. The method is much the same as we have used in the introduction of goggles. We sell them as far as possible as an individual proposition until we have 40 or 50 per cent of the men wearing them, and then some morning we have the foreman or superintendent (not the safety man), call his force together and say, "Here is a set of leggings which other men in foundries have found very effective to wear. We are going to wear these from now on." By this method alone is it possible to carry it out.

It is not enough merely for a man to wear leggings. They have to be checked up. A legging which is too large may prove to be a greater hazard than no legging at all. Every once in a while a report comes in of a man being burned who was wearing leggings, and we find, if he was wearing them, that the accident happened because he didn't have them on properly.

Let us touch for a moment the question of wearing goggles. It is enough to mention that in the last two years since the compulsory wearing of goggles by pourers, the record has been almost 100 per cent in our various foundries. We haven't had a single permanent eye injury due to splashing metal on the pourer. This has been due to the goggles, we believe. We have had scores of cases where the goggles have come in badly splashed with metal.

The real problem, after all, is the same as outlined in leggings, and that is to find a goggle which is comfortable and in this, I think, our experience has been a little different from that advocated, at least, by a good many goggle concerns. Our company has discontinued the use of cup goggles and has gone back to the rigid type of metal goggle, the type with side screens and full protection, because we find that they give better ventilation and the men will wear them much better than they will the cup goggle.

These last two mentioned hazards are fairly on the way to a 100 per cent reduc-

tion. I wish that was true with the rest of the hazards in the foundry industry and indeed with the rest of the hazards in most of our plants.

Perhaps this change has become more marked where the custom has been lately—and still is the custom—for a man to prepare his own sand, cut his own steel, temper it himself and when his day's work is up to pour it himself; because in the last few years this has all very largely been changed by the division of labor which has taken place in all industries. This is true particularly in the foundry industry of late, so that when a man comes in and prepares the sand, another man prepares the equipment; another man might be called a molder who puts up the work; another man pours it and someone else shakes it out. The problem of actual production in a foundry of that type is materially different from a foundry where an old time foundryman did all the work; and, of course, this brings the individual problem.

Whenever a change from one type of production into another is made, at once our difficulties begin. For one thing, we don't always know the hazards until the accident exists. We may say there is a good possibility of having an accident on a particular job, but human nature is such (and it is not peculiar to a foreman or to a superintendent), that until an accident of a certain type has happened in a particular shop, it is pretty hard to sell the idea that that accident has to be guarded against. So until we have accumulated certain experience, it will be hard to reduce our hazards. When one sort of a job has been carried on for 10 or 15 years, it becomes more or less routine and the problems are fewer, so that it is possible to crowd the safety angle pretty hard. But when new machinery has been introduced, and thousands, perhaps hundreds of thousands, of dollars have been expended to change over an operation, it is necessary as soon as possible to commence to realize returns on the expenditure for that operation. As a result, a constant drive against caution takes place and accident prevention has its place only along with the rest, although we can't crowd it out on the operation standpoint. The safety engineer, under those conditions, has a new job of selling safety and watching out for the hazards all over again.

Hazards About the Conveyors in the Foundry

Now, when we have introduced the new processes, what is the nature of some of them? Many of them take on the same sort of hazards we have in any other kind of shop. Perhaps the single largest change has to do with the introduction of conveyors in the foundry. Now, the power conveyor has shown itself to be dangerous and it is reasonably easy to make a man be careful around the power conveyor, but it is a different story around the gravity conveyor. It has a different current, and yet the temptation to step across a conveyor of that kind, and take the chance of twisting an ankle or breaking it, takes place more than once. A large casting may be coming down on a roll of conveyors and for some reason it isn't wanted, and it becomes necessary to stop that casting midway on the conveyor. The temptation to try to slow that casting is too hard for a man to resist. He slips, and a broken leg or an amputation follows; and so the answer is the same as it is with so many other things—you have to make sure that men understand that these conveyors are to be crossed only at the regular crossing and they are not to go over them unless there is a regular platform provided.

The shear hazard in the new foundry is particularly prevalent. A new molding machine will be set too close to a column. Someone will be climbing through and be caught between the two shears. Or, a roller machine will be set up too close to another machine, and before it is realized, a molder or workman will be caught between the two machines.

I noticed lately that instead of setting up a power conveyor with the table running over tracks, it had the table running over rolls and then the whole thing

was driven by a power chain; so it was necessary for the shears to be set up every time one of these tables crossed a roll. These are guarded against, if possible, back at the factory and the design is changed.

Then, there is that ever-present hazard that is present in any concern, the hazard of electricity. This is particularly a hazard in the foundry because, although we may introduce all the latest mechanisms and do our best to guard against this hazard, still the fact remains that there is always more grit and dust in the air in a foundry than in other shops and it is possible for this dust and grit to get into the finer mechanisms and a short or ground results.

The remote electrical automatic control is a very decided step into the future, so far as accident prevention is concerned. It has proved itself in some lines, and yet some of the most serious accidents we have had in the last year have been the result of the remote control becoming shorted in some manner and death coming as a consequence.

A Type of Switch Conducive to Accidents

The difficulty is, perhaps, that in most of these machines the switches are so designed that when the machine is set up in the morning and started it is not stopped again until noon, and maybe started again in the afternoon. So the switch has to be operated only once or twice a day. When a switch of that sort is put into a shop, an accident is quite likely sooner or later to be the result.

The hazard which we have always had more or less with us has been the tumbler hazard. I refer particularly, not to where the castings are fed into one end and taken out of the other as in the old type, but with the side open. I believe it should be an invariable rule that a tumbler of this sort should have an individual drive and interlocking guard so that the machine cannot be put in operation until the guard is closed and the door locked completely in place; because with the tumbler, if a man is hurt, it is not a scratched finger nor a broken finger. The penalty is quite likely to be an amputation, a crushed skull, or death.

But the hazard which probably is most prevalent, not only in the new foundries, but in the old foundries and throughout the entire metal industry, is the hazard to the fingers and toes of the employee. More than once a foreman has said: "Can't we get a pair of goggles for this man's fingers?" "Can't we put leggings on this man's toes to keep them from getting hurt?" But, as we know, the only protection to fingers, toes and feet, is the application of safe practice and constant education.

Now, I was in one of our shops just a week or two ago and noticed where two men were working on one particular form. It was a flask set up on a particular operation, set up on end and so balanced (the flask only weighed 500 pounds) that a man could push it in place with only a slight shove. The two halves were set up together and locked and the member on one side of the flask, when he pushed his side of the flask together, would keep his fingers completely out of the way. On the opposite side where another man was working, his practice was to take hold of the flask because he was able to get a better grip, reaching clear around with his fingers exposed on the closing point and just before it closed he would slip his fingers out. No accident has resulted yet, but unless this practice is changed, sooner or later, one or four fingers are going to be lost.

It is by watching such operations as those that we can eliminate our finger accidents, and the answer with regard to the feet is the same in a large degree. The introduction of the safety shoe, the shoe with a stiff toe, is a partial answer. We can show you cases, several of them, where a man has dropped onto his foot a casting weighing 500 or 600 pounds, and the man has simply gone to the first aid for dressing, where if he had had an ordinary pair of shoes he would probably have lost one or two toes, or possibly had a broken foot.

The biggest problem, though, is education and putting this into practice. Indeed,

that is the answer throughout with reference to the whole matter of foundry practice and is exactly the same as it is with all other metal industries and with reference to hazards wherever we may find them.

The answer is three-fold. First, practice and education, because the great bulk of our engineers' accidents are not the machine, but the result of poor practice.

The second is one that is almost as important, the question of layout within the shop. When a foundry is changed over from a manually operated foundry into a machine foundry, as a rule the old building is kept. Sometimes it is possible to erect a new building. As a rule, it is simply the old building, and when, as the process is changed over, there is a desire to increase the production per unit also. The result is that the layout is likely to be cramped. Congestion will result, and where there is congestion, there is an accident.

I don't believe we can eliminate a considerable number of accidents until we start checking up very closely on the matter of layout.

The third remedy is one we have heard ever since the safety movement began, the proper design and proper guarding of machinery and I believe that we are getting back to that direction somewhat without minimizing for a moment the importance of practical education.

Every New Machine Purchased Must Be Guarded

It is a rule in our plant that after they have written all their purchase orders and all their specifications, the requirement is that every new machine purchased must be guarded in conformance with the American engineering standards; and yet, very frequently, when you see a new machine come in, in spite of that, you will find that practically no attempt has been made toward safeguarding the machine at the shop where it has been made; and the answer is because many manufacturers have no idea of what standard guards are.

We have, just as an experiment lately, written to the manufacturer telling him what we think has to be done on the design and asking him whether he will be willing to change his design accordingly, and most answers have been very favorable. If every concern represented here would make it a practice to write the manufacturer of each machine which is not made according to standard safety designs, we believe it would be only a question of a short time until the manufacturer would construct machines which are safe. He is only constructing them unsafe because he thinks the average employer doesn't care very much whether they are safe or not. If we show him we are interested, he will change the machine, if he knows we want it that way and no other.

Of late, we have been hearing more and more about the dollars and cents side of accidents, and it is only fitting that we should. A week or two ago I had a man say to me: "I am not particularly interested any more in seeing a man hurt. It doesn't affect me a bit. I think the war has been largely responsible for the fact that broken bodies and deaths do not make very much difference any more." But he said: "The reason I am trying to safeguard my machinery is that I am trying to reduce accidents in my plant because I believe it is good business to reduce them."

Now, we may or may not agree with that sentiment, but we all know it is one of the reasons this safety congress is being held. There might not be so many thousands present if it weren't for the dollars and cents appeal behind it. Our employers expect that we will come back from the convention equipped to save our expenses a good many times in the course of the coming year because of our having taken an interest in accident prevention work. Yet, in spite of that, is that all? Isn't there another side to the thing?

Next to you sits a man whom you have never seen until within the last three-quarters of an hour, and yet, within the next hour, if that man's life were placed in danger, you would probably be willing to risk your life in order to keep him from

getting hurt. Whether we talk about it or not: "I am my brother's keeper"; and when it is simply some casual acquaintance that we are willing to watch out for, what about somebody closer? When I think about that little two-year-old boy that waved me goodbye, and of his eight-year-old sister sitting along side him, what wouldn't I do in order to make sure that they shall not even get a scratch or get into an accident that will hurt them in the least? To what length wouldn't I go? And this, I believe, is the reason that there is particular encouragement for the development of this great safety movement.

When we have a combination of economic worth with a sincere interest in humanity, then that, I believe, is the answer to any question of why the records of the iron and steel industry have been able to show a consistent reduction in accidents straight through from year to year over the last 16 or 17 years. It is the answer and I believe it has been a pleasure to all those who have worked shoulder to shoulder for accident prevention.

In the next few years, not only the iron and steel industry as a whole, but also the foundry industry, will witness further and corresponding reductions.

CHAIRMAN BENNETT: Our next subject is one of another specific operation in the iron and steel industry. "Coke Plant Accidents and Their Elimination," by Mr. George P. Wardley, superintendent of coke plant, Joliet Works, Illinois Steel Company, Joliet, Ill.

Coke Plant Accidents and Their Elimination

**George P. Wardley, Superintendent of Coke Plant, Joliet Works,
Illinois Steel Company, Joliet, Ill.**

The by-product coke industry had its inception in this country in 1892 with the construction of a modest little unit of 12 ovens in connection with the Solvay Process Company's plant in Syracuse, New York.

While it did not meet, at that time, with any ill will on the part of users of metal coke and the beehive operators, nevertheless, it did maintain a growing interest, although its growth was slight.

When the interest of the steel corporation in 1908 culminated with the Koppers' oven, the by-product ovens received added importance among the steel producing units, so that soon it was recognized as a necessary unit of any producing plant. Not alone in the field of domestic fuel, gas and coke, has it been acceptable, but the by-product coke oven industry has become one of major interest.

It is a singular fact that it was in the Joliet Plant of the Illinois Steel Company that the by-product oven industry, in 1908, recognized by importance of safety work, by the appointment of the late Captain H. B. Smith as a safety leader.

May I pause for a moment to pay a tribute to one who saw the silver lining of safety in the dark clouds of industrial accidents when it was not so clear to others? Behind the curtain of an abrupt manner this man had a heart of gold; stern and uncompromising in his efforts to reduce the unsafe practices of those days, he trod his path without the sympathy of many whom he sought to aid. Many of the cook-oven men who received their early training at Joliet have a vivid recollection of his persistence in making them pass a safety examination from a rule book. They looked upon him then as somewhat of a fanatic and a tyrant. But we look back upon this pioneer now as an evangelist of a new doctrine, "Thou shalt not maim or kill," and I pay my little psalm of praise to that man who helped to raise the dark cloud from industry.

If we are to discuss the elimination of coke plant accidents, it might be advisable briefly to consider the hazards in this industry. A coke plant handling 2,000 tons

of coal a day will find it necessary to load and unload 85 to 100 cars of material. The loading, unloading and moving of this many cars of different types of material necessarily brings many risks. In the oven operation in the curbing and conveying of 2,000 tons of coal a day, with its elaborate, mechanical, electrical equipment, we find many hazards. In the oven operation, we not only have the mechanical and electrical devices, but additional risk of handling hot material, such as coke and burning gases with the danger of explosion.

In the by-product department, including the benzol plant, again we have the mechanical and electrical devices, together with the chances of burns from steam, tar, acid, lime, caustic soda, noxious and poisonous fumes and explosive liquids: so that I realize the coke oven industry is in much need of safety precautions and devices.

The builders of the modern coke oven plants have cooperated with the operators and with the manufacturers of auxiliary equipment, to produce as safe an operating plant as they possibly can, and they have succeeded reasonably well with the limits of experience and foresight. But as no one has been able to protect a careless man against himself, it is this element which we must perfect, if we are to eliminate coke plant accidents and it is this phase which I propose to discuss.

The Safety Story of the Plant

This is a story of our plant. Beginning in 1912 we found that we had 55 lost-time accidents: in 1913, 52; in 1914, 22; in 1915, 15. In 1916 and 1915, I might say, operation had been decreased and the number of men had been decreased, and at that time we made a particular drive to see if we couldn't do something; we succeeded to that extent. But with war activity developing in 1916, and with the added operation at the plant, we found ourselves slipping and again went to the 30 mark. We pulled up a hole in our belt and started after it again and found we came down to 15; and by keeping after this thing, we were able to maintain 15 in 1918. In 1919 we dropped down to 13; and then in 1920, with the reaction of the strike and hiring a lot of new men, we went back to 15. In 1920 and 1921, we were not doing very much, the number of men we had was comparatively small, and so we had dropped down to four and three.

Then in 1923, with a lot of colored and Mexican labor, and in striving to get our production out, we slipped and went back up to seven. Again we went after this thing and in the following years we find ourselves with two and two, and in the last two years, we find ourselves with none. In other words, from Labor Day of 1925 until the present moment, we have had no serious accident that has caused the loss of a single day's time.

It is an interesting part of this, that in the first three years of this five-year period while we were able to limit the minor accidents of one to seven and eight to ten days, we suffered each year two of the more serious accidents.

In trying to find a reason for that, we found that all of those accidents had occurred in the operating department. Previous to that period, the repair and the maintenance labor and operating labor had been a fifty-fifty break, or in proportion to the number of men employed in the plant. When we got down to this period, the repair and maintenance department had succeeded altogether in stopping their accidents and the operating department had not. What was there in that that might give us some clue? In studying it over, we came to several conclusions.

One of them was that the repair man is not always called upon to hustle as much as the operating man. He has a chance of taking a little more time at the job he has to do and if it is a large break-down, invariably the foreman is there with him.

Another thing that entered into it was the question of whether the monotony of the operating man, having to do the same thing over and over again, had any

influence on his becoming careless. The repair man did not always have the same job, but had one hour at one end of the plant, another hour at the other end of the plant, each time on a different type of apparatus, and consequently this might have some bearing upon the problem.

Then another thing that entered into that was the question of the operating man having to stay on on his job up until the last moment of quitting time, where the repair man could possibly time his job to get through a few minutes before quitting time and be prepared to go home. The operating man who had to stay until the last minute, might have a tendency to hustle up and in that congestion produce an accident.

That is our story. That is what thus far we have accomplished.

Now, what are the tools with which we work? Being a department of a large plant, we are necessarily a part of the general safety organization. That has its value in that the safety department, being alive to safety, will concentrate and focus our attention sometimes on conditions which otherwise might not receive the consideration due them. We get, too, from this general safety organization, reports, service of their inspectors and committees from other departments, safety campaign slogans, etc. In our general safety organization, we have one man classed as an inspector whose duties are mainly those of an instructor. I don't believe this man is common to the general safety organization, but it is his duty to make contact with the newly hired man on the job as soon as possible. He takes to him a message of safety, the value of safety to himself and to his fellow workmen, his obligation to his foreman in reporting unsafe conditions and practices. Coming from the outside, he necessarily feels he has a big value in giving to that man a conception of safety.

The Instructor May Be Used as a Liaison

While the details of this operating job necessarily fall upon his foreman, nevertheless this instructor may be used as a liaison between the foreman and the man, if he happens to be a foreigner, since this instructor can speak several languages. I don't believe we can over-estimate the importance of that man.

Then again, he talks to the older men in the line of safety, men of the less skilled classifications, and holds a safety meeting with our big button men; and these big button men are selected in different groups to be the safety leaders in that particular group.

I might call attention for just a moment, to the fact that our general safety organization is a live organization. We feel that a good bit of our success has come from the cooperation and the assistance of that general organization.

In the whole plant, employing 2,400 men a day, 169 days have now passed without a single lost-time accident and that credit goes mostly to the general organization. We have our own department organization with committees having the function of investigation and inspection, but more and more we are coming to believe that if accidents are to be eliminated in our coke plants, the foreman is the man who is going to do it. A committee may investigate an accident and recommend something to prevent a like accident, but an observant foreman might have prevented the original accident. The foreman is in daily and hourly contact with his men and consequently is in a position to detect a false move in the human equipment, as he is in position to detect a false note in the mechanical equipment.

We are insisting upon our foremen developing the habit of observation. Not a casual inspection of his work, but a close observation of the man at his job; because we feel that if he will do that, there will come in that man's action, possibly some clue to an accident that might develop later on. Just the other day one of the foremen came to me and said, "I had a man come to work this morning and I noticed that part of his shoe was either torn or cut out and I said to him, 'I want you to be

careful today; and tomorrow I want you to wear a better pair of shoes. I don't want you to wear that kind because you are liable to have a burn." It wasn't two hours later until that man accidentally burned his foot with hot water, but fortunately it was a very minor burn.

We feel that near accidents are a clew to most of the accidents which happen, that in every serious accident which has occurred there has been a parallel in a near accident if we had been sufficiently observant to find it. How frequently when an accident has occurred have we heard such a man say, "I knew such-and-such a thing was going to happen because so-and-so was doing such-and-such." We don't hear that in our plant any more because we have tried to show our men that they owe it to themselves, just as much as they do to the fellow workmen, to report these little slips so that the foreman or the department superintendent can analyze the near accidents and see in them the possibilities of graver and more serious accidents. The foreman is in a better position to hear these things. It is difficult to have the men report these near accidents, quite difficult sometimes to have the foreman report them; but being in daily and hourly contact with his men, if he is an observant foreman, then we feel he is going to be in a much better position to find and catch these near accidents and from them enable us to learn a lesson.

The Foreman Should Be Rendered All Possible Assistance

Naturally, if we are going to put the burden of responsibility for eliminating accidents upon the foreman, we should assist him in every manner possible. That is our job and one of the ways that we have of assisting our foreman is in a safety letter. Each foreman is compelled every month to send a safety letter to the department superintendent. He is supposed to say that he talked about specific subjects to the men in his group. We have a way of checking that up, either by this instructor or by some other man going out to a man in a certain group and finding out whether that particular foreman has talked to him about a specific subject. This gives the foreman an opportunity to protect himself because if he has talked to his men on a specific subject and he has so reported, should an accident occur along that line, he has a written record that he can refer to. Sometimes this saves him criticism and possibly censure and maybe discipline.

Not long ago we had a case of a man at the change of turn, who had been warned that when the wind was in a certain direction and the steam hid the coke side of the walk, that it was dangerous for him to walk along that side and that he should use the steel work as a guide and go on the other side. The change came about eleven o'clock. He was in a hurry to go home. Conditions were bad. He didn't walk, he ran and fell off the walk. The result was a broken leg. The foreman was able to produce his written record that he had given specific instructions about that particular thing, so that there was no censure for the foreman at all. But since that time, as the winter comes along when these conditions prevail, we go to that foreman and recall to his mind the fact that that accident happened several years ago and that it is liable to happen again. We suggest that, besides telling the man of the condition and that he must not do that, if he is wise he will watch all his men at the change of turn, and see if they violate that rule or not. Thus he will be able to catch an unsafe practice which might result in a very serious accident.

When we receive a report of an accident from another plant, whether it comes from our general safety organization or from some visitor, we immediately transmit it to the foreman so that he knows about the type of accident, and if he has any conditions corresponding to that, he can be governed accordingly.

Then it is customary for us, ever so often, to review the accidents which we have had and to call the foreman's attention in the different departments accidents which have happened as much as five, six, seven or eight years ago. In this way we check

up on conditions surrounding such accidents and see whether there exists at the present time the possibility of a repetition.

In the six serious lost-time accidents which we have had in the last five years, only one of them indicated any failure of mechanical equipment, and I am not sure that was so much the failure of mechanical equipment as it was the failure of the man to treat the mechanical equipment in a fair manner. True enough, we will try to fix it so that even though it were treated in the same way again, that same accident could not happen.

Three of those serious accidents happened either at the beginning or at the end of the turn, indicating that the men were in a hurry to go home and were taking chances, or that the man coming on to the job was in a hurry to get his operation started and took a chance.

Safety Comes Through Close Supervision

Two of these serious accidents happened at an abnormal operating period. In other words, the operations at that particular time was not normal and smooth as it usually is, but they had piled up. It was necessary to hustle up, and these men, in hustling, in trying to do their work, made a false step, allowed themselves to get away from the safety instructions and a serious accident resulted.

So, as we review these things, we feel more and more than the accident elimination in the coke plant is going to come through a very close supervision of our men. That if we will closely observe them, not alone in the normal operating period, but will observe their actions under stress or under conditions of hurry, that we may find in that period some indication that later on will produce an accident.

Paraphrasing the comment of Will Rogers to a politician, "Accidents do not happen, they are brought about." So far as I feel now, the main man in helping to eliminate accidents in the coke plant is the foreman.

CHAIRMAN BENNETT: You will recall the first paper by Mr. Jaco of the Commonwealth Company, "Safety as the Foreman Sees It," in which he emphasized the inspiration the foremen receive from the management and also that the right and orderly way to conduct business is the safe way.

Mr. Underwood's paper on the "Safe Practices at the Blast Furnace" brought before us a good many of the late mechanical changes which bring about safety.

Mr. Peake on "Common Hazards in Foundries" brought out the use of leggings, goggles and the prevention of accidents and also the importance of some protection to the feet. He also put out other excellent points regarding the foundry accidents.

The last speaker's main point was the foreman's responsibility in accidents, besides the specific reduction in their own plant.

JOHN A. OARTEL (Carnegie Steel Co., Pittsburgh, Pa.): I have a question to ask one of the speakers, but before I do that I want to compliment the program committee on this program this morning. It is the best I ever heard, real practical stuff in all meetings. It hits us where we live, we fellows in the steel mills in this country.

A question I want to ask Mr. Underwood with reference to the oxygen installation and blast furnaces; has the piping a distinct color?

LAWRENCE H. UNDERWOOD (Youngstown Sheet & Tube Co., East Chicago, Ind.): We have an indistinct color, but it is conducted practically under cover most of the way through the gas houses and each outlet has the name on the enameled sign.

MR. OARTEL: Can any busybody or anyone else turn that on?

MR. UNDERWOOD: That is perfectly possible. It has a valve and a plug. They can turn it on but the only result is a waste of oxygen. I don't think it would be possible to injure any one.

E. H. GRAHAM (Carnegie Steel Co., Etna, Pa.): What is the line pressure utilized:

MR. UNDERWOOD: One hundred pounds.

GEO. MCCLAIN (Jones & Laughlin Steel Co., Pittsburgh, Pa.): I would like to ask Mr. Underwood a question with reference to provisions around his blast furnace for rescue work, we will say resuscitation. Do you have any crews that are trained in artificial respiration and things of that kind?

MR. UNDERWOOD: Yes; we have men in both the coke plant and blast furnace who are regularly trained in artificial respiration and use of apparatus. The emergency hospital is very close to the blast furnaces where we keep the H. & H. Inhalator, and it is also available for some of the other departments.

The coke plant is separated from the rest of the plant; it is located across the tracks, and we have the apparatus there for resuscitation and men are trained in that department separately.

MR. OARTEL: Do you have a mechanical means of respiration, a pulmotor or anything of that sort?

MR. UNDERWOOD: We have no pulmotor. The H. & H. Inhalator is the only one which approaches the pulmotor, but of course it is quite different.

MR. MCCLAIN: You use that for resuscitation, don't you? It is in no way related to making a man breathe when he quits breathing, or anything like that, is it?

MR. UNDERWOOD: No.

MR. SLOSS (Buffalo, New York): I would like to ask Mr. Peake what the American Radiator Company's attitude is in using force, as a matter of safety, in the wearing of goggles. Is it a rule absolutely laid down that men have to wear goggles and is it objected to if some do and some don't?

The Problem of Forcing Eye Protection

C. L. PEAKE (American Radiator Co., Buffalo, N. Y.): The men are required to wear them. As a matter of introduction we say, "Here is a pair of goggles. You have got to wear them." We sold them first to as high as 85 or 90 per cent of the men and they used them. Then the rest were told to use them and compelled to use them from then on.

With reference to shoes, we haven't got to the place where we are compelling the use of stiff-toed shoes. In some of the plants they are compelling the use of foundry shoes; that is, the regular standard congress type with the high bellows. I think the time will come probably when the same thing will be true with reference to some other departments where the total accidents are pretty high, but with reference to the stiff-toed shoe, we are simply urging its use at present. In time that will probably be a rule the same as with goggles.

MR. ROSEVILLE (Fairbanks Morse Co.): Do you use the all-metal goggle throughout the foundry?

MR. PEAKE: Not absolutely. We have made up a number of different units. We have 19 operating plants and in most of those plants they have standardized on one. The all-metal goggle is used by the pourers or what we call chainers, men who run the chain on chain hoists in connection with the ladle and clamp on the top plate before and after the pouring; but this is a patent goggle. There are one or two plants, however, which do prefer the cup type goggle for that operation. They have been using it for a long time and with their approval it certainly is just as safe as the other one. It is simply introduced, easier and better ventilated, but on shakeup we use the cup goggle almost universally and, of course, on grinding operations.

T. H. MCKENNEY (Illinois Steel Co., Chicago, Ill.): I would like to ask Mr. Peake with reference to a campaign on safety shoes. Does your company handle these shoes and do you sell them at cost or a little above? How do you do that?

MR. PEAKE: The company handles these shoes in all plants and sells them at cost plus ten per cent for handling. One of the methods used particularly so far

was checking up the pay line. When Friday or Saturday comes for paying off, safety men from the stock room will go out to the paymaster and inspect everybody's shoes and then start selling them and give the foreman the names of the men who need new shoes. Then if a man comes in with a pair of bum shoes, he is usually checked up by his foreman.

R. U. KELLEY (Copper Mining Co.): I would like to ask Mr. Peake on the foundry conditions regarding the throwing of electrical switches. I think he mentioned burns from this. Did you ever try the remote control, and if so, what success did you have?

MR. PEAKE: This fatal accident which I mentioned was caused from the remote control (and we are not sure yet just what was behind it) but it was the case of the push button having been improperly insulated. Whether it was due to the make or due to method of installation, we haven't been able to find out. The question we have in mind is whether the remote control, especially where it is used in a foundry, with automatic switch control, is not altogether a new hazard.

Protection of the Foot Still a Problem

CHAIRMAN BENNETT: Mr. Peake, do you think that there will be a time when we go further than covering the toes, that is, cover the instep with our shoes? There are devices out now.

MR. PEAKE: I wish we could, but you probably have noted the steel toe protector and instep protectors which are on sale here at the exhibit. We have experimented with this particular one, which was brought out a year or two ago. It is a little heavier, but we didn't feel free to compel the men to wear something of that weight. It is a very heavy thing, very awkward to carry around. I question just how much better protection it gives than the ordinary safety type shoe with the fibre toe. It does protect a little bit higher, but it is a very awkward thing for the men to wear.

E. H. GRAHAM (Carnegie Steel Co., Etna, Pa.): Was the tank machine practical, Mr. Underwood?

MR. UNDERWOOD: We have had ours in operation about two years, and it has proven very satisfactory. I was instrumental in getting that machine, so I can speak from an unbiased mind. The machine was bought before I went to this particular plant. We put it in operation and it is a big machine. It is rather expensive and yet it certainly has done very well.

W. S. STIEFER (Youngstown Sheet & Tube Co., Youngstown, Ohio): I would like to ask Mr. Oartel, in view of the excellent record he had in keeping down accidents, what his standard is by which lost-time accidents are based. Do you nurse your men or coddle them in such a way when they have an accident that it is not a lost-time accident? Just how far do you go in placing a lost-time accident?

JOHN A. OARTEL (Carnegie Steel Co., Pittsburgh, Pa.): The matter of a lost-time accident is based on whether a man loses a complete turn. If he were injured in the afternoon, or the latter part of his turn, and went home and did not lose a complete turn, it would not be a lost-time accident.

We do not coddle (that is the term the gentleman used) our men. We have had cases where a man was unable to do his own particular work but was able to do some other work in the plant and has done it, and that is what we do.

MR. STIEFER: I would like to ask both Mr. Wardley and Mr. Underwood what their opinions are in regard to the size of manhole tanks and also in regard to service in trenches. In a good many coke plants in the past it has been a practice to make these, and also to make the manholes, too small.

MR. UNDERWOOD: I think our general manhole is about 20 inches. I know that that it is true in our benzol stills. As far as trenches are concerned, we try very hard not to have them. We had some trenches in Benton Harbor which have

been filled up and done away with and we have practically no trenches left around there now.

The manhole proposition, of course, depends upon how careful we are. Any manhole would not be big enough to put men in the tank if it wasn't thoroughly inspected before you put them in. We have live mice at our coke plant. When men are going in, before they go in and also after, the mice are lowered into the tank for a certain length of time, then the men take mice with them. Of course, there is always a man right outside the manhole and a man in the tank.

T. H. MCKENNEY (Illinois Steel Co., Chicago, Ill.): Mr. Morey made an illustration of a man who was general manager who came down through the plant and saw a man who was not wearing his goggles and when the general manager referred to him the foreman said he had cautioned that man a great number of times and then he was disciplined. I am just wondering when is the right time to discipline a man. Should he be cautioned a great number of times, or how far should we go before we mete out that discipline.

We all agree, I believe, that a man is not injured the first time he pulls off some boner. Now just how far should we go before we discipline that man?

Discipline for the Man Who Needs It

E. G. QUESNEL (Commonwealth Steel Co., Granite City, Ill.): Probably I can answer that question for you, being with the Commonwealth Company and knowing this particular situation that was referred to. This man had been cautioned, as far as we could find out, three times; that is, the foreman and the man admitted that his attention had been called to his going without his goggles three times, at least.

We have an unwritten law at the plant whereby, if a man has been cautioned twice and he is caught violating a rule for the third time, he is then liable to be laid off. We give him the instructions the first time. If he doesn't heed them, it may be through lack of understanding, and he is again cautioned. If he still disregards it, the third time, he is apt to be penalized. That is one of the rules. Of course, in some cases we allow a man more time, but if he has been cautioned more than twice, why we lay him off.

R. B. KELLEY (Anaconda Mining Co., Anaconda, Mont.): I would like to ask you what to do in the case if a man contributes to an injury after general instructions on safety work have been issued. What do you do with the man if another man gets injured through his carelessness? Do you caution him again?

MR. QUESNEL: Do I understand you to mean, if an employee is injured through the carelessness of another employee, what do we do with the employee who caused the accident? If it was caused through carelessness, we lay him off for the duration of the time that the injured man is off. That is also an unwritten law, and circumstances govern that; but it is one of the ways in which we handle those cases.

MR. HODGKIN (Western Electric Co.): I would like to ask Mr. Peake which is customary, colored or clear lenses in the pouring of lead; also is it customary to use goggles?

MR. PEAKE: We are getting away from that because there are so many many cases in which we have had the goggles broken, the armored goggle.

CHAIRMAN BENNETT: Our time is practically up. Let me remind you of the importance of this round table discussion. We could carry it on all afternoon, but remember that you have a round table discussion at your hand the entire year. Write in the questions that you want to know, questions that puzzle you, questions you have asked here this morning; and if you don't want to ask them direct, suggest them to the National Safety Council. You may have a round table correspondence with the National headquarters staff at all times. A lot of that has been covered in the News Letter of the Metal Section, so if you happen

to have something new, help out the new officers and the new secretary, the editor of the News Letter, by sending in your new ideas, your new stunts; and then when problems are put up to you and the National headquarters staff asks you a question, give them a good reply. Answer it as completely as possible, because that is the only way in which we get any good out of the Section and that is by interchange of correspondence. As we stated yesterday, and Mr. Quesnell has told me since, it has increased materially during the past year. More of the plants get to exchanging their ideas and safety stunts every year and we are going to try to reach that end of definite accident reduction.

I think a great deal can be brought out of these round table discussions but remember, we mustn't let it all wait for a safety congress. Every day in the year we can have a round table discussion, although, of course, not as personal as when we are together.

I think that is one failure with any organization of this size, a lot of the smaller members and some of the larger members, don't use the safety advantages at hand. Any question you can put up to the National headquarters staff will be answered. If they can't answer at once they have about 700 or more members in this section and hundreds of members in other sections who ought to be able to answer, if the problem is solvable at all.

ADJOURNMENT.

Thursday, September 29, 1927

The third session was called to order at nine thirty-five o'clock by the chairman, F. G. Bennett.

CHAIRMAN BENNETT: The latter part of this program is going to be a round table discussion and we want all the time we can have for that. So we will start at once with the first paper on the program, by Mr. N. V. B. Ziegler, personnel director, U. S. Aluminum Co., New Kensington, Pa.

Conducting Safety Meetings

N. V. B. Ziegler, Personnel Director, The United States Aluminum Company,
New Kensington, Penna.

There are many kinds of safety meetings, some very good, some very poor, and some just medium. I have had the privilege of attending perhaps two or three hundred of them, in connection with my work. It so happens that I am a kind of singing safety evangelist, and in this capacity I have been actively present at nearly all of the big safety rallies and schools of instruction held in the Pittsburgh district for the past five years or more.

Many of the meetings made very little impression on me, while others filled me with enthusiasm and a desire to do my little part in the great work of accident prevention.

Why this difference? Why is one safety meeting interesting and effective and another uninteresting and ineffective? Well, I have observed this, that whenever the leaders and speakers are real safety men realizing the seriousness and importance of the problem, also the joy and satisfaction which come as a result of work of this nature, and are willing to put the thought, time and attention into it that meetings of so great importance deserve, a profitable meeting is usually the result. Men and women will go away inspired and fired with a determination to do more than ever before in the interest of safety. But when a meeting is hastily thrown together, without a definite plan or serious thought, the meeting is sure to be a failure. Certainly, it was built to fail. Have we reason to expect any other result?

I know of men, who claim to be safety men, who are continually making a joke of the safety movement, treating the whole proposition lightly and as if it were of secondary importance. Very little progress may be expected by attacking the problem in this manner. Some time ago one of my assistants attended a safety meeting at another plant. The superintendent of the plant was to make an address to his employees and when his time came to speak, the safety director, who was well acquainted with the superintendent, in introducing him said: "Boys, the big boss is with us tonight. Bill, get up and do your stuff." Do you think for a moment that the speech of that superintendent would have much serious effect?

I hardly think so. I believe such a procedure is all wrong. Life and limb are at stake, and this is no joking matter. Safety is a serious business and demands the best that is in us. It is all right to have a good, snappy, wide-awake meeting, lots of good entertainment, etc., but when the time comes for the safety message, it ought to be considered just as important and be treated with as much respect as we demand and expect of the minister and his assistants when they come before us on Sunday morning.

Why not? Religion and Safety are very closely related. Is there anything

more nearly like the story Jesus tells of the good Samaritan binding up the wounds of him who fell among thieves while on his way from Jerusalem to Jericho, than the work of the safety director who binds up the wounds of hundreds of thousands of human beings by removing the cause of injury? In fact, I think he is more of a good Samaritan than the original one because "an ounce of prevention is worth more than a pound of cure." It is certainly more important to lock the stable before the horse is stolen than after. It is a better piece of safety work to remove a board with a big rusty nail upturned than to allow someone to tramp on the nail and then hasten to dress his wound; yet how often we pursue this latter course. How many times, by our negligence, we allow conditions to exist throughout our plants which are unsafe until some day we have a bad accident; then we wake up and hasten to heal the wounded and remove the hazard.

Yes, safety is a serious business and it is encouraging to note that more and more, men and women are considering it so.

The Safety Address Must Ring With Sincerity

I have noticed time and time again that the safety address that rings with sincerity is the one that makes the best impression. Well do I remember the great, outstanding safety address given in Detroit last year by our good friend, C. H. Howard, President of the Commonwealth Steel Company. One cannot forget messages like that. They insure a successful safety meeting. Another safety address that I well remember was delivered by Isaiah Hale, of the Atchison, Topeka and Santa Fe Railroad Company. I was so impressed with it that I at once secured him for the large opening meeting of our Safety Lecture Course last fall. There were 1,200 or more at that meeting and he thrilled the audience with his sincerity and eloquence.

What did these men talk about? Just plain common every-day human interest stuff, showing us that we should be interested in safety, not only because we happen to be personnel men, safety directors and safety committeemen, whose duty it is to look after these matters, but also because of the service we can render humanity because it is right that we should strive to protect each other. You remember God taught us away back when Cain slew his brother, Abel, that we are our brother's keeper. This has never been changed. It is just as true today as it ever was. A selfish person is not a safe person, because he cares only for himself. The highways are full of such. They are the cause of most of the terrible accidents we are having daily. We also have them in industry—careless, indifferent, selfish. They are a constant hazard. Drastic measures should be taken to rid our plants of this type of employee. If they do not respond to training, let them go; your industry is better off without them. On the other hand, an unselfish person is a safe person as a rule because he is interested in his fellow man and will not knowingly do anything to injure him. We ought to be thankful that the great majority of human beings fall in this class.

We, of the United States Aluminum Company, pay a great deal of attention to safety meetings. We are organized as follows: A Safety Department as a section of the Personnel Division, with a safety director, reporting directly to the personnel director. There is a safety committee in every department of the plant. These committees work hand in hand with the safety director. These department committees are organized into one large safety committee. They elect their own chairman and the safety director acts as secretary. They have a regular order of procedure in conducting their meetings. Minutes are kept and read at the meeting and everything is conducted in a serious business-like way. These meetings are held once a month on company time, and last

one hour, from 4 to 5 p. m. The Company furnishes a box of good cigars at each meeting. Conditions of the whole plant are discussed and suggestions are made for improvement along safety lines. No part of the plant is overlooked as there are representatives from all departments.

The order of the business is as follows: call to order; reading of minutes; safety paper or talks, by one or two members of the committee, or perhaps by the safety director or myself; unfinished business; new business; review of accidents; roll call; adjournment. It is interesting to note how serious and business like these men enter into their committee work. We have found this the best type of safety committee organization we have ever had and we are seeing results.

Getting Closer to the Individual Worker

This is one type of safety meeting. Then we have another type which we have been carrying on for more than a year. Realizing that we were not getting close enough to the individual worker, we asked permission of our management to go into each department and conduct safety meetings throughout the plant. Our method is as follows: we notify the foreman of a certain department that we wish to hold a safety meeting; he gathers his employees together at some convenient point, and they are given two short safety talks, one by Mr. Hopkins, our safety director, and one by myself. The meetings are held at starting time, just after the noon lunch period. All is quiet; the machinery remains idle for 10 or 15 minutes while we talk safety to the employees, face to face, calling their attention to the great interest the company is manifesting by being willing to hold up production for this period of time in order to hold a safety meeting. We ask for their cooperation, telling them that we are helpless without their assistance, asking them to consider themselves assistant safety directors, showing them that they have all to gain and nothing to lose by getting whole-heartedly into the safety game.

We started out in this work with some timidity, wondering what effect the new move would have, but we soon found that it was the most popular move we ever made. We have been urged to return to departments both by the employees and managers, three or four times. They seem always to be eager to hear more about safety. Why? Because it is a subject which grips the heart and is of vital importance to all, and we are all anxious to learn more and more about how to keep from being injured.

Then we have another type of safety meeting, the large community safety meeting. We have been conducting them now for four years, during November, coupled with the general "Thanksgiving No-Accident Month." These are large meetings, 1,200 or more in attendance, with great enthusiasm, community singing, brass bands, orchestras, vocalists, and the very best of safety speakers available. These meetings create a great deal of community interest in the safety movement. The daily press gives space liberally. Industries 10 or 15 miles away send large delegations. The weather has no effect on the crowds, it appears. The series of meetings closes with a large banquet. The tickets are usually purchased by the various industries and presented to their employees as an appreciation of their attendance at 75 per cent of the meetings.

Also, we conduct safety meetings in the various public schools with good effect. We go into the rooms and talk to the children about safety and accident prevention. We always get a satisfactory response and we have the cooperation of the school authorities.

Thus, I have tried to tell you about the various safety meetings we are conducting in our community. What is the purpose of all this? Education, information, training, developing and keeping up interest in the general subject of safety.

Does it bring results? Yes, our records have been getting better and better year after year, this last year much better than ever before.

Some safety director might be saying "Yes, that's all right for you fellows, but I'm no public speaker. I can't get up on a soap box and talk, especially to my fellow workers." Well, neither are we public speakers, but we have found that if we are deeply enough interested in the subject we can talk about it, and that about the only reason we can talk at all is because of the interest we have in safety work and a sincere desire to rid our industry of accidents. All present today have this same interest and by a little effort and self confidence you can do it as well, and in most cases much better, than we can.

If the employees see that you are interested in them and their welfare, they will respond and compliment you on what you are trying to do, and follow your lead. Most of us are just waiting for some one to lead off.

It is necessary sometimes to put yourself out a little to show your sincerity. One of the most telling things we ever did was to come out at twelve o'clock at night to talk to the men on night turn. We have done this several times, and we have heard words of appreciation and statements from the men to the effect that "if these safety men are enough interested to come out at midnight, it is as little as we can do to be interested also."

We are guarding our machinery wherever it is needed, but we believe that the most effective work we are doing is the education of our employees through the medium of these personal touch channels.

In conclusion, I would urge all safety directors, general managers, superintendents, educators, mothers in the homes of our land, ministers, teachers automobile drivers, and men and women in public and private life, to get behind our safety movement, seriously and enthusiastically, for in no other way it seems to me, can we accomplish the purpose for which this great convention is assembled.

CHAIRMAN BENNETT: I am sure if that talk is to be prepared next year, whoever includes the speakers will include Mr. Ziegler's inspirational talk with those of Mr. Howard and Mr. Hale. We will proceed at once with our next subject, which will be handled by Dr. L. G. Harney, consulting surgeon, The American Steel Foundries, East St. Louis.

Health of the Steel Workers

L. G. Harney, M. D., Consulting Surgeon, American Steel Foundries,
East St. Louis, Mo.

Your secretary a few weeks ago, when he talked to me about speaking on the "Health of the Steel Worker," didn't realize what kind of a subject he had assigned to me. The health of the steel worker is no different from the health of the average individual in the same class and community in which he lives. Therefore, you can realize that he has probably assigned me a subject that means all the human ailments to which we are subject today.

I think it is time to really lay our cards on the table. Let me illustrate what I mean. I don't know how many of you have read Kipling, but he wrote a good many stories on "Tommy Atkins" or the "Soldier," and if you remember one of them, in a very graphic way that only Kipling probably can give, he described the feelings of a man who was frightened, scared. He described what the man said, how he felt, and then gave his impression of how that man must be feeling from what he said; and all of a sudden he woke up and ended the story by saying, "And this was I."

I think the time has come, gentlemen, when that point is going to come home to us, and instead of putting the burden on industry any longer, I think it is now time to wake up, as I am doing.

I am first going to take up a few of the things that I have inquiries about that may probably be of interest to you. The first point is the electric welder. You all know that nasty, little hurting burn that comes on in the eyes, when the eye begins to burn six or eight hours after, and if it is during the night you begin to lie awake with the pain. Let me say that I have investigated that very carefully and there are no X-rays in the welder. It is the same thing as sunburn—actinic rays. It affects the membrane of the eye, which is pretty hard to explain without going into a long scientific discussion; but I have had several cases over a period of time and have had it in my own eyes and there are no permanent results, either inside or externally.

On two occasions I have had men come to me who thought they had some trouble with the abdomen following exposure to the electric welder; and an investigation of these gentlemen showed, in one a case of gall bladder infection and in the other chronic appendicitis. There is, and can be, no internal effects from the rays of the electric welder.

I'll grant that you are going to have to take some things on faith today, but should any of you individually care to dispute the matter with me, I will be very glad to prove the statements I am going to make. I shall be careful not to make a statement which I can't prove, so I ask you to take it upon faith for the present.

✓ The Question of Exposure to Dust

The next point that I have in mind, and there has been considerable written about it, is the question of the sand blast, the exposure to dust. Thanks to your wonderful Safety Council and thanks to the present respirator, it is an absolute protection in the sand blast department. As you know, in most companies it is customary to inspect the sand blasters once in 90 days or oftener, to see if there is any indication of tuberculosis. I have had only one case in which tuberculosis developed, and careful investigation showed that this man's home life was the cause of the tuberculosis not, in my opinion, the plant itself. He had a child with a tubercular and enlarged gland that had broken open and a wife who was tubercular and had been for a long while.

I want to repeat that the up-to-date steel foundry is probably a more healthful place to work in than is the average home. With your ventilation, with your light, with your heating, with the convenient location of your laboratories, with your showers, with your locker rooms, I would say that you will find the up-to-date steel foundry a mighty healthy place to work.

The next thought that I might take up briefly is the question of core compound. You have probably all had experience of a core compound which has a phenol base and in the use of that, frequently there comes a dermatitis, a little burning and reddening of the skin. It gave us some trouble at first, but we soon found by unloading this material at night, putting on clothes simply for the unloading process and immediately removing them and then taking a bath, we got rid of this trouble. It is not permanent unless too often exposed or too severely over too long a time. At the present time we are having no trouble because we are carrying that point out.

Another inquiry which comes frequently is the effects of contact with the molten metal and the heat therein. You know most of us are swayed pretty much by emotions and we think something ought to be so because certain things that we haven't reasoned out may be true. We are really thinking of the fact that that metal has been heated to probably 2,800, 2,900 or 2,950 degrees Fahrenheit. Let's just reason a moment. What happens when you stick your finger in boiling water heated at 212 degrees? All right, that's common experience, we don't have to argue that at all.

Deduction No. 2 is that at no time is the heat which the individual is exposed to greater than 212 degrees. If so, it is nothing but a flash, because if you did you would get a burning of the skin just as you do in the hot water. No one has definitely measured the amount of heat that a man will be exposed to around the molten

metals, but what we all do know is that it is less than 212 degrees in which he gets a direct sustaining contact to the body.

What, then, is the trouble? We all know that on a hot, sticky, moist day in the summer time when we can't perspire, due to the fact that the air is filled with moisture, we do not get the cooling effects of evaporation or perspiration.

The next point that comes to your mind—and I know probably what you are thinking. You will say, "Well, but so many men are overcome by heat." Let's analyze this just a moment. Let's decide what heat exhaustion is.

Sunstroke, which may be experienced by being exposed to the sun, is one kind of a diseased condition. Sunstroke is demonstrated by high temperature, hot, dry skin and, if you have a severe enough degree, unconsciousness, and only comes from direct exposure to the sun. Heat exhaustion is characterized by cold, moist skin, plus unconsciousness only if it goes to that extreme. Death from sunstroke is not unusual. Death from heat exhaustion is rare.

Twenty Heat Exhaustion Cases in a Day

During a certain summer about five or six years ago at one of the plants with which I was associated, between seven and eight o'clock one evening we had 20 heat exhaustion cases. It was unusual and I immediately got upon the job, worked for days, and I will give you the answer that we arrived at.

The first thing, of course, that we thought of was our water supply. Carefully analyzed, we found it to be absolutely all right. We looked to any other unsanitary things that might be in this department. Nothing was found. What was the next problem? The individuals themselves. I was fortunate in treating all of these men and was able to follow them through (most of them were in the hospital) and here is what we found.

They were night men who had not slept well during the day. We had had a long period of six or eight weeks of very hot weather. The men's vitality was low, appetites were gone and almost invariably these are the facts as I found them. "I wasn't hungry this morning and I ate some cantaloupe and some plums instead of eating breakfast." They had been eating that way for several days. I came into the plant and in between the day shift and the night shift, the water supply had become very cold. The men came to work, filled their stomachs full of ice water and on top of plums and cantaloupe, there was one beautiful battle right there.

Since then, men in industrial work and those who are working on heat exhaustions, have definitely proven that heat exhaustions only come in those individuals who previously have a gastro-intestinal disorder. That may sound a little startling to you. You may want to question that. But, if you will check over, or your plant physician will check over, you will find this condition is there.

Those are the principal things that seem to occupy most of our minds today on the health as a probable or possible inherent hazard in the plant itself. This brings me to the point that I want to talk to you about. The question of "I."

Dr. Charles Mayo, two years ago last March, was quoted in the papers at a meeting of the Dental Society in Texas as saying that 87 per cent of all the deaths in America come from some type of infection, and of that 87 per cent, 87 per cent came from the teeth. I wish that Dr. Mayo had said, instead of the teeth, from a point above the lower jaw.

You gentlemen see daily in your plant a man who says to you some day "I stooped over to lift a core and I must have sprained my back." Gentlemen, without going through the process in arriving at this answer, maybe I can make you see that it is not possible for a normal back to be sprained by a simple lifting effort. Why? Just briefly, the sum total of muscles in the back are so superior to the sum total of the muscles of the arms that it isn't possible to put enough weight on the arms to sprain or overcome the muscle pull of the back. These men are frequently accused

of being malingerers. They are no such thing. The pain which they have in their back is many times greater than any injury that you can conceive of.

Some of the medical profession today are accepting what I am going to try to give you now. I am going to put in some of my own personal interpretations on this because I think it is worth consideration.

The average laborer's diet, gentlemen, is what? Meat, potatoes, bread, butter and coffee. That does not contain any of the vitamins which are necessary to good health. Have any of you been out camping and eaten the camp grub for a long while and began to get a sour stomach and wanted a pickle. A call of nature for vitamins, definitely and positively.

More Rough Food Is Essential

Our dentists tell us if we do not begin eating more rough foods that in the near future we will probably be a toothless race. Do you remember what your speaker said to you today, that you shouldn't quote a theory which is prejudiced? The dentists are prejudiced because it is in their line. Our breakfast foods are without roughage or coarseness and if we don't soon get a massage to the gums we are going to have a good deal more difficulty than we have had in the past.

What is a local infection? You gentlemen are hearing of this right along. Let's talk about it for a moment. When an abscess appears in some part of the body, it does not necessarily mean that all the symptoms from this abscess or this pus are localized at that point. When you get a headache, that isn't a sign that you have an abscess in the head; it is the sign of increased poisons in the blood, or toxinemias, as we speak of it. The infection that produces this most commonly comes from an area originally above the lower jaw, teeth, tonsils, adenoids, the different cavities that may get pus in them when you have a bad cold, and from that one or two things may happen. Either you will get painful areas lining the muscles of your back, or this infection or pus may travel to another part of the body.

It may be interesting to you to know, not just from the standpoint of the steel worker, but from the standpoint of the individual, doctors today are practically agreeing that before you can have appendicitis, gall stones, gall bladder infection, duodenal ulcers, gastric ulcers, that in the great majority of cases your infection starts at a point of entrance through the mouth. Our school inspections today are directed toward this and I think that is the place where the actual work is going to have to be done—habits of youth. I say this because at one of the plants with which I was associated, the plant manager at one time rather objected to the fact that men who had loose, pussy teeth that you could wiggle around anywhere, were not passed as first class risks. Some of the men were very expert workmen and naturally in good condition at that time, but were objected to by the plant manager because we were turning them down as not first class risks.

An Experiment With the Dentist

We then made this experiment. We took a certain number of these men, sent them to their dentist, had the teeth cleaned up and when they came back with their teeth in good shape (those that were capable of being cleaned), we put them to work; and again in 90 days we looked these men over and they were back to the same condition practically as before. Why? Because the habit of years cannot be easily overcome. We learn careless habits. In our youth we must learn the care of the mouth, the habit of those things that are best for us to do. Frequently, later in life, we cannot get people to learn to live that way.

Why do I bring this point up? There is practically no injury of a bone or joint that is not affected by a physical condition in this type of person. You take a joint, a sprained ankle, that ordinarily should last from two to three weeks, but in this type

of person it lasts four, six, eight and even twelve weeks. Gentlemen, you don't need to worry about what is the matter, your only trouble is to find out where the infection is and try to correct it. This brings up the point, what are we going to do about these physical examinations for the men who do not pass the examination for work? It is a question of simply informing these gentlemen what they have and try to let them get it corrected before troubles start.

Another thing that was interesting about those experiments was the question of checking these men with these conditions alone and finding out how soon these men would come in with back complaints or supposedly sprained ankles or some other condition similar to muscle mialgia, or rheumatism. You will be interested to know that 25 per cent of these men in the next three months (this was in the fall of the year when the cold weather produced certain things that we always find in the fall) came in with just what we anticipated.

How Toxemia Will Develop

You will say, "How does this particular thing interest us from the standpoint of the metal worker?" Maybe I can make you quickly see what I have in mind. How many of you have ever gotten out of bed in the morning when the wind happened to blow just a little too strongly on the side of the bed, and you couldn't get your neck around? What you are doing when you are carrying an infection, is somewhat like a man that is carrying a bank balance of only \$150. Suddenly something comes along when he has to spend \$300. He is \$150 in the hole, and it is a lot harder to get out and on the level again, and that is exactly what happens. Your resistance is low. This little exposure to the draft, sudden chilling of the body, quickly breaks the resistance farther and you start in to have trouble with toxemia.

We say, "Why worry about this particular thing, when it is the individual's viewpoint alone, rather than industry?" No, gentlemen; it is not. I think that industry today is beginning to look at these problems from the standpoint of an altruist; our life should be happy, definitely happy, and you can only be happy with good health. But there is something further than this; that is the duty we owe to mankind. I think lots of times we lose just the little contact that we need for knowing why these things are taught.

America is (I am sorry to say) at times pretty much mercenary. Maybe that is fine; maybe that's the motive force that drives us on. But we mustn't lose sight of the fact at all times that there is more to life, and I think industry is seeing that more and more as time goes on. What is my point? Did you and I have anything to do with the manufacture of electric lights or electricity, originally? Did we have anything to do with the planning and building of this building, of automobiles or of airplanes? Not at all. We are enjoying things that were given to us by our forefathers. Duty demands that we transmit to those who come after us the best also that is in us. Anything less than best is a slacking. Therefore, gentlemen, I do say, in maintaining my point, that the element of the individual in the steel industry must now be given attention because I think that industry, particularly in the metals section, has gone just about as far as it can go as regards any inherent hazards.

The Problem Is Up to the Individual

The problem now is up to the individual man, demanding that he himself do what he can to adjust the cause of absenteeism in sickness and industry.

CHAIRMAN BENNETT: We will proceed at once with Mr. Oartel's paper since he is called home on account of serious illness and we will defer the discussion of other subjects until after his slides are shown. I am sure we will have comments on Dr. Harney's excellent address.

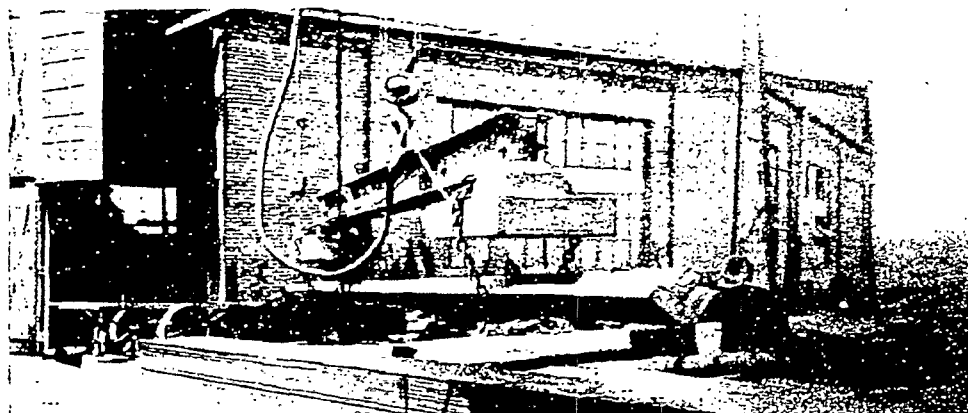
Late Developments in Safeguards

John A. Oartel, Chief of Safety Bureau, Carnegie Steel Company, Pittsburgh, Pa.

While we are getting the lights, gentlemen, I want to say that this has proven a very interesting thing to me for the last three years. This is the third time we have put a feature of this kind on, and I had a little reaction just about a month ago. I gave these pictures to the NATIONAL SAFETY NEWS after the Congress and they published one in the September issue; and I had a letter from New York and two letters from near Pittsburgh, asking for information about that device, so I think this is something that is finding, or filling a want, in the iron and steel industry.

Now, as they are shown on the screen, I will read a description of them and maybe someone here is acquainted with the industry which has given me these photos, who will explain more than I can.

The first few pictures are from the Commonwealth Steel Company, furnished by our good friend Ed Quesnel.



Slide number one

Slide No. 1. Note the safety chains used on this electric magnet to catch the load should the power be suddenly cut off. This device was perfected and is now used by the Commonwealth Steel Company, Granite City, Ill.

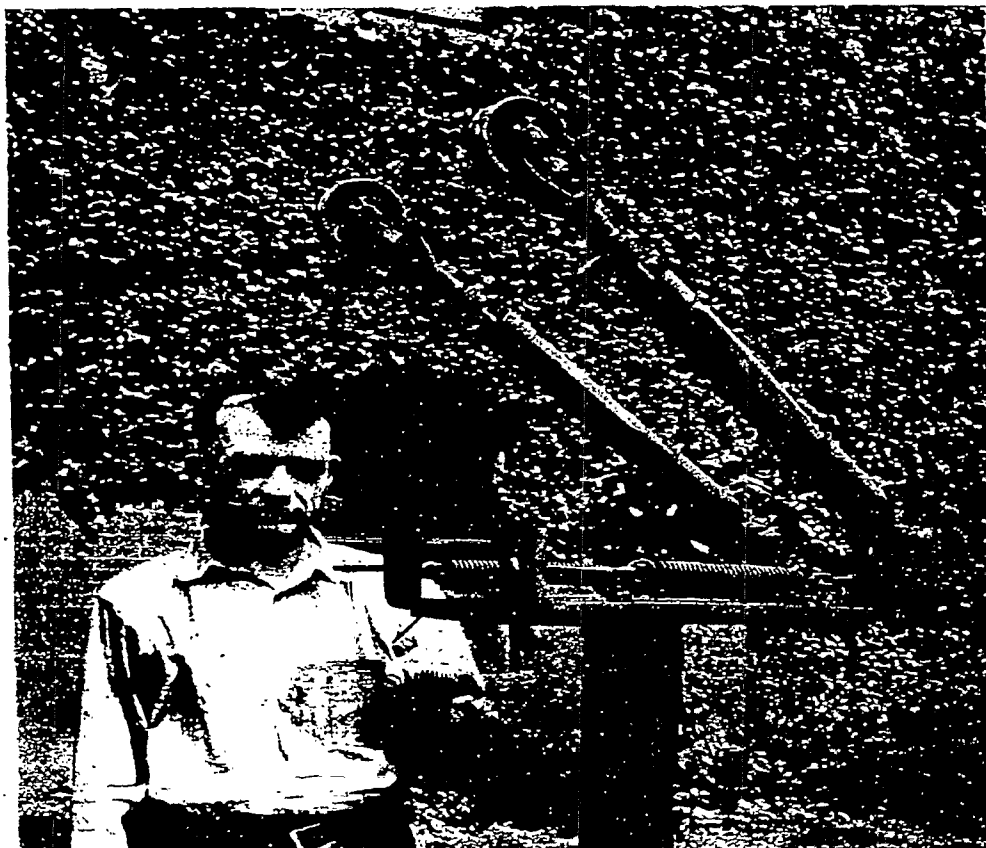
Slide No. 2. This safety trolley pole for cranes and yard gantry was also developed by the Commonwealth Steel Company, Granite City, Ill. These poles are so constructed that should the wheel fly off the trolley wire, the spring will pull the pole clear of cross arms, which hold the trolley wire, thus preventing the pole from being broken. Note how short the pole has been made.

Slide No. 3. Note how the Jones and Laughlin Steel Corporation, Pittsburgh, Pa., has effectively guarded the moving parts on this hot mill. This guard is held in place by two eye bolts and is provided with a loop so that it can be very easily handled by the crane.

Slide No. 4. The Gorham Manufacturing Company, Providence, R. I., fortunately installs the safety device, shown in the lower left hand corner, on all drop hammers. This shows the value of this device, as the eye bolt on this machine broke a few days after the machine itself was installed. The operator's fingers were saved.

Slide No. 5. The end of the roll, illustrated here, is the point of operation. This half round iron guard is simple, but positively safe. This is another development by the Gorham Manufacturing Company, Providence, R. I.

Slide No. 6. This illustrates a very clever square shear guard developed by the Gorham Manufacturing Company, Providence, R. I. This guard is automatically controlled, drops ahead of the knife and follows the knife up.



Slide number two

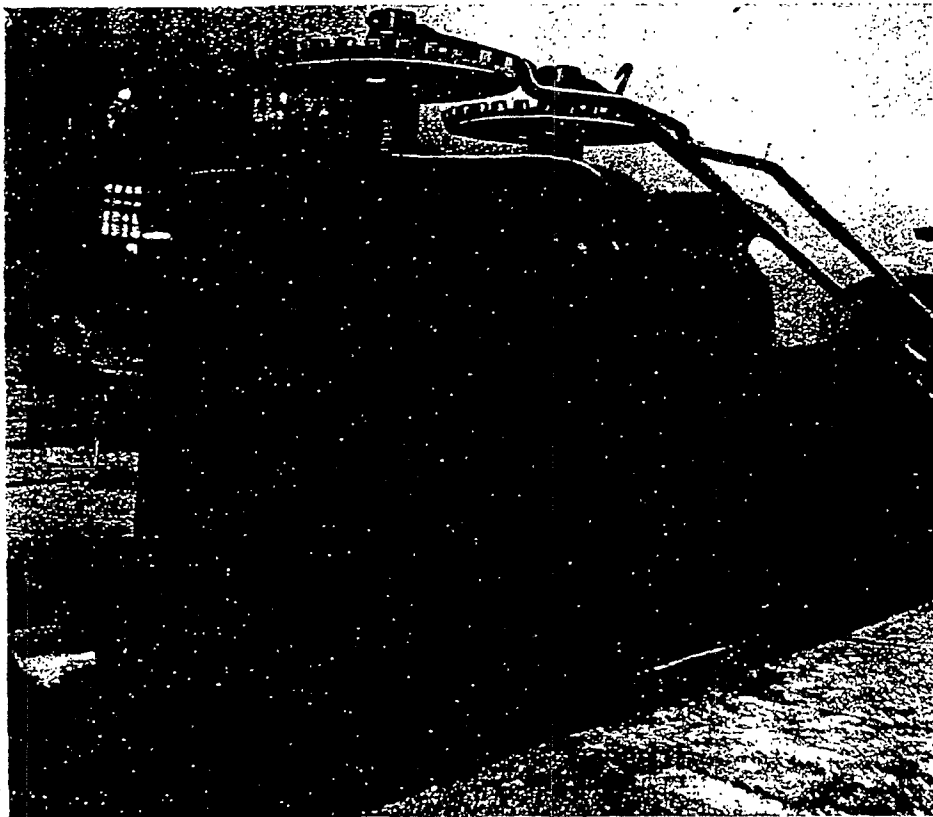
Slide No. 7. This acid carboy inclinator, equipped with glass splash shield, is now used by the Gorham Manufacturing Company, Providence, R. I.

Slide No. 8. This plan is used by Midvale Company, Philadelphia, Pa., to refresh employee's memory on safety rules. Rules were printed in ballot form and submitted to every employee with the request that he mark with an X the particular rules which he considered as the most important to him. Seventeen hundred employees read over the eighteen rules and each one returned a fine ballot. The rule that received the most votes was No. 2 which read as follows: "If you are injured, no matter how slightly, while in the course of your employment with

the company, you must report at the works dispensary for treatment immediately."

Slide No. 9. This guard is now used by the Bethlehem Steel Company, Steelton, Pa., on all swing grinders of this type. Note that the operator is fully protected and that he is also wearing goggles.

Slide No. 10. This is another type of swing grinder used by the Bethlehem Steel Company, Steelton, Pa. Note that the wheel is provided with a very substantial retaining hood as well as an exhaust system vented to the outside.



Slide number three

Slide No. 11. This face mask is used by men at Bethlehem Steel Company, Johnstown, Pa., when cutting rivets with rivet buster in car shop. When men wore goggles these goggles were broken and the face cut from rivet heads striking some other object and flying back. A King face mask was equipped with standard goggle lenses and a one-half inch mesh screen on hinge.

Slide No. 12. This large collar is now used on all hot metal ladles of the Bethlehem Steel Company, Johnstown, Pa., to prevent the crane hook from catching on the ladle trunion and causing the ladle to tip.



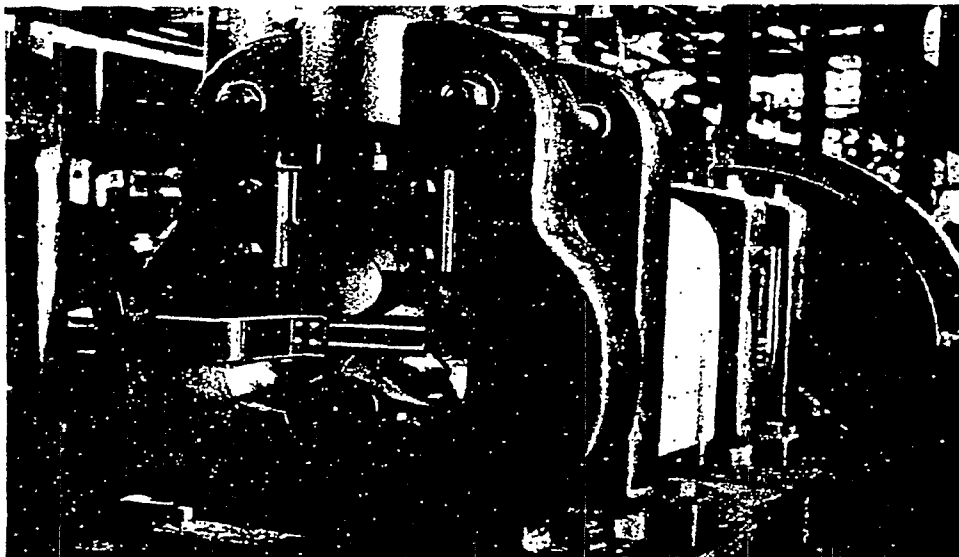
Slide number four

Slide No. 13. Flickering red lights over passage ways from charging floor to gas producers are provided, as illustrated, in the South Works of the Illinois' Steel Company, Chicago, Ill. These lights are installed on each passageway in a position where they can be easily seen. This is a warning that engine and cars are entering the building on these tracks. About fifty feet outside the building is a switch arranged with a trigger (illustrated in *Slide No. 14*). in the rail so that when

cars pass over the trigger the light begins to flicker and continues to do so until the train passes out of the building and throws the trigger in the opposite direction.

Slide No. 15. This trough used by the Duquesne Works, Carnegie Steel Company, takes care of bars running back from the roughers. The bars run back and up this trough instead of coiling around on the floor which was formerly the practice and was considered a hazard in the mill.

Slide No. 16. This slide shows a section of cast house at blast furnaces of the Edgar Thomson Works, Carnegie Steel Company. The shutters in the runners are controlled from the cast house wall.



Slide number five

Slide No. 17. This illustrates a blow-off muffler installed on narrow gauge locomotives of the Edgar Thomson Works, Carnegie Steel Company. This muffler is similar in construction to the automobile muffler.

J. A. OARTEL: That's all, gentlemen. I want to say, if you want this feature to be successful, you will have to send in photos and they should be in to my office at least six weeks before the Congress starts because they have to be sent away to be put on this bill.

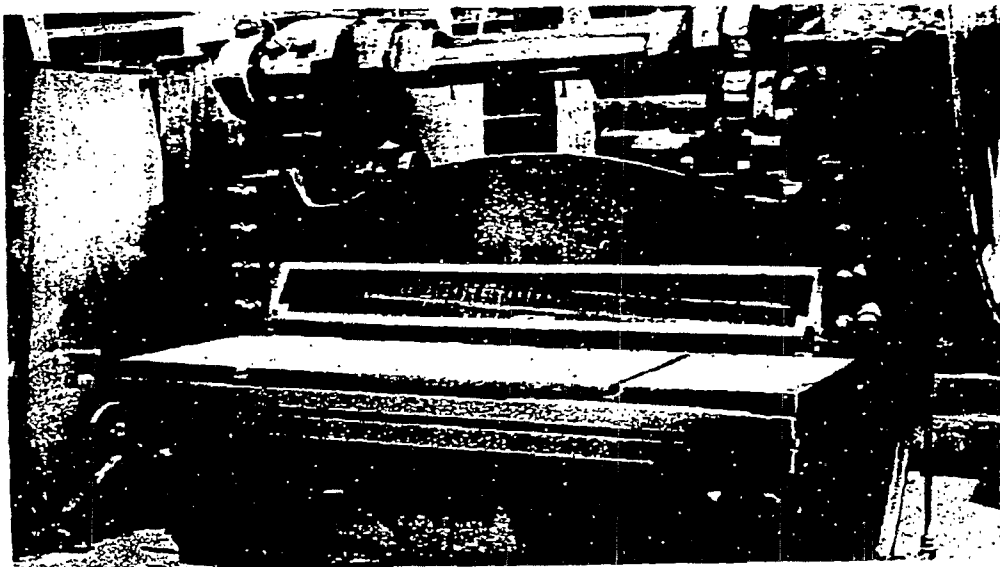
CHAIRMAN BENNETT: I am sure, Mr. Oartel, we appreciate very much your efforts and work along this line. I know it is certainly the hope of everyone assembled here that your wife's illness will not prove serious.

I am not going to take time to introduce all the incoming officers. I will present Mr. Northwood as chairman-elect to conduct the remaining portion of the meeting which is "Your Hour."

It gives me great pleasure to present Jack Northwood.

(Mr. J. A. Northwood, Bethlehem Steel Co., Johnstown, Pa., took the chair.)

CHAIRMAN NORTHWOOD: I attended the Public Speaking session this morning and



Slide number six

I have the method of doing it in my pocket, so I am all right. Public speaking is not my line, but I have one desire in our Metals Section and I think it is the desire of all of our executive committee, and the majority of our members, to make this Metals Section the biggest section of this tremendously big conference. We can do



Slide number seven

it, men, but we have all got to pull together. These are days of slogans and I would like to have our Metals Section called "The Friendly Section."

Now we speak a whole lot about what friendship means, friendliness, getting a little closer together; but what we want, fellows, is to get a little closer to each other. Our problems are all the same, no matter what kind of a plant we come from. It is the human element that we have to deal with. It is the human element that we have to reach. We have got to do our work with a spirit of enthusiasm and with all our hearts, if we are going to be successful in carrying on our no-accident pro-

The Midvale Company
SAFETY CENSUS
 1-28-27

In an effort to determine their relative importance, and to improve them, we submit to every employee in the Works a copy of our Accident Prevention Rules, with the request for criticisms and suggestions. Use reverse side for remarks.

Check the particular rules which apply to YOU PERSONALLY.

- ☐ 2 If you are injured, no matter how slightly, while in the course of your employment with the Company, you must report at the Works Dispensary for treatment immediately.
- ☐ 17 A neat and orderly plant means fewer accidents. Cultivate the cleanliness habit. After you eat your lunch, all paper and rubbish must be placed in trash cans.
- ☐ 18 As so many injuries in the plant occur to the feet, you are advised to wear the heavy box toe safety shoe. For further information, ask your foreman.

No. _____ NAME _____

Write your number, sign your name carefully, and drop in ballot boxes. We must receive a return from every employee in the Works. Reply promptly; do not make it necessary for us to go after you the second time.

THE SAFETY COMMITTEE.

Slide number eight

grams. It is getting harder each year in all our plants. The harder it gets, the more necessary it is for us to put our heart and soul into it and give it all we have.

There are men here in our Metals Section from all over the country. We have one man from our company who is from San Francisco, who came here to attend this conference. I just wonder what his impression is, whether he feels that we are friendly and earnest, or what it is.

Can we not get together a little closer, introduce ourselves to the other fellow? Men have been coming to this conference for years and never met John Oartel, who is an outstanding safety man from our Pittsburgh district. Well, now, John isn't a hard man to meet. Step up to him. A man came to me yesterday and wanted to know if I wouldn't introduce him to Mr. Oartel. Great guns, go up and tell him who you are and he will introduce himself to you.

Now, fellows, that's the spirit we want to get. Let's pull a little closer together and I am sure we will accomplish bigger things and better things for this coming year. It is a great game we are in. It is a game of life and it is worth while. It takes us all.

Mr. John Eib of the Illinois Steel Company is one whom I want to introduce at this time as our new secretary. He is going to be the editor of our News Letter. Fellows, what that News Letter is depends on you as individuals. What you send in to John Eib for the News Letters is what is going to make that letter a success and a help to us all. I don't know how many of you fellows enjoy that, but I look

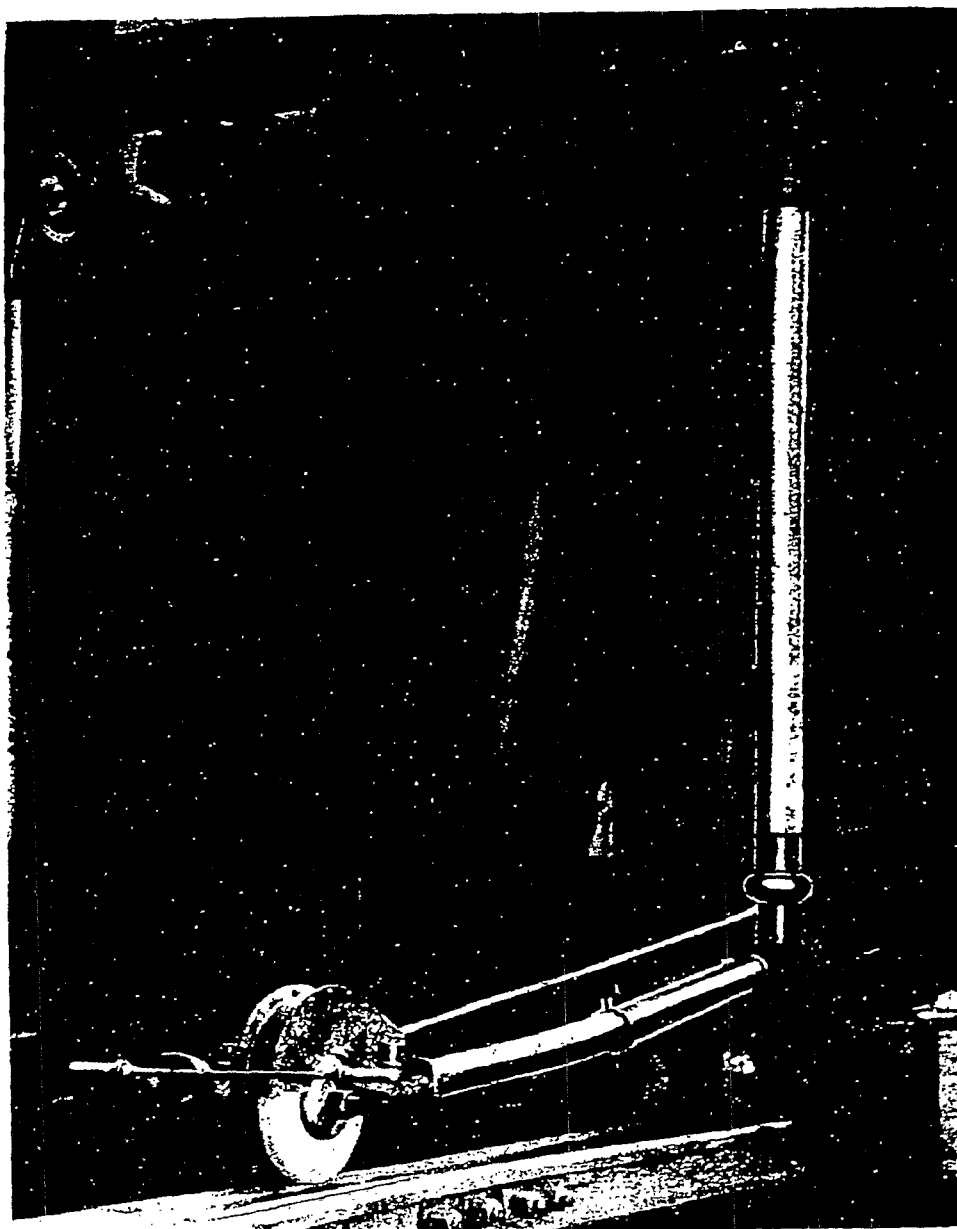


Slide number nine

forward to receiving it and peruse it very carefully. It is worth while. I know what it means to edit it. I acted as secretary for one year and it is a hard job to pull out from the atmosphere something that we want to get across that will be of interest to the other men throughout our section.

We have 700 members in this section and we want those 700 men to feel free and easy in bringing their problems to us. Perhaps, we can't help you solve them, but we will do the best we can. Just give us the chance. Write in to John Eib, of the Illinois Steel Company, at Joliet, and he will get the question in the News Letter and someone in the organization will be able to give you the help that you need. So much for that.

Now, then, I don't want to jump your outgoing chairman and I don't want to jump to "Your Hour" until we have that discussion on the talk of Dr. Harney. That, to me, fellows, was the most practical talk on health in the plant that I ever heard, and

*Slide number ten*

I know that there are some men here with questions to ask Dr. Harney about that talk. Let's be snappy about it. Let's be quick about it. Let's put some pep to it and we will have something that's worth while.

O. D. MOORE (Pennsylvania Railroad Co., Philadelphia, Pa.): We have three electric welders in our shop and use them in welding coppers and wet places on angles and things of that sort and quite frequently it becomes necessary for us to have fitting gangs in this welding department. There are about two helpers and a foreman. We had an awful lot of this difficulty of which you spoke, of men going home at night and getting up the next morning and not being able to come back to work and they lost two or three days' time (their own time, of course, because



Slide number eleven

they get no compensation) and then they come back and refuse to go back into the welding department again because they figure they are the losers and are not getting anything out of it and you can't blame them.

Of course, we send them to our eye specialists and he fixes them up temporarily, but they refuse to go back to work. We hit upon the idea of going to an optical company and getting amber colored glasses. They are so constructed that they have a shield on the side so the light from the welder can't get in.

Are injuries in these cases permanent? I would like to ask Dr. Harney if he thinks our efforts in that direction are right, and if not, what he would suggest?

DR. L. G. HARNEY (American Steel Foundries, East St. Louis, Ill.): Gentlemen, in talking to you, I only laid the ground work of what I hoped that you would ask me and this first question I am just delighted with.

Yes, your goggle is the thing. It is an amber glass you say?

MR. MOORE: Very light amber glass.

DR. HARNEY: The Julius King Optical Company is using a glass for the electric welder and that is your protection for electric welders. Now, I went out, personally, when these things came out, and stood around the electric welder purposely to get a burn. I did it just as deliberately as anything could be done. It was about 3 o'clock in the afternoon when I left. About 1 o'clock the next morning, I was in a confused state, my eyes just simply burning terrifically, and my

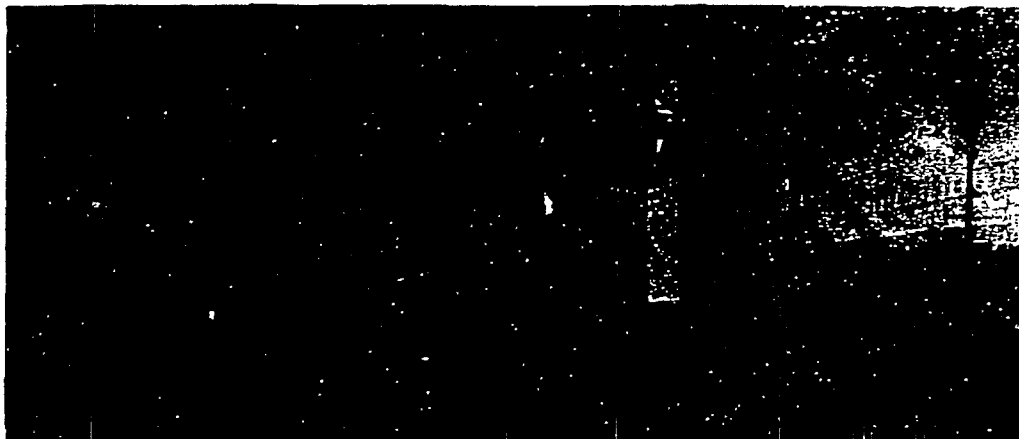


Slide number twelve

first thought was that I had happened to get something in my eyes. As soon as I got awake enough, I knew what was the cause.

With all my experiments, I find that packs of ice put on those eyes immediately give you the quickest results. Just take some ice, put it in a cloth and lay it right on your closed eyes. It is nothing but an increased congestion and I find, by my own eyes, they were feeling first-class, without the application of adrenalines, borac acid, etc. It isn't really an infection unless it has gone too far. Your cold application will probably give you the quickest and most satisfactory relief and ice is the thing I would use.

Your goggle is your protection, and that is what you must use, because anyone who gets exposed to that ray (and you don't have to be right on it) will find it

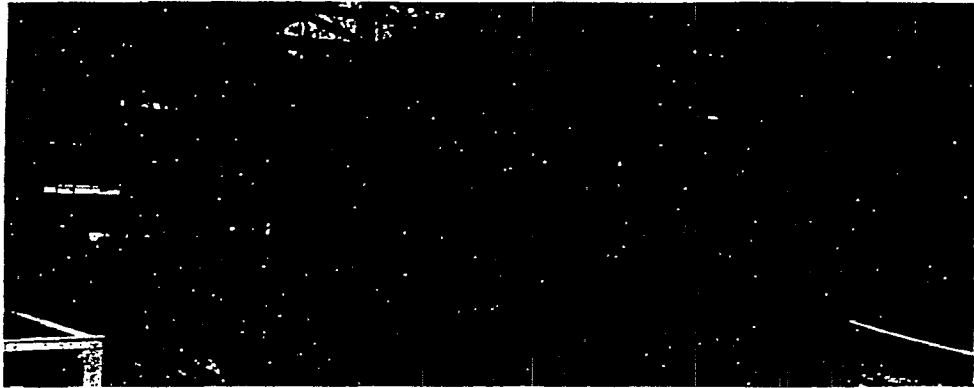
*Slide number thirteen*

painful. In electric welding on the street-car tracks, you will sometimes see a sign up, "Do not look at this light." It is purely an actinic ray and has that quality of burning even at quite a little distance. We have looked over these eyes during electric storms with static electricity when they get this sort of burn from arc when switch blows out and I know one man who has worked for 20 years with such frequent exposures and I had the privilege of examining his eyes to see if it would make a permanent burn. It did not. It is purely a congestion.

Now, then, your men don't want to go back to work. Why? Because they don't know these facts and I don't blame them, after having the amount of inflammation and that awful feeling. I would be afraid to go back to the same thing if I didn't know it couldn't do me any permanent harm. Your treatment is in your ice packs, and your goggle should be supplied as a protection to all electircal welders.

MR. MOORE: Will these light amber goggles do the stuff?

*Slide number fourteen*



Slide number fifteen

DR. HARNEY: The welding goggles are to be preferred.

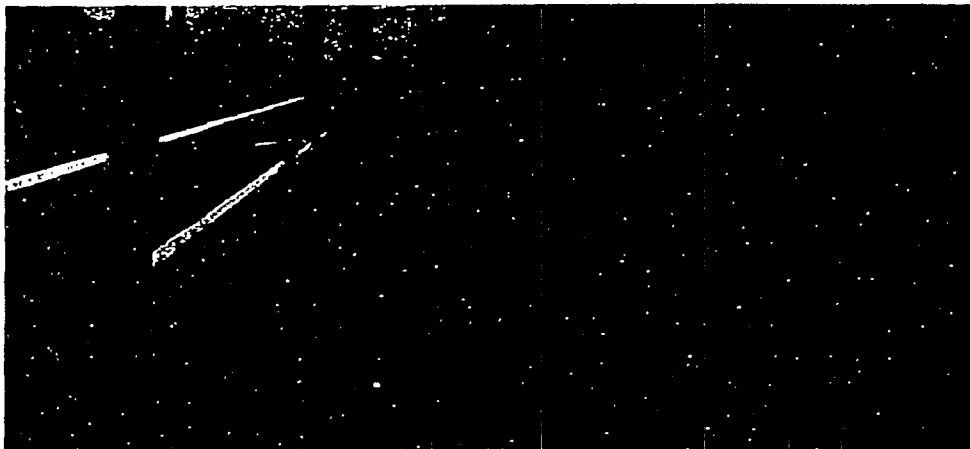
MR. MOORE: In this case, you will understand, the fellow who is doing the fitting cannot see the marks on the blue print and that is where the trouble comes in.

DR. HARNEY: He can't see until he turns on the light in the welder, and makes contact. You won't be able to see it until the electric welder or the arc is in operation, but you will with that.

MR. MOORE: You will understand, the fellow who is fitting material together will have to take them off when he is doing it. That means the other fellow will have to stop.

DR. HARNEY: You will not be able to do close work without the electric welders and you can signal the other fellow before you turn it on.

WM. A. HAUKAP: We do a lot of welding, and we have found that the American Optical Company goggles never wear. The Novi-weld Lens Goggle will, and



Slide number sixteen

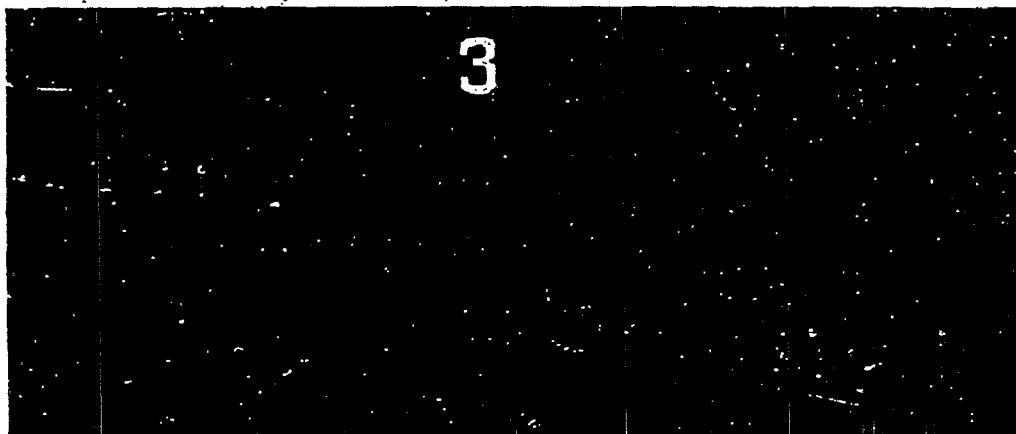
we get sufficient protection from this goggle and you can absolutely read a blue print. I have read many of them myself, as I happen to be an inspector as well as safety supervisor. Of course, you can't do that in the first fifteen minutes, you have to get used to it.

W. S. ELLIS, JR. (American Steel Foundries, East St. Louis, Ill.): I think he is going to get into trouble if he does have Novi-weld goggles; that is for acetylene and it takes a darker shade where you are around the light very long.

MR. HAUKEP: We have been using them for about eight months and haven't had any trouble. They will give you the protection.

CHAIRMAN NORTHWOOD: There isn't any one special goggle of any kind. They all have the different shades. Some call for the darker shade for welding.

MR. HAUKEP: I believe there are 14 different shades and almost any one of them will protect you. Of course, if you have very heavy work, it should be a little bit darker lens.



Slide number seventeen

E. G. QUESNEL (Commonwealth Steel Co., Granite City, Ill.): For the information of members who have employees only occasionally subject to the welder light, such as crane men traveling above the floors and getting flashes from a distance, and men working in the blue print rooms where they have to look at their incandescent arc occasionally—frequently we were having quite a little trouble with that and we couldn't put a colored glass on them because it interfered with their vision.

We ran across a lens known as "Ark weld," which is almost transparent. One shade of it, as far as I can tell, is absolutely transparent. It is made in three shades, the darkest shade has just a tinge of color. Now, this lens enables a man to take the electric welding flash or the incandescent arc flash without any apparent harm or discomfort to the eyes, and our crane men are now wearing these lenses as well as the men in the blue print rooms and we are having no trouble whatsoever from flashes when they are from a distance.

It is a new glass and, so far as I understand, it hasn't been on the market very long; the glass is ground about one-half inch thick. It can be ground to prescription and also can be ground to the regular goggle lens, but it gives you lots of comfort and does not interfere with the vision.

CHAIRMAN NORTHWOOD: All right now, so much for our electric welding side of the question. Is there anything else in Dr. Harney's paper that we want to bring out?

S. G. SLADER (East St. Louis, Ill.): Referring to the question of sprains to the back, Dr. Harney, I gather from your talk that it was impossible for a man to strain his back because the back muscles are stronger than the muscles of the arm. The question in my mind is whether or not a man can strain his back by the position he places himself in.

DR. HARNEY: That same point was brought up when I talked to a group of doctors. You will notice that I said "a normal back cannot be strained by a simple lifting effort." Now, then, if you don't come in that "normal" class you are going to take me into the abnormal class, which, of course, this is not the place to discuss. That is a matter ingrained and not of disease.

The Pain Really a Form of Rheumatism

I think maybe in my talk I just didn't quite make plain what this pain in the back is due to when you make your lift. This is really a form of rheumatism. Someone said he had found a cure for this, which was, "Don't let it happen." I think preventive medicine will be found so that in the future you will not try to cure a thing which has happened; you will try to prevent it from happening, and the medical profession is beginning to recognize that today.

What happens in these backs? They get a little inflammation around the joints from any source. The muscles become painful, just like any muscle around an inflamed joint. A lift is made, the muscles come into contraction and the muscle being painful, the more the contraction the more painful it is, and so you have got a vicious circle. Now, then, this pain which comes on immediately and is awfully disabling in this type of back—not the back that has a dislocation, nor the back which has a displaced something—but the normal back, cannot be injured by a simple lifting effort. Now, then, here's what I am getting at. If this back which is of the rheumatic, or lumbago type, it doesn't carry over what I want, as not being injured, but diseased.

If this type of back is treated as an injury, he will be going from six to eight months or a year with a painful back. If the cause of this pain (and it is the doctor's job to definitely demonstrate that there cannot be and is not any injury), is treated as an injured back by putting on an adhesive plaster and you don't stop to remove the cause, then the man seldom gets well soon. In a series of over 500 cases, it took from ten days to three weeks as a maximum.

It is the very point I am bringing home to you now, that too many of these diseased backs are being treated as injuries. Given a diseased back of this type and they are one of the easiest backs that I know of to have injured by a simple lifting effort. Am I going to say nothing happened there? Not at all. I tell you that a diseased back must always receive a proper test. Why? Because it is a potentially weak back.

Keep the Body in a Healthy Condition

Now, then, don't try to treat that back as an injured back. What I am after, gentlemen, is to try to get these men back to work as soon as possible by finding the cause and removing it. Take, for instance, a little yeast advertisement which you will see in every big magazine, "I have been feeling badly when I get up in the morning. I have pimples on my face." Eat yeast and get well. That isn't as silly as it sounds. What is he doing? He is putting in the vitamin content that puts your food over in the right way. But why get to the place of taking yeast the rest of your life? Why not do the things to prevent it? Then watch your symptoms disappear.

No, the normal back may not be injured in the way I told you; the other type, yes; but it is up to the doctor to find what you have got.

CHAIRMAN NORTHWOOD: I don't think there is one thing that gives us as much trouble as that old bugaboo of a sprained back, and sometimes it puzzles the doctors to determine what it is. It is a hard problem and I am very glad it has been brought out in this discussion.

J. F. COLLINS (Youngstown Sheet & Tube Co., Youngstown, Ohio): I would like to ask the doctor if he connects heat exhaustion and muscular cramps with men working in a hot temperature?

DR. HARNEY: Yes, sir; that is a very peculiar thing. This gentleman is the greatest ally. Now he has asked the question, and has brought up a point that I would like to have raised before. What is my answer on the question of muscle cramps in heat exhaustion? Do I think it has any connection with heat exhaustions or any connection with toxemia?

After a Little Party Is Over

How many of you have been out at a friend's party some night when you had a little poker game, and the next morning you drank lots of ice water and had a little headache? What do you suppose was behind that, gentlemen? Here is what happens. It is really very interesting, too. This man who collapses from potential heat exhaustion, is already a man who is filled with toxic products that ought to have been eliminated before that time. Why is it on this particular day the man gets heat exhaustion? Because he is physically unfit. Why doesn't every man who is exposed to the same heat conditions suffer from heat exhaustion? Because he happens to be in better physical condition.

There is too much toxemia, for your intestinal tract is a long tube and the big colon is nothing on earth but a cesspool. Now, I am not trying to criticise God's construction of us. But it is a cesspool. This man may have been drinking alcohol, which takes up water and holds it so that the water is not available for washing out the poisons of the body. Have you ever watched your wife put sugar in water so that finally the sugar will settle to the bottom? There is a point of saturation for these poisons beyond which you may not go. If you have a four-inch sewer and want to flush that sewer out, you can't put in one inch and hope to flush that out thoroughly. We create in urine, each day, 1,500 to 2,000 c. cm., or approximately a quart and a half, of water. A quart and a half of water is probably six to eight glasses. Therefore, if you don't put in enough water to clean these poisons out of the system they can't be carried out. Consequently, each man should drink in twenty-four hours at least one glass of liquid for each ten pounds of his weight.

Heat Exhaustion Denotes Intestinal Trouble

This man of the heat exhaustion is a previous intestinal tract individual. We have proved that beyond a doubt. What is happening? He has such a low degree of clearance for his toxemia that when his heat exhaustion comes on his muscle contraction starts in. Due to what? Due to an over-abundance of toxemia in these muscles when he works and the arm gets stiff, just like the day you have gone out and pitched a game of ball when you are not used to it. The blood supply was not able to take away the toxemia. It is another proof (thanking you for bringing it up) of the thing that I am telling you, that heat exhaustions primarily are first intestinal toxemias, and toxic muscles always cramp.

CHARLES W. HANKO (Pittsburgh Steel Co., Monessen, Pa.): We had, the first part of this month, about ten of these cases. You know last month was pretty cold and the first week of this month was very hot; we wondered if the weather conditions didn't have something to do with it. We had some of the most foolish back ailments you ever heard of. One fellow got a sprained back, and another fellow who

was wheeling a 25-pound piece of ice through our plant, as he was setting the wheelbarrow down, got a sprained back. We had a hard time trying to convince him that he didn't have a sprained back. Of course, the doctor said it was due to his job and he agreed that it was weather conditions and I just wondered if the doctor would agree with us on that statement.

DR. HARNEY: I absolutely will. Here is the thing. In cold weather there are two elements. In cold weather people drink less water than they do in hot weather. The elimination by perspiration is relatively very much less then. Now, these attacks may come on. You get a little chill and that is how it happens.

Here is the same thing again. What happens when you walk out first from a warm room. The vessels of your face contract and you turn pale. After you are in a little while your face begins to glow and this is adjusted. There is a sudden contraction of the muscles and that is what happens in these cases; and still a further degree, you have to eliminate the size of the vessel. Your weather has a lot to do with it.

Information of Value to the Medical Man

I tell these men when I am treating them (when I find out the causes), "You are getting along all right now in the summer time, but when cold weather comes on again you probably will experience another of these attacks if you don't take care of it." We have more trouble with this in the winter than we do in the summer.

CHAIRMAN NORTHWOOD: Is there anything else in Dr. Harney's paper that you want to bring up?

J. B. ORBISON (American Radiator Co., Kansas City, Mo.): I would like to ask Dr. Harney if we can carry the message back to our plant doctors in quoting his name in connection with the points that he brought out in reference to back injuries or sprained backs, because that is something in our plants which we have in an aggravated condition.

DR. HARNEY: Yes, I will be very glad to have you do it. I will even go farther than that. I was not able, of course, to go into the scientific reasons why this is so. I will even do more than have you quoted this meeting; I will be very glad to mail him a paper I wrote in which there was a beautiful bunch of discussion; I will be glad to mail him that for his own investigation. I mean, he don't have to accept my stated opinion, he can go back and check those things through. It is a very interesting study.

MR. ORBISON: I think we are overlooking a very vital thing in connection with this Congress, in that we don't have our medical doctors from our plants in attendance, as well as our so-called safety directors. I think that is something to give attention for the coming year.

CHAIRMAN NORTHWOOD: I think you are right.

Problem of Compensation for a Lame Back

R. B. KELLEY (Anaconda Mining Co., Anaconda, Mont.): The doctor has brought out a point which is very annoying to us in the mountains and that is this back ailment. I would like to ask the doctor, as physician for his company, if an employee came in with a lame back, would he consider it a valid reason for that man to collect compensation under the law of the state?

DR. HARNEY: I have probably been more open in my statements to you gentlemen today than I have ever been before in my life, either in a medical group or elsewhere.

You have had me in a little bit embarrassing position, but I am going through. The manager of my Casualty Department is sitting within three feet of me and I am going to tell you what they do. For seven or eight years he has been my good help in sticking with me and being convinced of the things which I am showing are true.

Here is what we have been doing with our cases, gentlemen. The legal right for a man to collect under this sort of a condition is being aired in the courts every day. I am brought into court practically two or three times a week to answer the question that you are giving. In Missouri, with the new Compensation Act, they have said that where no evidence of bone injury or injury to the soft tissues can be demonstrated, either by X-ray or clinically, that the man will be entitled to approximately three weeks' disability and that is the end of it. In Illinois, that isn't being held so. But today the courts and the arbitrators are beginning to recognize that what I have told you gentlemen today is an accepted fact.

This plant with which I work has done this and it is highly complementary. When a group of medical men once said to me, "Well, what do you do with each case?" I said, "In five years, if you can find one single case in a back injury, sprain or otherwise, outside of a broken back, that has been brought before the arbiters, I will make a donation of one thousand dollars to any charitable organization you can name."

Treatment Prescribed for the Cause

What do we do? We put them to bed at once. We put them on a diet and try to find a treatment for the cause, wherever it may be—intestinal tract, teeth, tonsils, bladder or elsewhere, and this company has been nice enough, because our period of time is from ten days to three weeks, to carry it on the basis, in the majority of cases, of a casualty. We do not explain to the men when they first come what it is. Why? Because they aren't in a position to accept it. But when you tell a man at the end of three weeks what is wrong, with a back that hasn't let him sleep day or night, you will find he is interested, ready to receive what I am trying to tell you gentlemen today. At the end of the time, we tell him where his trouble is, what he can do to get rid of it, and then he accepts it. Why? Because we have proved the statements that we made, and there has been no case brought up where they have been treated by this particular company, simply because we give the best results and best interests for the men.

If they are treated that way, there ought to be only a short time of disability.

The question of legality isn't for me to answer. I can only tell you that in the cases in Missouri, and some in Illinois, some of them were beaten and some of them were not, where there has been a case of injury; but that is a question of policy and I can't tell you what to do. That is what your plant will have to decide for itself.

R. B. KELLEY (Anaconda Mining Co., Anaconda, Mont.): We have in our employ a great number of men. The back condition is one we have the most difficulty with. I will now be able to go back to our medical practitioner that is employed with the company with an argument that seems to be accepted here this morning by the Metals Section, that a man must suffer an injury before he can collect from his employer compensation that he has never earned.

Additional Points in the Problem

CHAS. W. HANKO (Pittsburgh Steel Co., Monessen, Pa.): I would like to ask this question again, whether they treat this as a welfare case or otherwise. I believe if it is treated without making some decision, we are throwing ourselves open to the fact that we are assuming the responsibility for that accident. That is the thing which we talked of and we have tried to come to some conclusion, but we can't do it and I would like to know just how they treat that. Because if you do that the Compensation Board is liable to tell you that you have accepted this man as injured by treating him. I would just like to know whether you make that distinction or not.

F. H. ELAIN (American Steel Foundries, Chicago, Ill.): These questions we have accepted as a casualty case. What else can we do? If we refuse to treat the man,

if we refuse to pay him compensation, he takes it into the compensation period and then there is the expense of the lawyer and all those things that go with it. We make that in our reports. We try to protect ourselves there. We would rather give this man medical attention, possibly a few days or maybe a week's compensation, and get him back to work, than to fight the thing when there is no fight coming, and perhaps accept a larger cost to the department of the company.

CHAIRMAN NORTHWOOD: In other words, that comes right down to a company policy.

MR. KELLEY: I don't want to be misunderstood in denying the employee, because that is not the intention at all. We furnish the medical attention and hospital accommodation for all of our employees no matter what happens, but what we really don't understand out there is this. (and the doctor has quite clearly stated what we should do), that where we have so many back injuries, isn't it possible for it to occur from some other reason besides actual results from the employment?

MR. HANKO: I don't want to convey the idea that our company is trying to get away from paying any just claims, because we are trying to do anything we can and will continue to do so. What I asked is just how you would handle that? We are trying to do the just and right thing.

CHAIRMAN NORTHWOOD: I think we have gone pretty far on this discussion and I think the time has come when we can reach the question of "Your Hour." Now that doesn't mean "Your Hour" as an individual man. We would be here until next week. The question cards have been passed and some of the things you fellows want to bring up, now is the time to do it. Do it in as short and concise a way as possible and we will try to answer you in the same way.

Real Safety Men Are Sincerely in Earnest

T. H. MCKENNEY (Illinois Steel Co., Chicago, Ill.): Just before you pass on to "Your Hour," you have discussed the doctor's paper but you have called for no discussion on Mr. Ziegler's paper.

There is just one thing that Mr. Ziegler said in his paper that I don't like. His paper was very fine. I am willing to accept all of it but that part in which he said he knew of some safety men who were making a joke of the safety movement. I do not agree with him. I don't think he meant that. I think he should have said, and I don't like to see it go in the records, some so-called safety men. I don't know of any safety men who make a joke out of the safety plan. Every man engaged in safety work is a 100 per cent safety man and he does not like to make it a joke.

N. V. B. ZIEGLER (U. S. Aluminum Co., New Kensington, Pa.): Thank you, Mr. McKenney. I am willing to accept that. He would be a so-called safety man.

C. L. LOCKHART (Milwaukee, Wis.): I was interested in how the Midvale Company operated 95 days without an accident. I have a plant of 700 men but I haven't been able to equal that record. I came very close to it and we would be happy if we could run just one month without an accident.

We have not been lax in putting in safety devices. We have our committee and so on, but we haven't come anywhere near the record shown on the screen today.

The thought comes to me that probably I am too quick in terming an injury an accident and I would like to know what the Midvale Company terms an injury before it is termed an accident?

CHAIRMAN NORTHWOOD: Is there anyone else here who can answer that definitely? If not, I will say this, that the accepted understanding of an accident causing lost time is the man who fails to return to work on the turn following the turn in which he was injured.

R. G. FENLON (Carnegie Steel Co., Duquesne, Pa.): Before we go into the dis-

cussion of "Your Hour" I would like to suggest that we give Dr. Harney a vote of thanks in coming here and talking to us this morning on things that are interesting and of very great importance to every man who has to do with safety in the steel organization.

C. L. BAKER (Bethlehem Steel Co., Johnstown, Pa.): I want to second that motion. It certainly has been a pleasure for me to sit here and hear a doctor talk out loud in a meeting and say exactly what he thought.

(The motion was duly made and seconded, to extend a rising vote of thanks to Dr. L. G. Harney).

CHAIRMAN NORTHWOOD: Now we can get into "Your Hour" and answer the question "Should a foreman be held responsible for the accidents in his department?" Who is going to answer the question?

The Foreman Acknowledges Responsibility

W. S. STIEFER (Youngstown Sheet & Tube Co., Youngstown, Ohio): For the last six years, I have been a foreman and I feel he should be held responsible for the safety of those men, that he should be held responsible for accidents in his department. I feel that because of this, he should be held responsible for the education of those men in the ways of safety.

I think that is the fundamental reason in the test that should be applied in making that man responsible for the safety of the men under his care.

E. E. ARMSTRONG: I do not agree with this. In fact, I don't think it is fair to burden the foreman entirely with the question of educating his men in safety. We started out the first of 1927 with a new idea. In 1926 we were carrying on safety lectures in our departments as outlined by the speaker who presented "Safety Talks" which were being given by myself and my assistant.

We thought, well now, let's give the foreman a chance to do this talking. The men will probably listen to him more than they will to us. He can probably get the message across a little better than we can. We tried that. We wound up in 1926 with a very fine record. The first four months of our program of having our foremen carry on our safety lecture talks was a flat tire. The foremen are men who can talk production and they can talk machines but when they get up in front of a bunch of men and try to give them the message of a safety education and what it means, they can't do it as well as a man who spends his entire time on safety work and working out safety problems and things that mean safety to the average man in the shop.

Personal Talks on Safety Helped Reduce Accidents

So we discarded that idea. The first four months of the year we ran up 32 accidents. Eighteen of them were in our iron foundry. The foreman asked us to come over and take over the talk. We did so and we can't say this is the reason it stopped, but we know in 1926 what happened.

We went out there and started our talks from the safety department ourselves and we have had two since then.

I don't think we ought to give the foreman the entire burden.

CHAIRMAN NORTHWOOD: I don't think that was the idea of this foreman at all to give the foreman the entire burden; but the foreman being directly over his men in production, he can show and direct them the safe way in getting that production. That is my feeling on the foreman's responsibility. He is the key man.

J. F. CHAPMAN (Colorado Fuel & Iron Co.): I may be asking a very old question, but it is one of those that is of interest to us; and that is the production of a

rule book where you have to use it around the plant. I want to ask the men here their personal opinion as to the value of a general rule book to give to all employees; or the making of a rule book for individual departments in the steel plant which shall be given to the men who are working in that department; or whether there is some other scheme which they think is still better of getting over to the men the safety rules which the company wants the men to know and follow.

O. D. MOORE (Pennsylvania Railroad Co., Philadelphia, Pa.): We have a definite set of safety rules. At the time the foreman is given a copy to study, personally, he is also supplied with sets to mail to every employee who is on our pay roll. We figured that by mailing these rules, they would more likely enable the men to receive them and hang on to them than if we handed them out in the shop. They kept them in better condition; there is also the possibility of their being read and talked over.

Since that time it has been our counsel to send a set of these rules, along with a letter explaining the purpose of our safety effort, to every new man who comes in our employ. That is general throughout our entire shop. Our steel plant is just one big shop and the other shops are closely related to the main plant.

CHAIRMAN NORTHWOOD: Our plant of 3,000 men went 169 days without an accident.

New Men Ought to Be Thoroughly Instructed

JOHN P. EIB (Illinois Steel Co., Joliet, Ill.): This question of a rule book kind of gets my nanny in a little way. I think possibly I get more letters and more talks about giving rule books. I am still one of the old-fashioned fellows who believe a man who comes into a steel mill to work ought to have a thorough instruction on how to do it safely. What you do with a rule book all depends upon the justification in issuing it.

We give a rule book to every man. We have them printed in ten languages. But if you simply hand that rule book to a man who comes in to get a job with you, you are just wasting the time, effort, paper and money. If you follow that up step by step so that you know, and the man knows, and the foreman knows, that the fellow does know the hazard and risk of his job, you have accomplished something with rules.

We have spent a lot of money on rule books at our plant, but we do not start right in with the office where the man gets his first contact with the company. No matter where you go they have an employment office. There is the first contact a man gets. Needless to say, he is entitled to courtesy because it is there he forms his first impressions. If he doesn't get that courtesy there, he certainly doesn't care much about your company before he ever starts to do a tap of work. There is the place where we try to get that first contact along with the safety standpoint, along with the rule book.

Then we follow that up with the men. We have a man who goes to the employment office every morning where he gets the names and numbers of the men who have come in to work since the previous morning and he goes to each department and there, in conjunction with the foreman, they talk over the risks and hazards of this man's particular job and what is expected of him from a safety standpoint. You know then that the fellow has had his first step in education.

We started a long time ago to make sure that that was carried out, by having a printed form sent out from the employment office, divided into three spaces, whereby the place was provided for the man to sign, the foreman to sign, and if necessary the interpreter.

Then, after a man has been there a little while, it is followed up with an oral examination of that man's knowledge of the rules in the book. We don't expect him

to give them out word for word. I couldn't do that and I wrote a lot of them myself, but he can give an understanding, or his understanding, of the rule.

The safety button is still awarded at our plant. It is old-fashioned. But it is the idea of starting in at the employment office, following it down step by step, whereby you have the positive assurance that the man really does have the safety instruction on his job and that is what you want. You can't expect a man to cooperate with you from a safety standpoint if he doesn't know what you are driving at; and it is the job of your organization to see that that man is instructed. That is why I rose to the question of a rule book, because I feel it is what you do with it, whether you get any value out of it or not.

J. H. CHAPMAN (Colorado Iron & Fuel Co.): That is just along the lines I want to get hold of from one of the steel companies. Anyone who would sit down and read that rule book through, and read it intelligently—I don't believe he could do it in an hour and a half. A new employee is interested in his job. He is interested in going to work. He wants to get his money. He wants to get his job so that he can get his money. He is interested in that part of it. The rule book is something that he thinks is all right, maybe, to stick it in his pocket and that is about all he does with it.

I am glad that point was brought out. We need to have these rules and regulations gotten over to the man personally and the hazard of his job particularly called to his attention. It has been my idea that a rule book which has the general rules of the company and then in addition has some specific rules for the individual department where the man is employed, is the thing to give to an employee, rather than a general book having rules for all the departments, together with the general rules of the plant.

Foundation of Safety Laid in Employment Department

C. L. BAKER (Bethlehem Steel Co., Johnstown, Pa.): I don't think John Eib is so old-fashioned. I have an idea, after listening to him talk for a minute, in regard to his contact with the employment department, that there is where the foundation is laid for the wonderful record that the Joliet Works has made.

You have got to bring in one factor that I want to mention to John, and that is the doctor's physical examination. Dr. Harney is the right kind of a medical examiner in connection with the man coming into the employment of any company. When I say the right kind of examiner, I mean a doctor who does know something about medicine, who does know the plant in which the man is going.

You know, there is just a little peculiar trait about those old doctors, in my experience. A lot of times they cure and don't give you bad medicine. They impress you. Why? Because of their sincerity. The medical examiner is in a more wonderful position. Naturally, we have due respect for him because if we don't do what he tells us to, he makes us think he will compel us.

Now, I want to testify to the rule book. I want to see the man from Colorado. I have a word from a man of his, a message that I want to pass on to him. Give the employee a rule book that is a simple thing which doesn't take him a week or month to find out applies to the department he goes into. Then follow it up. The follow-up proposition in our safety work seems to be today the thing that is getting results.

Now, gentlemen, I am going to digress a minute and say a personal word about your chairman for next year. I think you all ought to know something about him, more than you do.

I am happy this morning to tell you how proud we are in the Bethlehem Steel Company to see one of our men having this wonderful place at the head of the Metals Section. I suppose a lot of you fellows are wondering whether this man is a real safety man or not, and wondering what is happening in the plant that he is taking

an interest in. I am going to tell you a few things about him. I don't say that the records made in this plant are entirely up to Ned, but I do say that he does have the cooperation and backing of a plant management in safety work from the general manager down. Cooperation is what gets results today, in my opinion.

Now, there have been some records made in that plant in the last three or four years that the management is proud of and I am going to tell you just a few that have happened in this last year. They are going on just now so that you will get the idea of the kind of leader you have for this Metals Section next year.

A number of you are acquainted with the wire gang. We have a wire mill gang with one inch and three-quarter wire rod, wire products, nails, etc., a separate unit of the Cambridge plant. It starts off by itself, starting in the steam plant, machine shop, electric power station, etc. Now that department this year has operated the entire year with one lost-time accident. They had that one in January and since January they haven't had a man with a lost-time accident.

We have coal mines running out right into the plant where the coal goes directly into the coke oven. They have two coke plants, two blast furnaces and all down the line, to the steel car shop (they used to call it the bracher shop).

The Latest Is the Best Accident Record

We just made a record last month of ten lost-time accidents in the entire plant. That was the best we ever did. We had 13 in May, 13 in June. Our general manager the other day said: "Say, I think it is about time you fellows went without any lost-time accidents"; so we are going to try in October. We are not going to make any noise about it and ask each department not to have an accident, because every department has gone over a month this year without a lost-time accident. We also made up our minds and the electrical department has gone 140 days straight ahead now without a lost-time accident.

We have a wheel plant which is a forging process, rolling and forgings. It has gone 146 days without a lost-time accident.

I merely point out these things to show what interest the chairman of your Metals Section takes in accident prevention work, and I will speak for him, for the cooperation of every member of the National Safety Council, to make it broad, but particularly the membership of the Metals Section. I particularly want to see the Metals Section continue to be the outstanding section of the National Safety Council. It is entitled to it. It has fathered safety; its leadership is pronounced all over the country in accident prevention work. I want to see you maintain him; I want to see you grow; I want to see this section the outstanding section of the National Safety Council and I want you to give your committee your closest cooperation for this next year.

Don't forget the fellow who publishes your monthly Letter. He has a hard job; I know it. Send him a note that will be encouraging; and I wish you, this next year, the greatest success that the Metals Section has ever had.

CHAIRMAN NORTHWOOD: This is not a testimonial meeting. It puts me in kind of an embarrassing position, but I want to say this, that your executive committee who arranged our program this year wants your criticism on it. We want you to let us know what you want for next year and we will try to give it to you. Do you have any constructive criticism as to what we should bring up and what we should have for our meeting next year? Let us have it, fellows; it's your meeting. Let's make it the biggest meeting we have ever had.

Mr. Blank is the chairman of our program committee for next year and I want you to come down here, Mr. Blank, so these fellows can see you and know who we can kick to if the program isn't the best we ever had.

E. F. BLANK (Jones & Laughlin Steel Corp., Pittsburgh, Pa.): I will appreciate very much a letter from any of you and all of you in regard to what your ideas are

of the subject or suggestions for the program next year. We want to make this program bigger and better every year. Some of these fellows are making it pretty hard to beat, but if we have your help this next year, with your suggestions, I am sure that we can even go further.

D. B. FITCH (Youngstown Sheet & Tube Co., Youngstown, Ohio): As a suggestion for next year, I move by all means that you invite Dr. Harney to this section.

JOHN P. EIB (Illinois Steel Co., Joliet, Ill.): There is just one thing more that I want to say. This meeting is about to close and as a fitting close, it seems to me that it should be the sense of the meeting (I say this not only as a member of the Metals Section, but from having been on the executive committee during this past year), that we express our appreciation to our retiring chairman. It has been, to repeat again, a privilege to work under Fred Bennett.

There is one thing else that I want to express. To my mind, in all of the years that I have been coming to the congresses, his graciousness this morning in turning over this meeting to the incoming chairman, to me is a most admirable thing; and I think that there should be an expression to Mr. Bennett for his wonderful year of service and I am sure this meeting will not only second, but give a rising vote to him.

(A rising vote of thanks was extended to Fred Bennett, retiring Chairman.)

F. G. BENNETT (The Buckeye Steel Casting Co., Columbus, Ohio): I only have one thing to say and that is to thank you for your cooperation for the past year.

ADJOURNMENT

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Mining Section

New Section Officers

Chairman, C. A. McDOWELL, Pittsburgh Coal Company, Pittsburgh, Pa.
Vice-Chairman, GEORGE MARTINSON, Pickands, Mather & Company, Hibbing, Minn.
Vice-Chairman, A. W. DICKINSON, The Union Pacific Coal Company, Rock
Rock Springs, Wyo.
Vice-Chairman, J. P. HODGSON, Phelps Dodge Corporation, Bisbee, Ariz.
Vice-Chairman, F. C. MILLER, The Colorado Fuel & Iron Company, Trinidad, Colo.
Secretary, DANIEL HARRINGTON, United States Bureau of Mines, Washington, D. C.
Poster Committee Chairman, H. C. HENRIE, Phelps Dodge Corporation, Bisbee, Ariz.
Membership Committee Chairman, H. I. YOUNG, American Zinc, Lead and Smelting
Company, Mascot, Tenn.
Publicity Committee Chairman, THEODORE MARVIN, The Explosives Engineer, Wil-
mington, Delaware.
Slide Committee Chairman, H. G. HENSEL, The Youngstown Sheet and Tube Com-
pany, Chicago, Ill.
Engineering Committee Chairman, J. M. CARMODY, Coal Age, New York City.
Statistics Committee Chairman, RUSH N. HOSLER, Pennsylvania Compensation Rat-
ing and Inspection Bureau, Harrisburg, Pa.
News-Letter Editor DANIEL HARRINGTON, United States Bureau of Mines, Wash-
ington, D. C.
Executive Committee—THE OFFICERS AND
B. C. YATES, Homestake Mining Company, Lead, S. D.
B. F. TILLSON, The New Jersey Zinc Company, Franklin, N. J.

Retiring Officers

Chairman, HOWARD I. YOUNG, American Zinc, Lead & Smelting Co., Mascot, Tenn.;
First Vice-Chairman, C. A. McDOWELL, Davis Coal & Coke Co., Thomas, W. Va.;
Second Vice-Chairman, GEORGE MARTINSON, Pickands, Mather & Co., Hibbing, Minn.;
Third Vice-Chairman, A. W. DICKINSON, The Union Pacific Coal Co., Rock Springs,
Wyo.; *Fourth Vice-Chairman*, J. P. HODGSON, Phelps Dodge Corp., Morenci, Ariz.;
Secretary and News-Letter Editor, DANIEL HARRINGTON, U. S. Bureau of Mines,
Washington, D. C. *Committee Chairmen: Poster*, JOHN L. BOARDMAN, Anaconda
Copper Mining Co., Butte, Mont.; *Publicity*, THEODORE MARVIN, The Explosives En-
gineer, Wilmington, Del.; *Program*, R. V. AGETON, Tri-State Zinc & Lead Ore Pro-
ducers' Assn., Miami, Okla.; *Membership*, H. W. GIESSING, Commerce Mining &

Royalty Co., Baxter Springs, Kans.; *Statistical*, H. G. HENSEL, The Youngstown Sheet & Tube Co., Chicago, Ill.; *Engineering Representative*, R. DAWSON HALL, The Coal Age, New York City; *Executive Committee*, The OFFICERS and B. F. TILLSON, The New Jersey Zinc Co., Franklin, N. J.; T. T. READ, American Institute of Mining & Metallurgical Engineers, New York City.

Tuesday, September 27, 1927

HOWARD I. YOUNG, Chairman

Manager, American Zinc, Lead & Smelting Company, Mascot, Tenn.

The first session of the Mining Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, Howard I. Young, manager, American Zinc, Lead & Smelting Company, Mascot, Tennessee.

CHAIRMAN YOUNG: The first order of business is the reports of the various committees. Mr. John L. Boardman, chairman of our Poster Committee and safety engineer of the Anaconda Copper Mining Company, Butte, Montana, will present his report covering the activities of his committee during the past year.

Report of Poster Committee

Official notification of our appointment on this committee was received on December 7, 1926. We immediately planned to place as much emphasis as possible on the hazards of falling coal and rocks; handling material; and cars and motors, these being the three most prominent hazards in both coal and metal mining.

In order to get a diversity of ideas and give a large number of members an opportunity to express their views, we requested the Chairman, Mr. Young, to appoint a large committee, and the following members were appointed: Anaconda Copper Mining Co., John L. Boardman, Chairman, Bureau of Safety, Butte, Montana; Berwin-White Coal Mining Co., E. B. Creighton, Supt. Ins. Dept., Philadelphia, Pa.; Calumet & Hecla Consolidated Copper Co., Calumet, Michigan; The Cleveland Cliffs Iron Co., W. Conibear, Safety Engr., Ishpeming, Michigan; Colorado Fuel & Iron Co., 801 Boston Bldg., Denver, Colo.; East Butte Copper Mining Co., O. A. Dingman, Butte, Montana; Homestake Mining Co., C. A. Brooks, Lead, South Dakota; Old Ben Coal Co., J. E. Jones, Safety Engr., West Frankfort, Ill.; Mine Rescue & First Aid Assn., W. G. McBride, Gen. Mgr., Globe, Ariz.; Phelps Dodge Corporation, C. W. Moore, Safety Engr., Bisbe, Ariz.; and Pickands Mather & Co., M. D. McIntyre, Cleveland, Ohio.

Request was mailed to each of the members appointed to submit a minimum of five poster ideas each, covering the three accident hazards mentioned.

Response to this request has been rather generous, as we have submitted material for 33 posters, in addition to copies of the daily bulletin service furnished by the A. C. M. Co. up to June 1, and many other posters submitted direct by members without going through the hands of the chairman of this committee.

On December 24, 1926, the plan of enclosing one copy of each mining section poster with the monthly News Letter was approved, but not followed successfully.

To date the committee has received 47 letters and three telegrams, and has sent out 40 letters and two telegrams.

We exhibit all posters printed for the Mining Section in the NATIONAL SAFETY NEWS from January, 1927, to September, 1927, inclusive. There are 15 in number, of which nine were chosen from the 33 submitted through the chairman, and six were selected from those submitted direct by members of the committee or by other members.

We find that during the same period, the Metals Section was allowed space for 19 poster units, as compared with our 15 units, but we call attention to the fact that these two sections are so very closely allied that frequently mining men may find the metals section posters very useful. We also wish to call attention to the very valuable posters of others, such as the Public Safety Division, and the Health and Chemical Sections, many of which may be used with profit by members of the Mining Section.

We recommend that when possible, exceptionally good posters which may be applicable to several of the allied sections, be printed in two unit size or larger.

We wish to take this opportunity to thank the members of the committee who have responded so generously to our request, for this work, and to express our special thanks to Mr. Gardiner, Director of the Poster Service, for his excellent cooperation and assistance throughout the year.

John L. Boardman, Chairman.

CHAIRMAN YOUNG: Gentlemen, you have heard the reading of Mr. Boardman's report. What is your pleasure?

FRANK A. POLLOCK (District Safety Engineer, Oliver Iron Mining Company, Eveleth, Minn.): I move the report be adopted.

P. M. ARTHUR (Director of Safety, American Zinc Company of Tennessee, Mascot, Tenn.): I second that motion.

CHAIRMAN YOUNG: It is moved and seconded the report of Mr. Boardman's committee be accepted. Is there any comment? If not, all in favor of that motion make known by saying "aye"; contrary, "no." It is so ordered.

Mr. Boardman, I want to express to you and your committee my appreciation of the work you have done. You certainly have put into your work a great deal of thought and effort and it is very much appreciated.

The chairman of our Membership Committee, Mr. Henry W. Giessing, safety engineer for the Commerce Mining & Royalty Company, of Miami, Oklahoma, will report the activities of his committee.

Report of the Membership Committee

In reporting the activities of the Membership Committee, Mining Section, National Safety Council, we wish to advise that, partly from choice and partly from suggestion, the following members were solicited to serve on our committee:

Mr. L. D. Anderson, Chief Engineer, U. S. Smelting, Refining & Mining Co., Salt Lake City, Utah.

Mr. D. A. Thomas, Montevallo Coal Mining Co., Aldrich, Alabama.

Mr. Everett H. Parker, U. S. Bureau of Mines, Berkeley, California.

Mr. Everett H. Parker, Elm Orlu Mining Co., Butte, Montana.

Mr. K. T. Sparks, Hecla Mining Co., Wallace, Idaho.

Mr. J. E. Jones, Safety Engineer, Old Ben Coal Corp., West Frankfort, Illinois.

Mr. C. J. Ennis, General Manager, McIntyre Porcupine Mines, Ltd., Schumaker, Ontario, Canada.

Mr. W. G. McBride, General Manager, Old Dominion Copper Co., Globe, Arizona.

Mr. Henry S. Richards, Safety Engineer, Blue Diamond Safety Dept., Winchester, Kentucky.

Mr. Baltzer Leonard, Safety Inspector, Harwood Coal Co., Harwood Mines, Pennsylvania.

Mr. G. E. Fatherolf, Safety Director, The Jeffrey Mfg. Co., Columbus, Ohio.

Mr. D. M. Stranaha, Safety Engineer, New York Zinc Co., Edwards, N. Y.

Mr. F. A. Dunyon, Safety Engineer, Utah Apex Mining Co., Bingham Canyon, Utah.

Mr. W. T. Kemp, Chief Safety Officer, Woodward Iron Co., Woodward, Alabama.

Mr. Dan Harrington, U. S. Bureau of Mines, Washington, D. C.

Mr. J. J. Forbes, Chief Safety Service Section, U. S. Bureau of Mines, Pittsburgh, Pa.

I am sure these men are all interested in accident prevention and strong for continued increase in the membership of the National Safety Council.

I received several letters of acknowledgment, saying they would be glad to do their bit in the community in securing new members.

Realizing that my facilities would not permit me to keep in constant touch with this committee, the names were forwarded to Council headquarters. In a letter to each member I stated that any information and all literature necessary in securing members would be furnished by the Council for the asking.

Cancellation and acceptance slips mailed me by the Council show approximately 29 cancellations and 38 acceptances. A great many of the cancellations were later reinstated. In the Tri-State district alone, I believe, two or three were again reinstated.

I sincerely wish I might have been in position to give this work more time and attention. I appreciate Mr. Cameron's letters of acknowledgment on different occasions, of a little bit of help I might have been.

As chairman of the Membership Committee I want to thank Mr. Howard Young for his interest. I know he has given time and gone out of the way to talk membership. I wish also to thank every member of the committee for the support given, and will be glad personally to render any service I can in the future.

Henry W. Giessing, Chairman.

Reports of Other Committees

CHAIRMAN YOUNG: You have heard Mr. Giessing's report. What is your pleasure?

R. V. AGETON (Safety Engineer, Tri-State Zinc & Lead Ore Producers' Association, Miami, Oklahoma): I move the report of the Membership Committee be adopted.

H. T. HARPER (Superintendent Service Department, Tennessee Copper Company, Copper Hill, Tennessee): I second the motion.

CHAIRMAN YOUNG: It has been moved and seconded the report of the Membership Committee be accepted and filed. Any comments at this time? I might say that the Council reports a net gain in membership of nine during the year. I think when you consider the conditions that exist both in coal mining and metal mining, you will all agree that the Membership Committee has, under the conditions, done a wonderful job. If there are no comments those in favor of accepting the report of the Membership Committee will make it known by saying "aye," contrary "no." (It is so ordered.)

Our Publicity Committee has as its chairman, Mr. Ted Marvin, managing editor

of *The Explosives Engineer*, Wilmington, Delaware. I will ask Mr. Marvin to make a report of the activities of his committee.

MR. MARVIN: The work of the Publicity Committee is rather limited and its results are intangible, I believe, except for one thing. As I say, the main purpose is to supply material for articles on mining to the NATIONAL SAFETY NEWS. Throughout the past year various men were designated to send in articles. On this committee were Mr. Pollock of the Oliver Iron Mining Company, Mr. Mills of the Alabama Safety Council, of Birmingham, Alabama, and myself. There has been mention of National Safety Council activities—that is, the Mining Section activities, made in various publications, and editors of various publications have at times received information as to activities of the Section. That is about the limit of what the Publicity Committee has done. Its real purpose has been to furnish articles on mining to the editors of the NATIONAL SAFETY NEWS, and I believe that has been done.

CHAIRMAN YOUNG: Gentlemen, you have heard the report of the Publicity Committee; what is your pleasure?

Report Accidents to the Bureau of Mines

R. DAWSON HALL (Engineering Editor, McGraw-Hill Publishing Company, New York, New York): I move the report be adopted.

MR. HARPER: I second the motion.

CHAIRMAN YOUNG: All in favor of accepting the report of the Publicity Committee will make it known by saying "aye"; contrary "no." (It is so ordered.)

CHAIRMAN YOUNG: Mr. H. G. Hensel, Safety Director, Youngstown Sheet & Tube Company, Chicago, Illinois, has been chairman of the Statistical Committee that was created this year. We will now have his report.

MR. HENSEL: There is not much to report in connection with the Statistical Committee for the reason that it was decided at the first meeting of your Executive Committee, that there would be no committee appointed, for the reason that no attempt would be made by the Mining Section to gather statistics independently of those gathered by the United States Bureau of Mines, and as your Section is cooperating with the United States Bureau of Mines, they thought there was no need of duplicating the work.

I would like to urge, however, that every member of the Mining Section report their accidents directly to the United States Bureau of Mines, who will gladly furnish the blanks necessary for such reports. You can secure those blanks by getting in touch with Mr. W. W. Adams of the United States Bureau of Mines at Washington, D. C.

All members of the Section are also urged to enter the National Safety Competition which is sponsored each year by the United States Bureau of Mines. This will enable them to make a comparison and to study the trend of accidents in the entire mining industry.

This year we find from their report that 257 mines competed for the Sentinel trophy, as compared with 210 in the previous year. I am speaking of 1926 and 1925. As many of you do not have comparisons for the past year I would suggest that you get in touch with the National Safety Council and get a copy of their pamphlet which is entitled: "Annual Industrial Accident Experience of Members of the National Safety Council for the year 1926." On page 11 of this pamphlet you will find the report of the Mining Section. This report is published through the courtesy of the United States Bureau of Mines. I wish to call your attention also to the fact that in that report for the year 1926, there was a decrease shown over the frequency rate for the year 1925, and in 1926 this frequency rate for the entire industry reported was 76.98. In 1925 it was 99.99. The severity rate for 1926 also is decreased over the previous year from 8.51 for 1925 to 8.47 for 1926.

I understand that it is the intention of the National Safety Council to continue to gather statistics in this manner through the United States Bureau of Mines for their report.

CHAIRMAN YOUNG: Gentlemen, you have heard the report of the Statistical Committee. What is your pleasure?

MR. HARPER: I move it be accepted.

MR. ARTHUR: I second the motion.

CHAIRMAN YOUNG: It has been moved and seconded that the report of the Statistical Committee be accepted. Any comment on the work of the Statistical Committee? This is a new committee and if anyone has anything to offer at this time we will be glad to hear it. If there is no comment, all those in favor of accepting the report make it known by saying "aye"; contrary "no." (It is so ordered.)

Mr. R. V. Ageton, Safety Engineer Tri-State Zinc & Lead Ore Producer's Association, Miami, Oklahoma, is chairman of our Program Committee, and they are responsible and deserve the credit for the program prepared for this meeting, which I believe is going to be very instructive to all of us. Mr. Ageton will now make his report.

A Program Planned to Answer Questions

MR. AGETON: I think the Program Committee, consisting of Mr. Hall, Mr. Harrington and myself, started out this year to try, in our program, to answer the questions that were brought up last year. We have our three morning sessions and our two luncheon periods. The Tuesday luncheon is under Mr. Jack Ryan, of the Mine Safety Appliances Company, Pittsburgh, Pennsylvania, and I am sure that Jack has something up his sleeve.

As you also noticed, we have a joint luncheon tomorrow at noon with the Mining, Quarry and Cement Sections, and Mr. Curtis has some very good things there.

In addition to our regular program there are two things like that I would like to call to your attention. The first one is the observations of industrial silicosis by Dr. R. R. Sayers, of the United States Bureau of Mines, which will be held at two o'clock this afternoon. On Thursday morning, Dr. Meriwether will discuss mine dust on health, and Dr. Sayers this afternoon is going to discuss other phases that we will not get from Dr. Meriwether's paper.

I would like also to call your attention to the fact that Mr. Pollock is giving an article on Friday morning at nine-thirty o'clock on "Safety Engineers in Small Communities."

CHAIRMAN YOUNG: Gentlemen, you have heard the report of Mr. Ageton on the program of this Section. What is your pleasure?

MR. MARVIN: Mr. Chairman, I move the report be accepted.

C. A. MACDOWEL (Safety and Personnel Manager, Pittsburgh Coal Company, Pittsburgh, Pa.): I second the motion.

CHAIRMAN YOUNG: It is moved by Mr. Marvin and seconded by Mr. MacDowel that the report of Mr. Ageton's committee be accepted. All those in favor make it known by saying "aye"; contrary "no." (It is so ordered.)

Mr. Ageton, I want to thank you and your committee on behalf of the Mining Section for the good work you have done.

Gentlemen, we now have the pleasure of hearing the report of our secretary, Mr. Daniel Harrington. You are all familiar with the good work he has done as secretary and editor of the monthly News Letter.

DANIEL HARRINGTON (Chief Engineer, Safety Director, United States Bureau of Mines, Washington, D. C.): The secretary has very little to report. As a matter of fact, practically all the secretary has done as secretary, is to get out the monthly News Letter. I would like to ask that if you have any criticisms of it, if you have

any suggestions to make in connection with it, that you let me know, either now or by letter, I don't care which. I would just as soon it be shot at me one way as the other.

The one thing that I would like to say in connection with the monthly News Letter, however, other than to ask for suggestions, is that if you have any data which you think would be acceptable for the letter, please send it in. You have been invited to do that but only three or four have done so during the year.

About the only thing, other than the handling of the News Letter, that has come up during the year is that there was one meeting of the Executive Committee held here in Chicago, and at that meeting the principal business transacted was the discussion in connection with the program. There was other business but it was of comparatively minor importance as far as the report is concerned. Now, as to the status of the Section, I have the following information: Total number of members in the Mining Section on September 16, 1926, was 227. New members added during the year, 35; memberships cancelled during the year, 29. Memberships transferred from other sections, 3. Total number of members in the Mining Section at the present time, 236. That corroborates, of course, the statement given you by Mr. Giessing.

CHAIRMAN YOUNG: Gentlemen, you have heard the report of our secretary; what is your pleasure?

MR. HARPER: I move it be accepted.

MR. ARTHUR: I second the motion.

CHAIRMAN YOUNG: It has been moved and seconded that the report of our secretary be accepted. Is there any comment? If not, all those in favor will make it known by saying "aye"; contrary "no." (It is so ordered.)

At the request of the Council Headquarters, the Nominating Committee for this Section was appointed on July 12. Mr. Yates of Lead, South Dakota, was chairman; Mr. John L. Boardman and Mr. Hodgson were members. Mr. Yates and Mr. Hodgson are neither present at the convention and I am going to appoint Mr. C. A. Brooks, who is associated with Mr. Yates and Mr. W. A. Siebenthal, of Morenci, Arizona, who is associated with Mr. Hodgson as members of that committee. You will meet with Mr. Boardman, who will act as chairman of the committee, during the afternoon and be prepared to make your report at the meeting tomorrow morning.

I wish at this time to appoint a committee on resolutions who will report at the end of our Thursday morning session. I will name as chairman of that committee, Mr. Frank Pollock. Other members, Mr. Bannister and Mr. Henrie.

The first paper we have on our program today is "Statistics and Their Bearing on Accident Prevention," to be presented by Mr. H. G. Hensel, Safety Director, the Youngstown Sheet & Tube Company, Chicago, Illinois.

Statistics and Their Bearing on Accident Prevention

H. G. Hensel, Safety Director, Youngstown Sheet & Tube Company,
Chicago, Ill.

A necessary part of any educational campaign is statistics, as a record of the progress made. Statistics are true indicators of your progress in accident prevention. They will point out the cause of the most serious accidents or the causes of the most frequent accidents and that is of vital importance. Statistics alone will not prevent accidents, but the study and analysis of statistics are essential in determining what to do.

If we have our attention called to the fact that numerous or serious accidents are occurring due to a certain cause or on a certain occupation, it is then an

easy matter to direct a strong campaign to prevent accidents from that source.

It will indeed prove very true that statistics are a waste of the time and the effort used to compile them, if we do not use them to advantage.

I believe statistics can be made interesting for all the employees of a works or mine, but I also believe that it is best to devise a plan of presenting the statistics to each group so that the most benefit will be derived from them.

It seems to me that in presenting the statistics it is best to consider the groups as follows:

- 1st. Plant or Mine Management (general superintendents, district managers, vice-presidents, etc.)
- 2nd. Department heads and foremen.
- 3rd. All other employees.

To the miners and other labor, I believe an effective means of presenting statistics to them is to put on the bulletin boards short, snappy statements of the week's or month's accident record, the number of lost time accidents and the comparison with other mines in the same company, or a comparison with last month's record. This should be accompanied with a record of one of the accidents that occurred in the department during the past month, and this record can be briefly written on the board with chalk, or, still better, show a photograph of how it occurred. Great stress should be laid on the fact that an unsafe practice caused this accident, if that was the cause, and the best known method of preventing the accident should be depicted.

A Weekly Report of Accidents by Department

For the superintendents and foremen a weekly report of accidents by department should be issued and some classification given of the accidents that have occurred during the past week, and a comparison with the previous week should be shown. The bulletin can also give brief histories of some of the most serious accidents and how they might have been prevented. This is of unquestionable value to the foremen in their drive for a clean accident record and he can use such a bulletin to advantage in safety meetings of his men.

The report for the mine or works management can be made on several different bases, but I believe it should be made on whatever basis the management thinks gives them the best picture of the situation each month. The following schemes for presenting statistics are typical, I believe:

First. Some managers desire the accident record to be shown on a dollars and cents basis, showing them a total estimated cost of the accidents during the past month and by departments. This is particularly true of an operation carrying their own compensation risk. Others want the cost per \$100 payroll, cost per ton and cost per man.

Second. Another plan is to show the accident frequency and severity rates by departments and for the operation as a whole.

Third. Still another plan is to show the number of accidents according to occupation and the percentage that each occupation has as compared with the total number of lost time accidents. This system gives the safety engineer and mine management information as to just what occupations are having the most accidents, and such information should be of great value to the department head if he is given to understand that he must use it.

Fourth. Some organizations classify the accidents in their mines and works as to the day of the week on which the injury occurred, hour of the day when accident occurred, married men and single men, and age groups.

Fifth. One classification which I noticed recently was according to length of time

men had been in the employ at the time of injury, and in that particular group I noted that 43 per cent had been employed less than two months. This means that the new employee should be reached on accident prevention and the hazards of his job should be explained to him at once. He should be shown the safe way to do his work, not merely told to work safely. The necessity of prompt first aid treatment should be made clear to him.

Sixth. Some people have graphic charts made which show the trend of the accident record as compared with previous months and years. These charts I have found are of interest to many executives and they can see at a glance whether there is a decrease in the number of accidents or an increase, and use such charts at their meetings of department heads.

Seventh. At one mine I visited recently there had been drawn large circles on sheets of paper and the circle was divided into sectors according to the causes of accidents during the past month. Each sector was a different color to attract attention to the most general cause of the accidents. Another circle depicted by sector the location of the accident by occupation in the mine. I was told that the men and foremen were much interested in these charts.

At one of our works we are issuing, in addition to our other monthly reports, a monthly report of safety meetings of workmen held by foremen, showing the attendance record and percentage of attendance as compared with the number employed. Department heads have been asked by the management to see that each man attends a meeting twice a month.

The Accident Record of the Mining Section

I desire to call your attention to the report recently issued by the National Safety Council which is entitled "Annual Industrial Accident Experience of Members of the Council for the Year 1926." This report is issued in pamphlet form and contains all of the statistics gathered by the Council. I would suggest that you refer to the particular section in which you are interested and compare your records with the records of the other companies shown therein.

I want to call your attention briefly to the record of the Mining Section as depicted in that report wherein it shows that during 1926, 257 companies reported accidents having a total of 95,177,047 hours working with 94 fatalities and a total of 7,327 lost time accidents and a frequency rate of 76.98 and severity rate of 8.47. In 1925 there were 210 companies reporting with 68,518,787 hours working and 68 fatalities, with a total of 6,821 lost time accidents, and a frequency rate of 99.99 and a severity rate of 8.51. From this you will note that there was a decrease in both the frequency and severity rates for the year 1926 as compared with the year 1925 and I am also glad to say that there was an increase in the number of mines reporting accidents to this section; in 1926 there were 257 as compared with 210 in 1925.

I am advised that these figures are originally reported to the U. S. Bureau of Mines at Washington, D. C., and that they are then sent to the National Safety Council to be used in this report.

I would like to urge that every company that is not now reporting to the U. S. Bureau of Mines at Washington, D. C., to do so, so that this report will be a correct picture of the accident record of this section and by doing so you are also cooperating with the National Safety Council who are cooperating with the U. S. Bureau of Mines in this statistical work.

If you desire blanks to be used for making your reports same can be secured by writing to Mr. W. W. Adams, Chief Statistician, U. S. Bureau of Mines, Washington, D. C.

It is also a fact that the companies which report to the U. S. Bureau of Mines are entered in the National Safety competition and are competing for the Sentinel of Safety Trophy each year.

I would like to impress upon you the necessity of having statistics issued and in the hands of those concerned promptly each month and also of the importance of talking over the accident records made with department heads and the management.

CHAIRMAN YOUNG: Thank you very much, Mr. Hensel.

Mr. W. W. Adams of the United States Bureau of Mines, Washington, D. C., will discuss Mr. Hensel's paper at this time.

MR. ADAMS: Mr. Hensel has covered this subject in such a thorough and admirable manner that I will not take your time to discuss his paper in detail. I presume copies of it will be made available to the members of the Section, isn't that so?

CHAIRMAN YOUNG: Yes, it will be published.

MR. ADAMS: I wish, however, to emphasize one or two points. I have an idea that what we need most in accident prevention is more statistics on accidents. That is a natural view for one specializing in statistics, I suppose, but it is my opinion that if we had more statistics of the right sort we would have fewer accidents.

Mr. Hensel spoke of the importance of accident frequency and accident severity rates. That is one point which I would like to impress upon all of the gentlemen here because I think that is the most valuable feature of statistics.

Give General Circulation to Good Statistics

The year ended in 1926 with 257 mines and quarries that succeeded in remaining in this safety race throughout the period and in 1925 there were 210 mines and quarries that succeeded in completing the race. There are a number of companies that do not report their accidents in this detail, to the Federal Bureau, and it is not necessary, of course, that they all should; but may I suggest whether you do or not, that you supplement any statistics that you keep for your own local needs, by calculating your accident severity and accident frequency rates for your plant as a whole and make those two rates available to other companies that would be greatly benefited by knowing of your experience. In most of our statistics we deal with the average rates for labor groups. Now, those average rates are instructive, but they do not, by any means, represent the best that can be accomplished by individual companies. I think it is far more important for us to be able to send around the country the best accident rates that any company has been able to establish over a year's time. We circulate these average rates, but let us supplement them by making available to the whole mining and quarrying industry the best severity and frequency rates that any company establishes.

CHAIRMAN YOUNG: Thank you very much, Mr. Adams. Mr. Ageton, you have a discussion to offer on this paper.

MR. AGETON: I have asked Mr. Oliver M. Wampler, Safety Director of the Eagle-Picher Lead Company, of Joplin, Mo., to discuss this paper for me. I am not in shape to go into the thing very thoroughly at this time. I received Mr. Hensel's paper, and there are just two things that I would like to say. First, regarding the importance and the value of the "Sentinals of Safety Trophy Contest." Of course, we feel the value and necessity of it down in our district more than some of the rest of you do, because (I am going to brag a little) we have won the Metal Mining Trophy two years in succession; but I think that the good effect of having your companies in there and getting your standing is wonderful. They can get their standing with the other companies and with the average.

There is another feature which is very dear to my heart Mr. Hensel brought out, and that is the presentation of proper statistics to the men at the face—the men in the ground. We have made during the past year a series of posters, each one of which we have tried to make humorous. We have succeeded, I think, because

some of the men whom we mentioned threatened to sue us for using their names. On each poster we presented one vital thing.

CHAIRMAN YOUNG: Mr. Wampler, you have a discussion to make.

OLIVER N. WAMPLER (Safety Director, Eagle-Picher Lead Company, Joplin, Mo.): Mr. Ageton asked me to discuss for a few moments our annual safety reference book which we compile each year. I don't want you to feel that that is the only statistics we get out, but we feel that we get a great deal of good out of this yearly reference book.

We do most of the things that are outlined in Mr. Hensel's report, in that we get out the weekly statistics of accidents which have occurred and present those to the management and to the individual foreman. And in monthly meetings of the foremen we give a report of not only the accidents that happened to the individual foreman's mine, but to the company as a whole. We also get out a chart each month which we post at each mine to reach not only the foremen, but the workmen. This chart takes in both the mines and oxide plants of our smelters. One interesting phase of this chart is the fact that our general manager rather objected to the comparison of the oxide plants with the mines, stating that everybody knew that mines were more dangerous than oxide plants and, therefore, it was not a fair comparison. Last month our mines had half the lost time accidents per number of men working that the oxide plants did, so that shows you can compare most any line.

Comparison of the Various Records

In regard to this yearly report, we get this out as to cause of the accident and it is practically a copy of the questionnaire which the Bureau of Mines gets out each year. We use this form for two reasons: One is that it is much easier to fill out the United States Bureau of Mines questionnaire at the end of the year; and also the fact that the Tri-State Lead and Zinc Ore Producer's Association uses the same form. Therefore, we are able to compare not only the record of the individual mine as to the company as a whole, but as to the Tri-State district as a whole. One important thing in this report, is the last sheet showing everything that enters into the cost of our accident prevention work including insurance. Being a self insurer, our management is very much interested in the comparison with the regular basic rate, and we try to use a great deal of care in including everything that an insurance company might include in their report. We believe that our board of directors pay more attention to this last sheet than to the rest of the report.

CHAIRMAN YOUNG: Gentlemen, the meeting is open for discussion. I know there are a lot of you here who are handling statistics in other ways, and we will be very much interested in hearing your method and your experience and your opinion. Mr. MacDonald, would you tell us something about the Phelps Dodge Corporation work on statistics?

WILLIAM T. MACDONALD (Mill Superintendent, The Montezuma Copper Company, Phelps Dodge Corporation, Nacozari, Sonora, Mexico): Gentlemen, I am quite unprepared to make this discussion. Mr. Henrie was to be here this morning for that purpose.

I think, gentlemen, that the point to work toward is a reduction in the number of accidents. We must work, of course, toward a minimum, and the irreducible minimum as we all know, will be zero in accidents.

In 1924 among the employees of the Montezuma Copper Company, numbering approximately 2,300, we had a total of 104 lost-time eye accidents. In the year 1925 we commenced the present active safety campaign. During that year we introduced the use of various goggles—screen goggles underground principally, glass

goggles in the shops and so forth, this campaign going into full effective approximately the middle of the year 1925. During that year, we had 21 lost-time accidents due to eye injuries. During the year 1926, the entire year, we had two lost-time accidents. I am very happy to say that unless we have had an accident since left the property, this year to date we have had no lost-time accidents due to eye injuries.

To get off of the main track for a moment, I will state that practically all our labor there is Mexican native labor. It has been said that it is very much more difficult perhaps, to inculcate the ideas of safety among Mexicans than it is among the American labor. I realize, of course, there is a great deal of foreign labor included under what I have just termed American labor. Whether that be so or not, the fact remains that the record is as I have stated, or substantially so, since I am not entirely sure of my figures.

Men Saved From Serious Injury by Hard Boiled Hats

In the matter of hard-boiled hats as a protection against head injuries, I am very happy to say that we have on record now some 28 cases of men who have been saved from serious injury—several of them certainly from death, by the use of the hard-boiled hat.

The chairman, Mr. Young, asked me to make a few comments on statistics. I don't know that I have touched very much on statistics, but I would like to say that the Montezuma Copper Company, as a branch of the Phelps Dodge Corporation, believes very thoroughly in a campaign of education in selling the idea to the different division bosses, to the foremen and of course, to the men themselves. We take the attitude that the safety idea must be sold to perhaps 50 per cent or more of the men. By that I mean that if you are engaged in a goggle campaign, we get 50 per cent of the men voluntarily to wear the goggles or the safety hats. From that point on perhaps it may be necessary to assume what might be considered something of a hard-boiled attitude on the part of the management, in that we then arbitrarily post rules saying that all men must wear goggles or must wear the safety hats before they are allowed to pass onto their respective jobs.

MR. AGETON: What kind of goggles do you wear?

MR. MACDONALD: That is a point rather near to my heart. In my opinion it doesn't make any difference essentially what kind of goggles you wear, the attitude is to do something. Without being personal in any way, we know of certain companies that have spent perhaps a year in endeavoring to get the best goggles or the best hard-boiled hat. That is a most desirable thing to do, but the point of it is, in our opinion, to get the one that perhaps you think at the time is best or, is at least a good one, and make the men wear them. We use mostly the glass goggle, the Wilson goggle, and in the other we use a so-called all-vision or, wide vision metal goggle; metal screen goggles. We had some little trouble with the goggles rusting underground and had aluminum frames made and so forth. The point of the thing is, however, to do something and make them wear a goggle of some kind, or a hat of some kind without experimenting a year to possibly determine which may be the best kind and later on find out a new one has been developed.

Make Statistics to Suit the Men Concerned

CHAIRMAN YOUNG: Mr. Boardman, how do you handle your statistics?

JOHN L. BOARDMAN: We have a wonderful set of statistics. We call it a wonderful method of keeping statistics, but I have gotten a brand new thought out of the paper and I have been wondering how many of you fellows got the same idea; and that is, are we making our statistics to suit the men concerned? For instance,

now, the vice-president up there in the office wants to know how much those accidents are costing, and when he sees the compensation bill come in and it is rather high, he begins to ask questions. He has one important point from which he views statistics. He has also another important point, of course, which we all have, and that is the sentimental side of it. So when he sees his compensation going up he asks the mine manager what is the matter here. The mine manager wants to know not only about the cost but he wants to know the reason for it, so he is concerned with how these accidents are happening. He wants to know whether these men are falling in chutes or whether the ore cars and trains are injuring them, or whether handling material is injuring them, or what is doing it. Then the foreman not only wants to know all that as well as the cost, but he wants to know in which particular part of the mine the accidents are happening. But all this knowledge is not going to prevent accidents. The man in the mine wants to know something else. He wants to know who is getting hurt and how, so you see there are your four ideas or four subjects of knowledge for statistics.

Getting the Accident Story Over to the Individual

Now, we classify our accidents, of course, as to cause and all those other things mentioned in the paper, and then after we have gotten that all done we have to show this man down in the mine how he is getting hurt. For instance, as a case in point, we were having a number of semi-serious accidents extending over 14 days' disability, which we seemed unable to prevent. We began an investigation from the miner's viewpoint. We found that 25 per cent of all compensable accidents were injured toes; 30 per cent were injured fingers, injured below the metacarpal bones in the hand; 25 per cent were injuries below the metacarpal bones of the feet. Now, from the viewpoint of the workman who is suffering these injuries, what is the answer? One thing is safety shoes; another thing is greater care in watching after the fingers. Fifty-five per cent of all of our compensable injuries for a long period of time were injured toes and fingers. And the way to prevent that is to get the man who is injured to see it and thus bring your statistics down to the man who is hurt, and that is what statistics are for. They do the manager good—they do the vice-president good and they do the foreman and shift bosses good, but the real service is to the man who gets hurt, and that is the thought I got out of the paper today.

H. T. HARPER (Superintendent Service Department, Tennessee Copper Company, Copper Hill, Tennessee): Taking for granted your statistics have been compiled for different departments, the idea is to get it across to the employee. The ordinary employee does not understand what you mean when you show a reduction of 97 per cent. You have a frequency rate of 97.05 or 13.3. The ordinary man does not get it.

Here is our method of presenting facts to the employee. This is for the sulphuric acid department of the Tennessee Copper Company for the year 1923. We had a frequency rate at that time of 90 per cent. For the year 1927 it is zero. In other words, we have now rounded out eight months of this year in the sulphuric acid department, a group of some 140 employees, without a single lost-time accident. Reports are made for the different departments and are put on a large board at the entrance of the plant for everybody to see. Each department is listed separately. You don't need to give them any figures at all. Here is the power and electric department, its record for the past four years. The last two years you will notice no accidents at all represented by this star. I find that is the most desirable method of getting the employee's attention. He reads and runs. He doesn't stop to get any figures at all.

I might say that the frequency rate for the entire plant of the Tennessee Copper Company in 1923 was 188.25. For the first eight months of the year 1927 it has been 15.5, a reduction of 91.8 per cent. In the mining department the frequency rate in 1923 was 288.72. For the first eight months of this year it is 28, a reduction of 90 per cent.

CHAIRMAN YOUNG: We would like to hear from some of the coal operators.

C. A. McDOWELL (Safety and Personnel Manager, Pittsburgh Coal Company, Pittsburgh, Pennsylvania): It is rather interesting to listen to the statistics as given by the metal mines, but I notice that no one in the room representing the coal mining division has made any remarks. I have just gone into a new field of endeavor in this kind of work, coupling it, in fact, with the operating end.

Showing the Costs in Compensation

Where I came from I presented a paper last year. We carried on very extensive statistics and it covers all the phases as presented in the paper here this morning. One thing I noticed that brought to our attention very forcibly the accident statistics, was this: Each month we put out what was termed an accident report in relation to compensation. On that report we showed the injured man's name, how he was injured, the number of days lost—that is, the actual number of days lost, also the scheduled days lost.

Then we showed, following that, the amount of compensation paid to that man on a maximum basis; the amount of compensation paid to the hospital and then the total compensation paid. Down in the right-hand corner we made a summary by mines. Of course, the top part of this sheet was in detail. Now, we have been talking about accident statistics and how to get these statistics to the face—to the men who are working at the face, but we haven't stated so far just how that should be done. We put that across in what we term "Personal contact." We had our superintendents, foremen and assistant foremen meetings monthly and in some cases, where our accident rate was high, we had them semi-monthly. These reports were put down on the table before these men and they were told exactly what happened. Then they in turn took this information to the boys at the face. That is really the only way that you can get accident statistics across to the men. At least, that is my opinion, and experience seems to show from other statistics that it is really true. It falls to the foreman in general, or the assistants or whatever you might term them, to talk to these men as they go about their daily work, and tell them just exactly how these accidents occur.

CHAIRMAN YOUNG: We have with us today a representative from Canada, Mr. A. W. MacDonald, superintendent of industrial relations of the British Empire Steel Corporation. I wonder, Mr. MacDonald, if you will take a few minutes to tell us how you handle your accident statistics in Canada.

Bulletin Board with Names of Mine Foremen

A. W. MACDONALD (Superintendent, Department Industrial Relations, British Empire Steel Corporation, Sydney, Nova Scotia, Canada): Our accident statistics are somewhat differently compiled from those of the gentlemen who have spoken before. I listened with a good deal of interest to Mr. Hensel's report. We carry out the same system in connection with the making of our accident statistics. In our mining department we have, in addition to what Mr. Hensel has outlined, at each mine mouth a bulletin board with the names of all the mine foremen. The dates—the days of the month run across the top of the board and as every accident case happens in that mine it is chalked up against this mine foreman or over-

man, as we call them. It is the duty of these overmen, at all times, to keep preaching the doctrine of safety and the right way to work to their employees.

We figure our accident statistics for the management on the basis of man days worked and tonnage produced as well as on the percentage basis of employees injured. Our compensation law in the province of Nova Scotia is different from the compensation laws in some of the states. A lost-time accident with us is an accident that entails the loss of six or seven days, according to whether an employee is a six-day worker or a seven-day worker—that is, as far as compensation is concerned; and in addition to figuring accidents on the severity basis and on a frequency basis, we also figure them on a cost per ton basis—on a dollars and cents basis—but we don't stress that point in talking accident prevention to our men, we don't mention dollars and cents at all. We go at it from a more humanitarian side, pointing out to the men, talking to them and by the aid of posters from the National Safety Council and others that we make ourselves and through competitions, the tremendous importance of carefulness. We have competitive contests and award prizes to the mines showing the best accident record. We have reduced our accidents a great deal and we hope that the future will bring even greater results. Although we have been working at accident prevention for a matter of six or seven years, since 1920, it is still in its infancy. We now feel that it is a matter of educational process and that eventually we will get all our men to take the same viewpoint of it as our mine foremen and executives.

We have a safety committee and these committees are shifted every two months. That is, new men are put on these committees and eventually we hope that every man working for us will have served as a member. Our employees are very largely English speaking men. We only have seven or eight per cent foreign labor in our mining operations, out of 16,000 or 17,000 employees. Out of that number we only have about eight per cent who are not English speaking, and although it may seem an anomalous thing, a contradictory thing to say, I think it is harder to do safety work and get it across right among men who are English speaking than it is among some of Brother MacDonald's Mexicans, or some of the laborers you people in the United States employ.

Statistics That Run Forward and Backward

CHAIRMAN YOUNG: Your chairman is handicapped in not knowing personally everyone in this room, consequently he cannot call upon you.

F. C. MILLER (Chief Chemist and Safety Director, Colorado Fuel & Iron Company, Denver, Colorado): When it comes to statistics, I think the Colorado Fuel & Iron Company has records both forward and backward. In fact, I sometimes think we have too many statistics. However, they run on a horizontal plane of departments and take, for instance, the total number of accidents, that would be one line; and then for the different departments as to the number of injured, that is compared in length with the total length. Of course, that is graphic. But what we endeavor to do is to find out the number of accidents in one department and then find ways and means to prevent the accidents. We are placing more time at present upon prevention than upon the real statistical record, to the miner himself. That, we feel, is the part for the management. We work in conjunction with the United States Bureau of Mines. They send a car to our mines each year, for demonstration purposes, and we have a car of our own—a safety car—and we go around to each and every mine and teach first aid to the miners. In fact, it is absolutely necessary now that each man receive instructions in first aid before he is employed. That is one of the rules we have just established, and it has this advantage: it gets a man to thinking safety. It is like these posters. You may smile as you look at them and ask, "What good are they?" But with persistence

it isn't long until the miners are looking at them regularly. In fact, it is becoming a part of their daily work to look at the new posters. In other words, it is making the men think safety.

Our district is divided. We have in all about 30 coal mines. They are divided into three districts, separate by themselves. We don't total all of the accidents but we total the accidents for the mines in that district as they are all in that district somewhat analogous. Men working in a shaft are naturally working under different conditions from men in the stope. Men working with mule haulage have different conditions from those working with electric haulage. Therefore, it is hardly fair to compare electric haulage with mule haulage, but it is fair to compare one or more mines having mule haulage with others in that same district. There is where our statistical work comes in.

Handling the Problem of Goggles

As to goggles—it is all right to say, "You must wear a goggle"; but we endeavored to put that on rather hastily and we discovered it was really more dangerous to work with the goggles on than off, because the men simply could not see, and in the humid condition of the mines the glass goggles, at the end of about ten minutes, were useless. Then we tried the wire gauze, but unfortunately they started to rust within a few days and became useless. After experimenting with various forms of goggles, we adopted for the present one that is slightly conical and made of gauze. It gives you a very wide vision and permits of a larger mesh. It has a tendency to deflect the particle without going through the mesh and yet it doesn't retard the vision. We would be very grateful indeed to anyone who could lay a goggle upon the table and say, "That is it." Because we have been in the game now two years and we are a long way from the right solution; although our compensation for one year was \$84,000 for eye injuries, and after persistent cussing and discussing and with the use of goggles, we have reduced that to about \$5,000. So that is a very laudible undertaking; but on the other hand it is to the men that we look. When a man loses an eye, why, he has lost his means of making a living, because to put a man under ground with only one eye means that you are heading him toward the cemetery; so we leave him outside. We feel that if we can prevent eye injuries, even though it costs us \$90,000 a year to prevent them, it is money well expended.

We had a strike at one of our mines because we endeavored to put in the electric lamp. They were using carbide lamps and, of course, they would burn themselves once in awhile; but that was all right as long as they had plenty of light. They did not care how often they singed their noses or eyebrows while working. Finally we simply told them that if they wanted to strike they could strike and if they wanted to go back to work they could go back to work with the electric lamp. After a period of using electric lamps in this mine, something happened to our charging station, and the men were obliged to go back to their carbide lamps, with the result that they worked one day and on the second day went on a strike, saying they would not work with the damn things.

General Use of the Electric Lamp

In all of our mines at present, I am pleased to state, we are using permissible powder. There is no one in the mine excepting the shot firers when we shoot, and each and every person uses an electric lamp, with the exception of the fire bosses, and they use electric lamps in conjunction with the very latest improved safety lamp; so when it comes to safety, I think the Colorado Fuel & Iron Company has made wonderful strides. But, of course, it is up to all of us at this meeting to further the progress that is being made in safety. We feel that we have contributed

our part, and if each and every one will do in a like manner, I feel that within a short period of time we will cut our accidents down like that little star, to nothing, and I hope to God we do.

CHAIRMAN YOUNG: Thank you very much, Mr. Miller. We have time for one more speaker. Who is it going to be?

E. A. STOCK (Safety Engineer, St. Louis Smelting and Refining Works of the National Lead Company, St. Francois, Missouri): I don't know whether I am a little out of order here or not, but I think they were speaking about statistics, Mr. Chairman.

Two Good Months Without Lost Time Accident

We have been in the safety game, I think, about eight or ten years and this year is the first we have gone 62 days without a lost time accident. We employ approximately 800 men in lead mining. We are not in the Tri State district. We are located in St. Francois, Mo. St. Francois is known as the largest lead belt district of the world. We mine lead exclusively. Now, about the statistics. We have regular monthly meetings, and we have our foremen's reports. We give a copy to every foreman at these meetings and then post them on the bulletin boards. We use the National Safety Council service and keep our bulletin boards up in tip-top shape. We paint them about four times a year and have the janitor go over them and clean the glass every so often. We do not use mining section posters exclusively, but if there are suitable posters listed in the catalog from the metals, tanners or any other section, we use them. We have about 450 men that work underground and the rest of them on the surface. Of course, we have them mining underground and machine shops and locomotives and everything else; and just this one word about statistics: We put these posters on the board and also a calendar. For every lost time accident we put up a red sticker the day it happened and the object of it. Someone said, to try to get this to the men at the face, and I believe that is the way our men get it, because they have to pass these bulletin boards. We have them conveniently located at each mine. We have three mines and we have this bulletin board at each mine where the men pass and must see it.

We don't believe in purchasing safety. It is for the man's own good that he works safely. That is the way we look at it. Of course, at our foremen's meetings every month we pass out cigars and chewing gum and cigarets. But that is as far as we go. We use the wire screen goggles.

Goggles Are Used When Sledging

Of course, in mining, underground, as you all know, a miner's time is occupied in picking up a rock and shoveling and loading the cars; but when he is sledging, that is when we ask him to wear these goggles. That is the time he is going to have his eye injured. We know that a man cannot put the wire screen goggles on his eyes and wear them for eight hours underground. He can't do it but he can use the goggles when sledging.

Now, one question. I came here mainly for this question and I would like to have somebody tell me how we can eliminate injuries to the feet from falling material. One of our problems arises from rocks rolling down a bluff and causing fractured toes, bruised feet and contused toes. If somebody has any good thoughts I would like to hear from them on that.

CHAIRMAN YOUNG: I think that would be a good subject to bring up at the round table discussion tomorrow.

The next paper is a review of the work of the Mining Section since its inception, by Mr. R. Dawson Hall, engineering editor, the Coal Age, New York City.

Review of the Work of the Mining Section Since Its Inception

R. Dawson Hall, Engineering Editor, "Coal Age," New York City

In a sense the Mining Section of the National Safety Council dates back to the year 1912, when the First Safety Congress was held and Dr. Joseph A. Holmes, the founder of the U. S. Bureau of Mines and then its director, made an address on "Safety in Coal Mining."

At the Third Annual Congress, in 1914, mining was not forgotten. H. M. Wilson, then engineer-in-chief of the U. S. Bureau of Mines, addressed the Governmental Session on "Cooperation for Safety by Government and Industries."

Here, we should go back to the year 1912 and the foundation of the American Mine Safety Association, of which H. M. Wilson became secretary. This institution had only a brief career. It met twice in Pittsburgh and once in New York City. The latter meeting was a failure, though a first aid and mine rescue meeting at Terre Haute was a complete success. The Association gave all its attention to first aid and mine rescue and but little to safety. Its membership ultimately transferred its allegiance to the National Safety Council, and the Mining Section was formed. The vote of the members making the transfer was cast at Sewickley, Pa., July 15, 1915. The new section held its first meeting at the Council's Fourth Annual Congress, Oct. 20, 1915, in Philadelphia, with H. M. Wilson as chairman.

Thereafter safety and industrial relations formed important subjects of discussion. At the Philadelphia meeting a committee composed of B. F. Tillson, New Jersey Zinc Co., John Lloyd, Lehigh Valley Coal Co., and W. G. Wildin, Lehigh Coal and Navigation Co., presented by-laws for the conduct of the section which were adopted. Mr. Wilson was re-elected chairman.

At the meeting held at Detroit in 1916, J. W. Paul, who had been appointed chairman of the committee on standardization, brought in a report advocating the formation of standards on (1) first-aid contest rules, (2) mine-rescue contest rules, (3) mine signs (4) danger signals (5) signalling codes (6) miners' lamps, (7) general safety rules. It seemed to be the opinion that papers should first be read and discussed on these subjects and that, following these, codes should be prepared.

Various Committees Were Formed

As a result of Mr. Paul's suggestion, working committees were formed, one on "Mine Rescue, First Aid and Contests" another on "Accident Statistics," a third on "Ropes and Safety Devices in Hoisting and Haulage," a fourth on "Mine Hygiene and Sanitation," fifth on "Mine Fire Prevention and Fighting," a sixth on "First-Aid Methods and Rules for Conducting and Judging First Aid Contests" and a seventh on "Mine Rescue Training." Out of the appointments came some excellent papers and discussion but no definite effort at drawing up conclusions. The members were not circularized and asked to give the subject their comment. Had this been done, more effective work might have been accomplished.

Until 1921 no attempt was made to draw up comprehensive Safe Practice Pamphlets, for that was the form of document which the National Safety Council found best in accord with its purposes. The attitude of the Council is, I believe, favorable not so much to rules of prescribed action or practice as to

an outline which will indicate practices which operating companies have found helpful in promoting safety, or appear likely to have that effect.

Says the report of the proceedings for 1921, "As a part of the program for the year, the chairman asked Mr. Gillette to take the responsibility for preparing a Safe Practice Pamphlet on 'Maintaining Safety Interest at Mines.' He stated Prof. Stock had agreed to be responsible for preparing a Safe Practice Pamphlet on 'Mine Haulage.' Mr. Kudlich agreed to prepare one on 'Hoisting,' Dr. Sayers one on 'Hygiene and Sanitation,' and J. W. Reed one on 'Mine Fire Prevention and Fighting.' Dr. R. M. Raymond agreed to prepare one on 'Ropes.'"

Of these, only three were actually presented. One was that of R. R. Sayers on "Mine Hygiene and Sanitation" and another by R. Kudlich on "Mine Hoisting Equipment," which were read at the meeting in 1922 held at Detroit. That by Mr. Gillette was presented and held so that further suggestions made at local meetings might be incorporated. All these papers are to be found in the proceedings for 1921. The other pamphlets were never prepared. At the same meeting the members accepted a form of accident report which has, I believe, been in use ever since in collecting information regarding casualties from members of the National Safety Council.

Standards Needed for First Aid Contests

It is unfortunate that Standards have not been prepared for the judging of contests in first aid and mine rescue work. To such standards there would be no real objection. Safe Practice Pamphlets on the methods of operation should also be prepared and published. This activity should be vigorously prosecuted to completion, for the papers presented at the various meetings have plowed the ground from which a plentiful crop of safe practices might be garnered, more complete than any heretofore collected.

The safe practice papers to which reference has been made might with advantage be mimeographed and sent to members of the Mining Section for their comment and then be rewritten by a committee in accord with the suggestions made. Then they should be submitted to the Executive Committee of the Council for publication. Later this committee will make the usual more general submission of the pamphlet to members and finally after revision reprint it as a Safe Practice Pamphlet to form part of the regular series.

Such pamphlets are more valuable than papers or discussion. They are more complete and methodical, and they have more authority because they represent the opinion, not of one man in one locality confronted with peculiar conditions, but the broad and well-considered conclusions of many men having a wide range of experience. Lacking a secretary for the section, little has been done, but with the wealth of material available in the proceedings and in other directions, it is time that some effort be made to formulate a compilation of statements of preferable operating methods.

Under the administration of B. F. Tillson, that began after the meeting in 1917 and concluded in 1923, meetings of the Mining Section of the National Safety Council with the Industrial Relations Committee of the American Institute of Mining and Metallurgical Engineers were held yearly at the annual February meeting of the latter society. Few of these papers, if any, were reprinted by the Institute and so are not available. The joint meetings continued till at least 1924.

Mr. Tillson also interested the U. S. Bureau of Standards in the testing of ropes magnetically so as to ascertain defects in ropes that outwardly were in good condition. A tentative report was made to the Industrial Relations Committee of the American Institute of Mining and Metallurgical Engineers. It might be well to ascertain the final disposition of this inquiry.

In 1919 Mr. Tillson urged the need for a technical service in the Mining Section and sought that dues be doubled to bring the necessary \$10,000 a year for the services and traveling expenses of an engineer. It was found difficult to get a response to such a plan, but Mr. Tillson believed that if it were started it would result in a disposition to pay larger dues or in such an increased membership as would make the Executive Committee favorable to financing a paid secretaryship.

Good Publicity Was Secured

In 1921 he induced the U. S. Bureau of Mines to cooperate with the Executive Committee of the National Safety Council in providing a paid secretary, C. L. Colburn. This lasted for two years. Mr. Colburn was paid by the bureau, but some of his traveling expenses were paid by the National Safety Council. He visited mines for the purpose of gaining and imparting information; he wrote articles for the NATIONAL SAFETY NEWS; he took photographs of safe and unsafe practices and prepared safety posters, he made talks on safety when opportunity presented. During the first year, 78 mines and 14 "mills" were visited, 42 being coal mines, 35 metal and 5 non-metal. Of the 14 "mills," 6 were breakers or coal-washing plants, 5 were concentration plants at metal mines, and 3 were mills connected with non-metal mines. He wrote 17 articles for the NATIONAL SAFETY NEWS.

During the second year he visited 49 mines, one smelter and 3 mills, and wrote 28 articles dealing with safety for the same publication. During that year he addressed 16 different meetings and traveled 26,747 miles. In all he took 261 photographs, from which 32 safety posters were prepared.

After July 1, 1923, the National Safety Council discontinued its financial support of the paid secretaryship, but nevertheless three articles were written for the NATIONAL SAFETY NEWS and material was furnished for 8 posters.

Mr. Colburn assisted in a Mine Safety Conference held in Duluth, Minn., in 1922 where more than 80 delegates were present from the Lake Superior Iron Mines. He promoted the Northwest Mine Safety Conference held in Butte, Mont., 1922, at which 125 picked men were present. He promoted and acted as chairman of the Southwest Mine Safety Conference in Globe, Ariz., in 1923, in which 110 picked delegates took part.

It was hoped that after a trial the Mining Section would be so firmly established that the secretary could be paid out of the dues of the Mining Section, but that did not prove to be the case.

A Section News Letter Inaugurated

Bad times in both metal and coal industries made two of the three local sections fail after their first meetings. It should be added that owing to Mr. Tillson's activity, Mr. Guerrant, safety engineer of the National Safety Council in 1919, made a tour to some of the mining properties to compare for approval a Safe Practice Pamphlet on "Mine Cars and Haulage" which was published as a second pamphlet on "Mine Rescue and Training."

In the year ending with the meeting of Sept. 29-Oct. 1, 1925, the "Monthly News Letter" was inaugurated. This is sent monthly to members of the Mining Section. T. T. Read, the secretary of the section, and safety service director, U. S. Bureau of Mines, was the first editor. Since that time, Daniel Harrington, also secretary of the section and chief of the Safety Division of the U. S. Bureau of Mines, has edited the monthly letter.

In all, 114 papers, excluding one on the activities of the Mining Section and

the proposed increase of dues, have been presented. The printed proceedings, excluding papers equally germane to the mining industry read in the general sessions and in those of other sections, totals 1,440 $\frac{1}{4}$ closely printed pages. An index has been prepared dividing these into their appropriate subjects.

**Subject Index of
Papers Presented to National Safety Council
1910-1926**

General:

1910 (1); 1912 (1); 1924 (1); 1926 Alabama (1); 1926 (2); (Safety Kinks) (1). Total 7.

Industrial Relations:

General 1919 (2); 1920 (2); 1922 (Safety Practice Pamphlet) (1); 1926 (1). Total 6.

Vocational Training for Safety and Efficiency 1925 (1).

Safety Propaganda:

Interesting Executives 1921 (2). Total 2.

Interesting Shift Bosses 1921 (2); 1923 (1). Total 3.

Interesting Miners 1920 (1); 1923 (1); 1925 (1). Total 3.

General Interest 1926 (1).

Fire Aid:

Contests. 1918 (1); 1920 (1); 1921 (1); 1925 (1). Total 4.

Stations 1921 (1).

Rescue (see Mine Fires):

Training 1919 (1); 1922 (1); 1925 (1). Total 3.

Apparatus and Fire fighting 1919 (2). Total 3.

Stations 1917 (2). Total 2.

Accident Statistics:

1917 (1); 1918 (2); 1919 (2); 1922 (1); 1924 (1). Total 7.

Sanitation:

General 1917 (1); 1922 Safety Practice Pamphlet (1). Total 2.

Water 1921 (1).

Toilets 1921 (1).

Industrial Nurses 1925 (1).

Drilling:

Health of Drillers 1918 (3). Total 3.

Hoisting:

Ropes 1917 (3); 1918 (1). Total 4.

Ropes in General 1922 (1).

Practices 1922 (1).

Devices 1920 (2); 1925 (1). Total 3.

Signals 1925 (1).

Mine Fires:

General 1917 (1).

Fire fighting 1920 (2); 1923 (1). Total 3.

Fire Prevention and Fire Fighting 1921 (3); 1922 (1). Total 4.

Explosives:

General 1918 (1); 1926 (1). Total 2.

Stray Current 1924 (1).

Explosions:

General 1920 (2); 1924 (1).

Gas 1925 (2). Total 2.

Rock Dust 1926 (1).

Transportation:

General Underground 1922 (3); 1923 (1). Total 4.
 Tracks 1923 (1).
 Mine Cars 1918 (1); 1923 (1). Total 2.
 Locomotives 1921 (3); 1923 (1). Total 4.
 Animals 1921 (2). Total 2.
 Derailments 1923 (1).

Ventilation:

General 1917 (2); 1918 (1). Total 3.
 Auxiliary 1922 (1).

Loading Chutes:

1919 (1).

Roof and Ore-Falls:

1920 (2); 1925 (2). Total 4.

Lighting:

1917 (1); 1918 (2). Total 3.

Electrical Apparatus:

1917 (1); 1924 (2); 1926 (1). Total 4.

Signs:

1921 (1).

Coal Breakers, Washery and Ore-

Dressing Plants: 1918 (2). Total 2.

Open Pits:

1920 (2); 1925 (2). Total 4.

Grand Total, 114.

CHAIRMAN YOUNG: Thank you very much for your paper, Mr. Hall. I am going to ask Mr. Harrington of the United States Bureau of Mines to lead the discussion of this paper.

MR. HARRINGTON: Mr. Hall has given you, to my mind, a very comprehensive resume of the National Safety Council's activities as far as the Mining Section is concerned. He has brought back to me memories which had slipped my mind for a number of years. It seems to me that even though the Mining Section is not able to employ a paid secretary, that the Mining Section has not failed in performing a very useful function in the mining industry.

I attended my first meeting of the National Safety Council six or seven years ago, when the meeting was held in Milwaukee, and I have been attending meetings of various descriptions—technical meetings on mining chiefly—for the past twenty years or more, and I can very freely say that I got more real benefit out of attending the meetings of the Mining Section of the National Safety Council than from any other meeting that I ever attended, and I don't make any exception of any of them—the American Institute of Mining Engineers or any other.

Safety Ranks Before Dollars and Cents

One reason for that is this: That, of course, it affects me from a safety point of view. I am essentially and intrinsically a safety man. I know nothing but safety, and in attending other meetings (I don't care where you go) there are very few of them that are not devoted largely to the dollars and cents point of view, and they forget the safety side of it. The meetings of the National Safety Council Mining Section don't forget the safety side of it and they do side-step, or side-swipe (if you want to put it that way), the dollars and cents point of view.

That is the real advantage I see in the National Safety Council Mining Section,

and I can't understand and I have never been able to understand, why mining companies throughout the United States, coal and metal, have not paid more attention to the Mining Section of the National Safety Council than they have done. There is a certain amount of money involved in it, yes, but there are also in these meetings discussions which they cannot get any place else. I defy you to go any place where you have more accurate discussion than you get in the meetings of this Mining Section. They are thrown open to everybody, and as far as I have been able to find out, they are participated in by nearly everybody. At least, there is a freer participation in the discussion in these meetings than you will find in almost any other.

Discussion Brings Out Many Valuable Points

One of the difficulties in most meetings, as I take it, is that there are too many papers and not enough time for discussion. You are asked to read a paper before some—we will say the larger societies—and you will be one of a dozen. There will be so many papers prepared where the only thing that the men who prepare them can do is give a short abstract. Well, by the time you have given your abstract the time is up and somebody else's paper is on. Here it isn't that way. There are comparatively few papers. There is plenty of time generally for discussions and you get real discussions.

Now, one of the things that came up before the meeting of the Executive Board of the Mining Section here in Chicago during the winter, was the matter of trying to employ a paid secretary, and we canvassed the situation and found a number of points of view as to the possibility of securing money for that purpose. I think it would be a very fine thing if it could be done. If there were a paid secretary, he could devote a considerable portion of his time to getting out to you and to me and the rest of us the wealth of information that is contained in the discussions of the National Safety Council Mining Section. They are published in the transactions, and if they were taken out of the discussions and published in connection with the Monthly News Letter, they would be timely and they would hit home and the people who would really be interested in them would get them to read.

If you people have in mind some philanthropic mining man who would like to let loose about \$10,000 or \$15,000 a year, it seems to me there isn't a better place for it than the employing of a real, live, up-to-date secretary for the Mining Section, who will devote all of his time to it and the mining industry of the United States can get all kinds of benefit from that sort of a thing.

CHAIRMAN YOUNG: Has anyone else any discussion on this paper? If not, we will go on. There was distributed on the chairs a question card. If you have any questions that you wish to ask at any time or that you wish to present at the round-table discussion, just write on this card and hand it to the secretary at any of the sessions.

Now, I certainly am gratified to see as large an attendance as we have here this morning. I am going to ask the secretary if he will please announce the number that registered.

MR. HARRINGTON: I have looked over the registration cards, and there are 64 registered, essentially as follows: 20 gypsum plants; 20 from coal properties; 32 from metal; three from steel mills, and several from various outside agencies; and by the way, I would like to know if there is anybody here who has not signed a registration card. I might say that those "outside agencies" include such animals as editors and representatives from the Bureau of Mines.

ADJOURNMENT.

Tuesday Luncheon, September 27, 1927

J. T. RYAN, Chairman
Mine Safety Appliances Company, Pittsburgh, Pa.

Keeping Everlastingly At It

**Harry L. Gandy, Executive Secretary, National Coal Association,
Washington, D. C.**

I hope I can get across a real message today, for I am called upon to speak of the untiring efforts of the bituminous coal mining industry in the interest of safety. Memories of safety demonstrations that I have witnessed enhance my appreciation of the opportunity to meet with you on this occasion. Ten days ago I attended the State Safety Day meeting of West Virginia, where not only were the contests on a high plane but where a considerable section of the industry publicly pledged itself to continued warfare against accidents. Knowledge gained through intimate contact with operators in every bituminous field of the country, knowledge that these operators, ideally and practically, have made the cause of their employee's safety their cause, enables me to discuss this subject with the utmost frankness. The bituminous industry brings its brief to the bar of public opinion; a brief that is a straightforward statement of performance.

The safety movement is now well under way throughout the industry, both in the small and the large operations. It is organized not only to hold down but to further decrease the accident rate, notwithstanding the fact that the continuing introduction of machinery means a constantly increasing hazard. Employers generally realize that safety work is an investment which pays dividends in lower costs and in the health and happiness of employees. It may be true that some few operators have not grasped the fact that the over-all cost of accidents is perhaps four times as great as the compensation and medical payments. However that may be, the safety movement is driving home the facts, and distinct progress is being made.

My observations respecting safety should be prefaced by the statement that relatively there is little new in the safety movement. This work consists largely of efforts to bring home to every operator and miner the stern, every-day facts and to keep everlastingly at it. The only claim which I can make to any degree of originality lies in the words of Carlyle, "that man is most original who can borrow from the greatest number of sources of information." Safety statistics, practices and principles have been cussed and discussed from many forums. It is our responsibility to make the discussion bigger, better and more productive of good results. I emphasize only the obvious when I add that in the brief time I have here today I cannot deal with technicalities, with description of mechanical safeguards or with analyses of mining methods and systems. I can, in the main, only review the salient facts relating to the safety record of this industry.

A year or so ago the National Coal Association prepared a symposium of answers received by its safety committee to a questionnaire addressed to the industry as to particular efforts to promote mine safety. The information obtained furnished a most encouraging picture of the efforts of bituminous opera-

tors to advance the safety movement. This digest disclosed that the work of federal and state agencies and the practical experience of bituminous coal operators have pretty thoroughly established what is safe and what is unsafe in mine operation. There remains the vital measure of seeing that that knowledge is utilized and that the spirit of safety is instilled in every member of the industry, from the executive down to the "mule skinner."

First aid and mine rescue work are being promoted in all fields, and much energy also is being directed toward accident prevention. With respect to first aid work, I am informed that the U. S. Bureau of Mines has, to date, trained over 210,000 bituminous miners. There is a steady increase both in the membership of the Holmes Safety Association and in the number of local chapters thereof, the latter now being 175. A most favorable safety factor is the marked improvement in state mining inspection. Daniel Harrington, who directs the safety work of the U. S. Bureau of Mines, states that there is a decided tendency on the part of state mine departments to employ "better men with more scientific training." Mr. Harrington also bears witness to the progress that the bituminous industry is making in its safety work.

The National Coal Association, the nation-wide organization of bituminous operators, is continually disseminating safety literature and information and is engaged in constant study and effort looking to the establishment of improved practices and the firm inculcation of the safety idea in the heart and soul of every miner and mine-owner. It is promoting cooperative studies of falls of roof and coal by the U. S. Bureau of Mines, state mining departments and the industry. Only a few days ago the Association received a letter from the Bureau expressing appreciation of the support given to the International First Aid and Mine Rescue Meet held within the past month at Pittsburgh.

Cordial Relations with the Bureau of Mines

I could discourse at length concerning our amicable relationship with the U. S. Bureau of Mines. As a typical example, I cite briefly the record of Mr. J. G. Bradley, of West Virginia, a former president of the National Coal Association and its representative on a committee named by Secretary Hoover of the Department of Commerce to outline a program for the Mines Bureau. As a member of this committee, Mr. Bradley urged that the Bureau, "continue unfalteringly its missionary endeavor toward the prevention of accidents, its encouragement of an increasingly higher standard of safety and the actual rescue work in emergency cases." What is more, Mr. Bradley declared against any plant that would reduce the Bureau appropriations for this work and stated that if officers of the Commerce Department, "are to discharge the duties toward industry laid on them by the law, they must have the funds necessary to the collection of data, performance of experiments, study of results and dissemination of information." The safety committee, the directors and membership of the National endorsed this position of Mr. Bradley and are not only on record but also "in harness" with respect to the fulfillment of his recommendations.

It should be remembered that the U. S. Bureau of Mines is not clothed with regulative power. The Federal Constitution would not permit that. The Bureau is purely an educational force. The committee named by Mr. Hoover reported that the laws and regulations governing the actual production of coal are those of the states in which the mines are situated, and it is well that this is so.

Dr. T. T. Read, upon his resignation as safety service director of the U. S. Bureau of Mines, said, in part: "I have no faith at all in making mines safe

by law. If regulations are made that the operators regard as not being necessary, you will merely have a situation such as that created by certain sumptuary legislation which people joyously and openly disregard." Dr. Read stressed the need of first securing the whole-hearted cooperation of the operators. This is necessary to bring about the adoption by the industry of the safety practices recommended by the Bureau. I think his point is well taken.

In speaking of the efforts of operators, aided by their National Association, to reduce mine accidents, I am reminded of another statement made by Dr. Read, when he said: "I regard it unfortunate that many people in the past, in trying to awaken greater interest in observing safety precautions, thought it necessary to emphasize the loss of life in the coal mining industry, rather than what is being done to reduce the loss of life. The coal industry deserves great credit for what is has done," continued Dr. Read. * * * "It can fairly lay claim to having made substantial progress in making coal mining safer. The question is sometimes asked whether all the effort put into accident prevention has shown results. As far as the coal industry is concerned, we can say quite definitely that it has. * * * The coal industry may well congratulate itself that its safety movement has not only been well handled but has shown definite progress." This statement should carry great weight, coming as it does from the former safety service director of the U. S. Bureau of Mines, who is now assistant secretary of the American Institute of Mining and Metallurgical Engineers.

Statistics Sometimes Inclined to Be Misleading

There must be something back of such statements. Let us consider for a moment the actual figures of fatality records. Remember that, in all cases, unless I specifically cite the anthracite industry, I am speaking only of bituminous mining. Combining the figures of the two industries is misleading. Fatality statistics are frequently based on man-hours, but in order to appreciate the meaning of such figures one must realize that it requires about two and one-half times as many man-hours to get out a ton of anthracite as a ton of bituminous. The life cost of producing a ton of bituminous coal is considerably less than that of anthracite. When we consider the mining of coal in terms of fatalities, statistics based on production ratios are significant.

Let's see what the fatality record kept by the Bureau of Mines shows. In 1911, the first year of the record, the fatalities per million tons of bituminous coal mined were 4.82, while in 1926, the figures was only 3.56. The Bureau has monthly statistics from 1916 only and the lowest monthly fatality rate as shown by that record was scored in March of the present year, when 60,151,000 tons were produced at a fatality rate of only 2.31 per million tons. Comparing the record of the coal industry here with that of foreign countries for the five-year period from 1921 to 1925, inclusive, we find that the American record was 3.96 per million tons of coal mined, including anthracite, as against the record of Great Britain of 3.98, Belgium 6.54 and Prussia 10.30. The record for France for 1925 is not yet available but the four-year average from 1921 to 1924, inclusive, was 5.68. The American record for bituminous alone for the same five-year period was 3.67. Those are government figures and constitute eloquent testimonial to our safety work and point to continued progress.

As a matter of information, I quote the record of causes of fatal accidents in bituminous operations in 1926, wherein we find that 48.18 percent of the fatalities were caused by falls of roof and coal; 18.38 by underground haulage; 18.09 by

explosions; 4.51 by electricity; 4.12 by accidents above ground; 2.23 by explosives; 1.31 by shaft accidents; 1.26 by mining machines; while 1.92 per cent were from other miscellaneous causes.

Divers and numerous are the plans advanced to reduce the accident rate. A somewhat common notion, especially among theorists, is that the best way to bring about the millenium is by laws to make mines safe. Such a procedure is doomed to failure, as I have pointed out through a statement quoted from a former government official who was rich in experience in the safety movement. Owing to the variable conditions in different mines, it is simply not feasible to provide identical regulations for all mining districts. Mines cannot be placed in one of two classes, safe or unsafe, any more than colors can be classified as either pink or green.

I am sure you will appreciate the significance of the statement which appeared in the September 1 issue of *Coal Mining Review*, published by T. L. Lewis, formerly a high official of the United Mine Workers of America. In commenting on the high percentage of accidents from falls of roof and coal, he said that a rigid investigation would disclose that the lesser proportion of fatalities occurs in mines which have the most dangerous draw slate or roof. Mr. Lewis adds that, "Safety First, in its effect, depends upon the individual and not the management of the mine." Experience of insurance carriers supports the conclusion of Mr. Lewis.

Not a few accidents from falls of roof and coal and other causes can be traced to dependence of miners on their supposedly accurate knowledge. Some miners continue to blunder through their failure to make the prescribed examination and take sensible precautions, thinking they know almost to the minute how long a roof will hold. A narrative from *London Tid Bits* illustrates one way in which this so-called accurate knowledge operates. An old woman was going down a coal mine for the first time in her life. As the cage descended, she noticed how they were dependent upon a single rope to which the cage was attached.

That Rope Was No Doubt Quite Safe

"Do you think it is quite safe?" she asked a miner, as she glanced up at the rope. "Don't you fear, mum," was the reply. "You're quite safe. These ropes are guaranteed to last exactly twelve months and this one isn't due to be removed until tomorrow."

And to show the pride of the miner in his possession of this "accurate knowledge," I am reminded of the reply which Mr. Chuggins made to a policeman, who had said to him reproachfully, "You were going 40 miles an hour." The motorist countered with, "I'm no deliberate law-breaker. I'll admit I'm ashamed of myself, but I'm kind of proud of the old flivver." That reply reflects the mental attitude of some miners. They know they *should* live up to the rules; the idea is drilled into them at every safety meeting; but they apparently delight in relying exclusively on "accurate knowledge."

Because accidents at the face of the seam are the most common form of mine accidents, that phase of the subject is today engaging the most serious attention of the industry. The personal equation is of outstanding importance. It must be made doubly sure that the worker has heard and heeded the safety message, which is a message of admonition for his own protection and that of his fellow workers.

Along this line of thought, I was impressed with the statement issued this month by the motor vehicle commissioner of Connecticut, who, in speaking of an outstanding safety improvement in the way of a new four-track highway,

Wednesday, September 28, 1927

The second session was called to order at nine-thirty o'clock by the chairman, Howard I. Young.

CHAIRMAN YOUNG: We are going to change the order on the program a little this morning because the Nominating Committee has asked for a little more time in getting together before they make their report.

The first paper this morning is, "Foremanship Training Conferences and Their Bearing on Accident Prevention," prepared by Mr. McHenry Mosier, superintendent of mines, Phelps Dodge Corporation, Morenci, Arizona. Mr. Mosier is unable to be present and the paper will be read by Mr. H. C. Henrie, manager of Industrial Relations of the Phelps Dodge Corporation.

Foremanship Training Conferences and their Bearing on Accident Prevention

**McHenry Mosier, Mine Superintendent, Morenci Branch, Phelps Dodge
Corporation, Morenci, Arizona.**

The Arizona State Department of Vocational Education conducted the first Foremanship Training Conference in Arizona in January, 1923, for the Miami Copper Company. The next Conference was a joint meeting held in January, 1924, when the Miami, Inspiration and Old Dominion Copper Companies participated under the auspices of the State and Federal Governments. Since that time conferences have been conducted in various mining camps in Arizona, including every Phelps Dodge Branch, by leaders furnished by the Arizona State Department of Vocational Education.

The first conferences were demonstrations of methods covering a limited field. At the follow up conferences, more specific problems in production, safety, supervision and leadership were discussed. The underlying object of this work was to increase the efficiency of Industry in Arizona, first by showing the responsibility of supervision to those who direct labor and later by reaching the individual worker through some form of vocational education. As stated by the leader at one series of conferences, the purpose was:

- (1) To get group opinions of foremanship problems.
- (2) To encourage the habit of analysis of these problems.
- (3) To promote a better understanding through discussion of the problems of fellow foremen.

It was emphasized that nothing was to be given in the form of lectures, but that all that would come from these conferences would be the result of the conclusions reached by the group itself. In this leader's opinion, after a full systematic discussion of a problem, in almost every case, the conclusion of a group is right. Regardless of the purpose of any of these conferences, safety work, accident prevention and other closely allied subjects, have always been introduced and have proven important and valuable topics.

The first development of the idea of cooperation at Morenci was expressed through foremen's dinners held at frequent intervals where all the company officials met in the evening to discuss an operating problem or some topic relating to the welfare of the company and of the men. As an extension of this idea a series of Foremen's Conferences was started early in the year 1924. Further expression of this idea of cooperation is found at Morenci in

the weekly meeting of superintendents with the manager, for a round-table discussion of operating problems; and in the weekly meeting of the mine foremen with the mine superintendent, where every problem arising at the mines is frankly discussed. Another form this cooperation takes is the committee system of safety work, inaugurated in March, 1925. This was patterned somewhat after the method used by the United States Steel Corporation and was outlined by H. C. Henrië at the Fifteenth Safety Congress, at Detroit. By this system, the sense of individual responsibility for safety is carried directly to the workmen themselves.

The First Foremanship Training Conference

The first intensive Foremanship Training Conference at Morenci Branch was held for three weeks during March, 1924. The conferences were begun with a group of 13 superintendents and other department heads participating. This was followed by a group of 15 foremen and finally by a group of 15 shift bosses. The subjects discussed included:

- (1) Duties and responsibilities of each group.
- (2) Safety.
- (3) Analysis of specific accidents.
- (4) Leadership.
- (5) Cooperation.
- (6) Labor turnover.
- (7) Giving orders.
- (8) Instructing.
- (9) Loyalty.
- (10) Job analysis.

The second conference was held by the mine foremen for one week in February, 1926. The topic was Standardization of Mining Methods, the entire week having been devoted to a job analysis of stoping operations. So far as known, this is the first complete job analysis of such large scale operations which has ever been made by a group of men so intimately connected with them. This year a conference was conducted for two weeks in April for the benefit of the shift bosses. The first subject treated was safety work, with analysis of accident hazards and means of their elimination, followed by a discussion of operating problems.

These intensive conferences have been supplemented with other conferences of foremen to establish operating and construction standards, with the idea that the most efficient way is the safe way. There was an excellent illustration of this in the Mining Department last year when the stoping foreman presented a report on "Drawing through Grizzlies" which was accepted and put into effect as standard practice. In underground transportation this idea has been carried still further, by including in the conferences all the workmen in the haulage crews, from which has resulted the present standardized operation of trains.

At Morenci the purpose of the original Foremen's Conference was indirectly to reduce production costs, by encouraging men to think analytically and by effecting better cooperation among the men who discuss their problems together. This year the prime object of the conference was to promote safety work. It is interesting to note in the minutes of all these conferences, the frequent references to standardization, to efficiency and to safety of the men. Even in the first series of conferences, in 1924, all groups agreed that looking after safety was one of the most important responsibilities of each group; while the shift bosses were unanimous in saying that it was the most important. This is not surprising because safety work and other forms of cooperation are inspired from

the top of an organization and it is the attitude of the management that safety work is a major operating problem. Some of the other contingent factors allied with safety work, which these conferences have assisted in promoting are:

- (1) Standardization and efficiency.
- (2) Improved morale.
- (3) Staff leadership.
- (4) Better instruction of working force.
- (5) Effective discipline of working force.
- (6) Reduction in labor turn-over.
- (7) Increased plant pride.
- (8) Better knowledge of plant policies.

The effectiveness of safety work at any plant can be gauged by its accident record. The frequency and severity rates for the Morenci Branch of the Phelps Dodge Corporation follow:

Accident Frequency Statistics Lost Time Accidents

Department	1923		1924		1925		1926		5 Months 1927	
	Per		Per		Per		Per		Per	
	No.	Shifts 1000	No.	Shifts 1000	No.	Shifts 1000	No.	Shifts 1000	No.	Shifts 1000
Mining	228	1.509	263	1.344	281	1.315	72	.352	6	.094
Concentrating	64	1.412	81	1.192	38	.529	7	.165	8	.094
Smelting	38	1.065	51	.950	36	.578	18	.277	4	.150
Mechanical	22	.888	26	.857	24	.749	5	.120	4	.153
Miscl. Surface and all others.....	41	.544	45	.586	20	.269	11	.145	1	.074
Totals	393	1.184	466	1.059	399	.878	114	.264	15	.089

Fatal Accidents (Included above)

Mining	3	0	3	0	0
Others	1	1	0	0	0
Totals	4	1	3	0	0

Accident Severity Data

	Shifts Worked		Shifts Lost		% Shifts R'd'ction % Lost in Rate		in 1926
	1925	1926	1925	1926	1925	1926	
Mining	213,701	186,406	26,829	4,196	12.55	2.25	82.08
Concentrating	71,898	66,361	1,597	180	2.22	.27	87.84
Smelting	62,327	64,996	2,972	532	4.77	.82	82.82
Mechanical	32,050	38,416	2,755	47	8.61	.12	98.60
Morenci Surface	16,724	16,743	82	142	.49	.85	73.47
Carpenters	8,239	8,943	147	759	1.78	8.48	376.40
Railroad	15,014	13,801	49	11	.33	.08	75.77
Clifton Surface	1,686	1,411	41	8	2.43	.57	76.56
Morenci General	5,543	5,559					
Other Dept's.	27,245	29,246					
Totals	454,427	431,776	34,472	5,875	7.58	1.36	82.06

Calculated on method used by the United States Bureau of Mines.

The following data on the plant will assist in interpreting this record. It shows that efficiency and safety go hand in hand. The smelter output is 5,000,000 pounds of copper per month. The concentrator treats 4,200 tons per day. The mine operates six days per week and produces sufficient ore to run

the concentrator seven days. In the mine the stoping efficiency has increased approximately 50 per cent each year over the preceding year. Full production was attained in 1925, since which time the overall mine efficiency has increased 50 per cent. During this same period the milling costs have been reduced 20 per cent, while smelting costs have been lowered 15 per cent. Most of the manual labor is performed by Mexicans, who constitute about one half the employees of the District.

The improvement in the Morenci safety record is due to many causes, chief of which are the following:

1. Attitude of Management: An increasing desire to eliminate all accidents has been manifested.

2. Closer Supervision: Supervisors are paid a safety bonus, based on the number of shifts supervised without an accident. Foremen and shift bosses have fewer men. Work is planned farther ahead. More attention is given to smaller details.

3. Better Cooperation: This is not only manifested in each department but between departments as well.

4. Analytical Investigation of all Accidents: The investigating committee of three or more includes at least one workman. The cause of the accident is established and the responsibility for it is fixed regardless of whether the accident resulted in loss of time or not. Recommendations are made for avoiding a similar accident in the future.

5. Standardization: An increasing number of operations are becoming standardized, while most construction work is on a standard design.

6. Better Instruction of Workmen: Duties of each job are becoming more specific. Men showing especial aptitude for certain work are kept on that especial work so that they develop into specialists. As a rule each department promotes its own men to the better jobs. If many new men are acquired at one time, a school of instruction is established.

7. Better Discipline: For infraction of safety rules, a warning is given for the first offense, a lay-off for the next, and a discharge for the third offense.

8. First Aid: Training employees in first aid helps create the proper attitude for safety work. In addition to saving life, it also prevents minor injuries from becoming serious. Last fall over 600 employees took the Bureau of Mines course in First Aid Training.

9. Better Spirit, or Increased Plant Pride: Morenci is known as a desirable place to work. There has been a recent improvement in streets, walks, parks and appearance of public buildings. The winning of the Holmes Trophy last year, at the Bureau of Mines International Safety contest, together with the development of a State Champion First Aid Team, has helped.

10. Smaller Labor Turnover: The percentages are shown here since 1923:

Per Cent Annual Labor Turnover

	Mining Dept.	All Others	Total
1923	102.71	88.40	91.98
1924	112.35	95.75	104.93
1925	84.38	77.27	81.13
1926	61.05	60.00	60.49
1927 (5 Mo.)	51.72	45.00	47.88

These factors collectively represent safety education. Many of them are inspired from the highest officials of the corporation and are filtered downward through the organization. Great credit is due the operating staff.

(1) For developing the proper attitude towards safety work.

- (2) For making the safety of the workmen the first consideration in all their plans.
- (3) For getting the safety idea across to the individual workman.

The holding of a Foremanship Training Conference reflects the policy of management. Every successful organization has a definite morale or spirit. Where cooperation exists Foremanship Conferences naturally find a place and function smoothly.

Where cooperation does not exist, the Foremanship Training Conference, with the approval and assistance of management can be made of material value in establishing this vital factor of a safe and successful plant. Although there is not a direct relationship between Foremanship Training Conferences and a plant's accident rate, yet there are many indirect benefits such as clearer analytical thinking which eventually promote better plant safety. Foremanship Training Conferences are not a golden cure-all for a sick organization but we, at Morenci, endorse them as tending to promote some of the very things responsible for a good safety record.

The Foremanship Training Conference of Great Value

MR. HENRIE: I think the principal point Mr. Mosier has in mind in his paper, is that these foremanship training conferences which were originally introduced and promoted by the federal and state vocational training departments, have been of great value, not only to the Morenci branch but to all the mining companies of the state. Perhaps this was the first agency which was successful in getting mine foremen and shift bosses together and getting those men to really talk freely—express their opinions and arrive at certain definite conclusions concerning their work and duties.

Now, it might be of assistance to the group here if I would outline just how this conference work is functioning at present. The particular conference I am speaking of now is not handled by the vocational training department, but rather by the individual organization itself. It became necessary to reorganize the safety and accident prevention work of the corporation in 1925, because it was apparent we were not getting results, and the present form of safety organization was instituted.

After the system had been introduced it was soon evident that while we were talking about instructing workmen to do things safely, there was considerable doubt in the minds of the individual foreman and boss as to what really constituted safe practices. By that I mean one foreman would have an opinion as to how to do a given piece of work; the foreman, say in the adjoining division, might have some thought of a different idea. Naturally, if men were to be instructed in the safe way to perform a given operation, there first must be some clear idea in the minds of the supervisors or officers, as to how this work should be done; and, of course, where a large number of men are employed, procedure should be uniform.

So we instituted a method which had for its object really the education of the foremen and the bosses in safe practice. It was realized that if a safety engineer should go down into the mine and tackle a certain operation, the first foreman that would see it would be ready to punch the plan full of holes. So taking advantage of the excellent results which had been obtained in the conferences held by the state vocational training department, we adopted this idea, and I will use the mine department as an example. These conferences are held in every department. The mine superintendent was instructed that at least twice a month, he should have a conference with all of his foremen—night foremen and shift bosses, at which time the matter of standardizing work, or, rather, finding the safe and efficient way of doing a given operation be taken up. It sounded all rather complicated.

The start was made this way: After analyzing our accident record we found that

about 52 per cent of our accidents were occurring in haulage operations; and of these 30 per cent of the accidents happened directly at the chute or, in other words, in the operation of loading an ordinary mine car of ore from the chute. Maybe from a chute door; maybe running a car over the foot; maybe pinching their fingers, but all were tied up with that one operation. Since that appeared to be quite a hazard, that was the starting point for the mine departments.

The mine superintendent at his first meeting simply put the matter up this way: Well, boys, here are the figures—there is where the accidents are happening. Now, we have got to figure some way out. Let us take this matter of loading a car. How do we do that work?" Well, it was surprising, practically no two men agreed. We got the men talking. One man would venture an opinion and another one, so finally we started at it in a systematic manner.

We found that the mere operation of running a small egg car under a chute and loading it could be divided into 22 separate and distinct operations. This bunch of foremen and bosses finally agreed that if a man would perform those 22 operations in a certain way, why, men would be pretty safe. Naturally when you are working on that, a thousand and one other questions were woven into the discussion—construction of your chute, height of the chute door, height of chute mouth above the drift, your trolley wire and method of guarding the trolley wire. In other words, in starting on the mere problem of loading a car you really take in all operations and all construction, so to speak, surrounding the operation. Well, anyway, that group perfected this standard procedure.

The Collective Opinion Looked Good

Now, I am not saying that perhaps some one man couldn't go out there and find a better method. The whole point is this: It represented the collective opinion of the foremen and shift bosses of the mine. It looked good. And, of course, experience in the conferences conducted by the state vocational training department seemed to indicate that where the group opinion was practically unanimous, you can consider the decision of the group as right. In any event, you had a practice which was agreed upon by the foremen and bosses. Naturally, they would carry out that practice—put it into effect because it was their own idea rather than an idea given to them by some efficiency engineer.

Naturally, after this standardization of loading a mine car was made, the next question that came up was, "Well, now, what are you going to do with it?" These men were told, "Now, we will mimeograph this—each foreman and boss will get a copy. We want you to study it because this is the way we will do that particular operation from now on. We will also post a copy of this method on each loading chute. It is up to you to instruct every man you have in this method of doing the work and see that he does it. If he doesn't follow this method, we want you to warn him. Go over it with him and then if he doesn't line up, put somebody else on the job who will. On the other hand, if we come through your division and find men loading haphazardly, find that this practice is not being followed, you are responsible—not the man." After that operation had been disposed of, naturally, other operations were considered.

Those so-called safety standardization conferences have now been in effect two years. You appreciate that perhaps there are a lot of operations connected with mining which it would be very difficult to standardize, but there are a lot which can be standardized and have been. However, as an educational measure we have found that this method of getting the foremen and bosses together and allowing them to work out the solution of a particular problem and then insisting that they put their own conclusion into effect, has been of wonderful assistance in reducing the accident record, not only to Copper Queen, or the Morenci branch, but all of the Phelps

Dodge Corporation property. In fact, the method has been so successful that it has been adopted by the management of the corporation and is being used at every branch.

CHAIRMAN YOUNG: The discussion of this paper will be led by Mr. C. A. MacDowell, safety and personnel manager, Pittsburgh Coal Company, Pittsburgh, Pennsylvania.

Conferences Really the Beginning of Safety Work

MR. MACDOWELL: I don't think there is any doubt in the minds of those present who have followed this safety movement daily, that conferences of all kinds have a material bearing on accident prevention. Foremanship conferences have been reaching the desired goal, and the fact that they have been successful, I think, has been proven indeed by the paper that has been presented. It is a little different, however, probably, as it might relate to the coal mining section, although I don't think so personally. Personally we cannot have too many conferences, and I do not know of a better way to promote or put across accident prevention work than by conferences.

In foremanship training conferences an opportunity is presented to set down specifically the right way to do things. They are the seat of what I term "personal contact." I have always contended that accident prevention could be put across as an ideal, by personal contact. Naturally, then, the first group of employees that we would desire to reach would be the foremen, who must be taught the correct way, and they in turn reach the men under their jurisdiction at their daily occupations by personal contact.

These conferences are really the beginning of accident prevention work. In a sense officials, as you know, are responsible for the safety of the men under their supervision. We must then assume that all officials, or the entire official family, are the key men to the situation and circumstances at all times, as they are constantly meeting with the men at their working places several times daily. They have an excellent opportunity to tell these men the correct ways and means of preventing these accidents. We are told that 90 per cent of all accidents causing injuries are due to carelessness, and the immediate thought is, "Carelessness on the part of the employee or the person injured." Now, that may be true in a sense, but it seems to me we should not overlook the responsibility and probable careless attitude of the officials—officials who visit this man daily. Now, by such conferences all officials are instructed in the personal contact program to cover all emergencies that may arise. Foremen and others cannot be trained to responsibilities, safety leadership, cooperation, efficient labor turnover, instruct loyalty, giving orders, standardization, general efficiency, improved morale, effective and proper discipline and industrial policies, without having such conferences. I know such conferences have been successful. Some have been conducted differently from the outline given in the paper this morning, but the material goal was the same. The success was noted not only as it related to accident prevention but in all phases of the industry.

I am heartily in accord with conferences of superintendents, foremen and assistants, fire bosses and, in fact, what may be termed occupational conferences, all of which help in the ultimate success of the undertaking.

It is also apparent to me that a safety program has not been successfully put across in some instances, because of the indifferent attitude of leaders to have foremen and other conferences; and you will find that the accident rates of such companies are exceptionally high.

Now, a new type of conference has been developed in recent years, where the superintendent, the foremen, the assistant foremen and all others, including miners, gather together in monthly meetings, and they may be termed safety conferences of a mine, but at the same time it is a conference just the same. No lectures are given. Con-

clusions are reached, however, after considerable discussion and instructions issued by the chairmen who in these cases happen to be the superintendents. It was surprising to find the amount of frankness shown by the individuals and the results were excellent.

To substantiate what I have just given you, I know of one company who has this record from actual statistics, compiled for eight years: A 52 per cent increase of production for each fatality; a 35 per cent decrease in frequency rate; an 80 per cent decrease in severity rate; a 75 per cent decrease of explosive accidents; a 66 per cent decrease of natural deaths to employees; 15 lives saved by artificial respiration and general first aid treatment. That is given by the medical men themselves. One hundred per cent first aid employees; 22 per cent decrease in turnover of employees; a 21 per cent increase of the staple force of employees. As to compensation—and that is generally brought up at all these meetings as to just what it is costing—in one state this company had a decrease of 22 per cent of their compensation rating. In another state 60 per cent decrease. In another state 54 per cent. In that state with the 54 per cent decrease, they had an increase of weekly benefits during that period of 33 1/3 per cent; an increase of pensions of 50 per cent, and this all figured on a basis of an increase of the earnings to the employees of 66 2/3 per cent.

CHAIRMAN YOUNG: Thank you very much, Mr. MacDowell. Mr. J. C. Wright, director of the Federal Board of Vocational Education at Washington, D. C., will now discuss Mr. Mosier's paper.

Convincing Testimony of Conference Value

MR. WRIGHT: This is a very important subject. I don't know how many of you know that I happen to be the man who put on this first conference to which the gentleman referred to in his paper, at the Miami Copper Company, in Miami, Arizona. Previous to that I had put on several conferences with the Stonega Coke & Coal Company down in Virginia. Some four years later I was asked to come back to a banquet that was held of foremen, and I asked the general manager and vice-president why he was continuing the foremen conferences. He told me that he had continued to invest money in those conferences because he saw the value of them. I said, "What is it that you can point to that indicates that the conferences are of value?" He said, "Well, Mr. Wright, I do not believe that there is any tangible results coming out of a foreman's conference that you can point to and say that that is a direct result and an only result or is due only to that particular conference. But," he said, "I am absolutely convinced that it was our foreman training conferences which enabled us to continue at full production during a rather adverse period," that they had gone through in that time.

Now, I am of the opinion, gentlemen, that his statement is very largely true, that the tangible results which come out of a foreman training program are rather difficult to measure. The intangible results are those which you cannot set up and point to as being specifically due to that program. Oftentimes it can be measured in opinion and, therefore, I am very glad this morning to hear these figures set up by the two preceding gentlemen, as indicating in your mind a very tangible result coming out of a foreman training program.

I am going to run over some of the principal factors which affect, in my opinion, the question of accidents in any industry.

The first of these is pride in the individual's job. I am talking about a foreman—his attitude of mind, his sense of responsibility for his job, realizing that he has a real job and that he isn't just drawing wages. Realizing that he is a part of the organization; that he has a responsibility for others—for men and for materials, and for enabling the concern with which he is employed to make a profit, for otherwise

they cannot continue to do business, and an appreciation for the needs of cooperation in order that the organization may accomplish its purpose; an interest in his work, not only on his part, but on the part of the men themselves. Those five factors in my opinion, are factors which can be improved by the foreman conference training program. Such facts as experience, as technical information about the business, such as mining, are not properly part of the program of foreman training.

When I appeared in 1921 or 1922 down at Norton, Virginia, before a group of 20 hard-boiled miners from the four different coal companies in that region which were cooperating in that program, I was just a little bit nervous because it was my first contact with that group and I wondered how they were going to receive me. In order to break the ice I said to them, "Now, I suppose that you gentlemen are here for this program and it is my duty to see that the program becomes successful. I do not often pose as a mind reader, but I am going to undertake to read your minds this morning. You gentlemen are all sitting here and thinking and wondering what it is that this man is coming down from Washington to tell us about digging coal here in Virginia." And, of course, I got a response, because they were wondering about what I was going to tell them. And I followed it up by saying, "I am not down here to tell you how to dig coal—I never dug a ton of coal in my life—I don't know anything about coal mining." I said, "In fact, you gentlemen know how to dig coal; if you did not you would not have been made foremen and, therefore, the program that we have before us today is not one on how to dig coal. It is not dealing with the technical work of a miner, but we are dealing with that job which you now have in addition to your ability as a miner and your position as a foreman—a new job which has been placed upon your shoulders since you entered the coal industry."

The Job Did Not Concern Technical Matters

It broke the ice and we got along very well after that because they did not hold me responsible for knowing anything about digging coal. My job there was to conduct a foreman training conference at which we discussed the responsibilities of a boss; and the responsibilities of bosses are very much in common, dealing with specific industries and with specific ways and methods of doing things, and the specific types of individuals.

Then I would like to present as a factor affecting accidents in industry which can be improved by a program of foreman training, as an appreciation on the part of the foreman of the cost of accidents; the ability on his part to analyze the causes of accidents. In this connection at a later conference in that same region with the Stonega Coke & Coal Company, we had in the group one general mine foreman. He was rather a popular fellow; a leader among that group. In fact, he had quite a history. He did not say very much in the conferences, but when he did speak it was to the point. We were discussing the question of carelessness on the job. We had analyzed it as to cause of carelessness and what we could do about it; the placement of responsibility; and after we had practically finished with the program, he said: "Mr. Wright, I have a case that I would like to put up for discussion and for the placement of responsibility." I said, "All right, go ahead."

"Well," he said, "a year or two ago during the war, I was coming through an old entry that we had reopened and the safety engineer was with me—the inspector as he called him, and he called my attention to an overhead trolley wire where it had been fastened to a support. That support was giving way. 'Now,' he said, 'you ought to have that fixed.' I made a note of it and went out and got an electrician and told him to go in there and fix it. When he went in he cut the wire on one side, and when he cut it he let the tension on the other side pull the support to one side and down fell a lot of loose rock which killed him. Now," he said, "who is responsible?"

Well, we began analyzing the problem. The group began to discuss it and out of it came these facts: That the electrician was an experienced man; he was a young fellow, but had been on the job three or four or five years—most of his work was outside; that this general foreman and the inspector had come by this place and observed the condition and that the man had gone in there and been killed, and the question was: Who was responsible? Well, there was a diversity of opinion. Some felt that the company was responsible because that was an old entry way, and that it should have been completely re-timbered and gone over before they attempted to use it again. Others felt that perhaps the inspector had some responsibility; and most of them felt that the man himself had been responsible—that he should have known better, and the question was about to be left there when the general foreman spoke up. He had kept still during all this time.

The Foreman Who Convicted Himself

He said: "Well, Mr. Wright, if you have no objection I would like to express my opinion. I think the foreman was responsible." That meant that he himself was responsible for that man's death. "Well," I said, "Why?" Well," he said, "I came through there at the time and my attention was called to this and I had an opportunity to inspect that working place and to note the working conditions. I knew this electrician and I should never have sent him back there to repair that without going back with him, or without having examined that place carefully in advance and told him about the dangers he was going into. Now, a further detail was gone into, but the important point is this: That because of that discussion on which we had been spending three or four hours, this foreman had come to a full appreciation of his responsibilities for the men and for the prevention of accidents, and he had in analyzing this situation in his own mind; he established his own responsibility because he saw how he could have prevented this accident.

Now, I believe that is a very valuable result that you get from a foreman training program. But when we consider the question of setting up foreman training conferences that have a specific objective in prevention of accidents, we run into some difficulties. It is all right for me as a teacher, or as a parent, to undertake to make boys be good. We all desire our children to be honest. A teacher desires his children to be honest and truthful and have high ideals and so forth, but it is my experience you don't get very far when you set out and say: "Well, now, son, I am going to teach you how to be honest—I am going to make you be honest—I am going to make you be truthful." When we approach that problem directly, I don't think we get very far. My experience is that such objectives as honesty, as truthfulness and a great many others of a similar character, can best be approached in an indirect way; and I believe that accident prevention work, so far as it is affected by a foreman training program, is the result of a lot of things that you do with foremen without telling them directly that you are going to bring about a reduction in accidents. That naturally comes out of it and cannot be avoided.

In addition to these other items that I have given you, there comes a question of leadership. A foreman needs to be a leader and one of the objectives of foreman training programs is to assist him in being a better leader. When men don't know how to do a thing, simply ordering them to do it does not get results, but if the foreman has an appreciation of his responsibility as a teacher or instructor, he is going to get a great deal farther with it and will be able to organize and plan his work. He will have an appreciation of the losses that come with excessive labor turnover, and lastly, an appreciation of results that may be accomplished through the use of safety devices.

Now, I want to discuss very briefly the question of developing a foreman training

program. Reference has been made several times this morning to the fact that the federal government through the federal board for vocational education, and state governments through state boards for vocational education, have interested themselves in this program. The experience that has been gained has covered some nine years, and these two agencies are not out for the purpose of filling the need throughout this country for improvement of foremanship, through the conducting of conferences organized and conducted by their representatives. These two agencies, the federal government and the state governments, through the board for vocational education, believe that the improvement of foremanship is very important from the standpoint of vocational education, and they believe that their responsibility is to help the other fellow to help himself.

Organization Conferences Often Possible

In many instances the program can best be conducted by the organization itself. There are other concerns where the numbers employed are too few to warrant the industry putting on a program of its own, and some other agencies need to do the job, if we are going to make the service available. There are other industries that are large enough to carry on this work themselves, but they do not care to do so and they are willing to take the advantage of a service that is available. Now, from the standpoint of these two governmental organizations, their objective is to help industry to help itself, in so far as it relates to foreman training. Some of this work is, therefore, carried on directly by the federal government and to the extent we carry it on, it is only for the purpose of demonstrating the value of a conference program. That is one objective, or, for the purpose of developing people who can conduct a foreman training conference. In other words, it becomes a training school. Some of these conferences in this country are now carried on by local public schools within their community, through what we may call cooperative programs.

We have assumed that all that was necessary is for the industry to say, "Yes, we will put on a program of foreman training and we will get our foremen in and have them join these meetings,—come together in these groups and that is all that remains to be done." That is far from the facts of the case. The most difficult factor that needs to be overcome in making a program of foreman training successful, is the presence of a skilled conference leader. We have long since passed the time in our educational work where we believe that the mere possession of knowledge on the part of a teacher enables the teacher to teach efficiently. We have institutions, normal schools and universities and various other institutions today, that are training teachers because they are realizing that the job of teaching is itself a trade or a profession, requiring special preparation beyond the mere possession of the thing that you are going to teach. Well, a conference is only a method of teaching, as has been pointed out here by the first speaker. Instead of getting up and lecturing to people, as I am lecturing to you, we change the method to one where the entire group participates. In fact, in the conference as it has been developed, it is not necessary for the conference leader to be an expert in that particular industry. As a matter of fact, it is often a handicap because the danger is that he will revert from a conference leader to a lecturer and begin to tell them how to do it.

Down at the Miami Copper Company in Miami, Arizona, when the first conference was put on there, I asked the manager to have a group of general foremen, an assistant mine foreman and general superintendent of the mine. I always want somebody of the management to sit in on an initial conference. It accomplishes a good many things; first, the removal of suspicion that something is going on and going to happen that will be undesirable and that is the easiest way to remove it. Second, you have at hand someone to whom difficult questions can be referred, and this gentleman was an exceptionally good man. I asked him in the beginning to keep still, to

be an observer, until he was called upon or it was evident that he was to speak, in order that the men would not be embarrassed by having their opinions measured up along with the general superintendent. But we came along one day to a problem similar to the one that Mr. Henrie put up to you, from one of his mines, in which the question of prevention of accidents was the paramount one; and as in the other case, this accident happened to deal with one of those ore cars, not at the loading end but at the dumping end of it. It seemed on that particular type of car it was a frequent occurrence that men would get their fingers cut off or mashed in the dumping of the car. When they would dump it up the thing would kick back on them and pinch a finger off. Well, that was a case for discussion, and we used the usual procedure of trying to determine the cause and how it could be removed.

One of the foremen finally got to the point where he began to get so restless that he couldn't sit still any longer, and he said: "You know, I have a notion about that car—how it could be improved and reconstructed, so as to prevent that situation from happening again." Well we immediately began to dig in on him, and he went to the blackboard and attempted to illustrate his idea. He didn't have any luck because he was not a draftsman. He didn't know anything about drawing, but here is where our superintendent came in. I saw that he was likewise getting so full of a desire to speak that he couldn't sit still any longer. So I asked him to help and he went to the blackboard and began to draw out the parts, and by questioning this fellow he got from him his idea. It wasn't long until they sketched out a change in the construction of the car which would presumably prevent this accident from happening. The men agreed and disagreed until finally it was the general consensus of opinion what it was the desirable thing to do. Well, that ended the session. The next morning I came on the job as usual, and there was nobody in the room. I was alone. The hour for the group to be there was at hand, and I began to wonder just what had happened to all my pupils; had they played hookey this morning? By that time, however, one of them came running around the corner, and he said: "They told me to tell you that they were all down here at number five shaft, and we have one of those mine cars up there, and we are having it taken over to the shop and are going to have that change made on it."

Where Opportunity to See Need for Improvement Lies

Now, I am giving you that simply as an illustration of a procedure by which improvements can be made. You must not forget that the man who is intelligent enough to be a foreman and who is working right next to the job, is the man that has the greatest opportunity to note the need for improvement. The conference is a means of self-expression. It gives him an opportunity to express his opinion and to have his opinion either appreciated or depreciated by his fellow foremen.

Now, I want to sum up by saying: "Do not attempt," as the gentleman reading the first paper said, "to make foreman training conferences cure-alls for all evils." If you do, you will expect so much of it that it will begin to fail and the result will be that it will be discredited. It is a method for improving foremanship, and to the extent it does improve foremanship and your accident rates decrease, it certainly is desirable. But there are many other desirable results from a good foremanship training program: and I want to leave with you the other point, and that is to make certain that you have successful conference leaders before you undertake it. That doesn't mean that conference leaders are so difficult to get that we could not have an adequate supply. It simply means that the men who are going into those programs should have the benefit of the experience that has been accumulated during the past nine years, in order to enable them to make certain of success. What we need in this country today is an adequate program for training

conference leaders, and then industry will take care of the question of foreman training.

There seems to be a consensus of opinion that something should be done about a program for training conference leaders. Certain states are going about it as a phase of teacher training in the same way that they train teachers for the shops and for vocational schools. The character of the training program is entirely different. The best conference leader is one who has had considerable experience in industry, and within these various organizations you have men who are qualified by what I may choose to call basic qualifications, through experience, through temperament, and a desire to serve their organization. In that way they can be given this additional training.

In all of my conference groups, I have always asked that somebody be present who would be expected to continue the program in the future as a conference leader. Sometimes you make a mistake. In one instance the man was very successful; in another instance he came to me before the conference was over and said: "Mr. Wright, it is no use for the management and you to expect me to go ahead and do this work after you leave. I am too nervous. I have got to get up and tell these fellows. I can't sit here like a Chinese idol, like you do, and let this discussion roll around here until the fellows have it all out of their system. I have been around the mines and have seen this and that, and want to get up and tell them; but at the same time I know I shouldn't do it." And I agreed with him.

The conference leader must regard himself not as one who knows how all these things should be done, and what a foreman needs to know; but he must realize that, as was expressed in the beginning, the group probably does know. Out of the 20 men there will be somebody who has had experience; and the group opinion, if it is properly directed and properly drawn out, will be better than that of any single individual.

The Rank and File of Men Are Dependable

CHAIRMAN YOUNG: Doctor Wright, we wish to express our appreciation for the time you have given to come down here and for this talk on this most important subject. The meeting is now open for discussion.

MR. MCAULIFFE (President, Union Pacific Coal Company): I think that the paper read by Mr. Henrie is very close to the bottom of your safety problem. The trouble, in my opinion, lies very largely in the directing force. I confess that I have more confidence in the rank and file of our men who, as a matter of fact, take the punishment, making progress, than I have in developing leadership that belongs to the directing force.

Now, my thought is, that one of the first things we must do is to try to give citizenship to our foremen. The majority of them are suffering today from what might be called an inferiority complex. They came out of the ranks. They live in the camps. Their blood relatives are working at the face, and working alongside of them. Now, I have thought that no man should ever be promoted to a directing position in a mine (and I am speaking now of coal mines because I have no knowledge whatever of any other form of mining) unless he has the material that bids fair to make him a successful leader. Failing in which, I think it would be very much better for the company to relieve him entirely, rather than to put him back a disaffected being—put him back where he came from.

Now, we want to start that theory of citizenship. Get these men to develop the measure of self-respect that must go with leadership. No man ever led troops successfully unless he felt, at least, a certain measure of superiority over the average of the rank and file that he led. That is a sentiment that we will have to

create to get the results out of our leadership. Now that matter of citizenship in leadership, permanence of position, I think is quite vital to the success of that program.

Then I want to mention two or three other things. I am very fond of reading the results of the work started by Frederick Taylor, a man who came out of the ranks, educated himself under rather adverse conditions and started the movement that put the manufacturing industry of this country, or, a major portion of it, including our railroad shops, on what might be called a real efficiency basis. Perhaps that word has been overused and overstressed, but Taylor laid down the principles, that there are better methods for doing every task and the first way to get results is to educate the man who is responsible in that method, and thereafter use him in turn to get the method carried out by the men.

Getting the Matter Over to the Foremen

How can we get that over to our foremen? I think there is a dearth of text books directed to the particular industry that these men are engaged in, written in such simple language that can be readily read and understood. Perhaps we want something more in that direction. Again, how many of us make an effort to get our foremen to read one or more technical papers? They are all text books. They come along weekly and monthly, and it is quite astonishing how few copies of the Mining and Engineering journals are read by our foremen. We could help them in that direction if we would make the effort. Of course, a simple way would be to take a list of these men and mail their names with the voucher to the publishers, and instruct them to forward these publications; but that is not the way to get them to read books or magazines. Unless they have a feeling of personal interest in owning this thing, they are not going to read it, and in many instances they will not take the wrapper off of it. Inspiring lectures, of course, are tremendously helpful. As Doctor Wright said, it is quite important that the man who undertakes to direct this organization of foremen must, using the modern expression, "know his onions."

I have a profound respect for academic knowledge, but these men are rather critical, and it is quite important that the man, who, in the last analysis issues the instructions, is relatively well informed on his subject. After 25 years hanging around coal mines, I would be somewhat hesitant about attempting that task myself, and I know it can be done better by men who have a better knowledge of the situation.

R. V. ACETON: When your program committee put this subject: "Foremanship Training Conferences and Their bearing on Accident Prevention," in the program, we did not think that foremanship training conferences were a cure-all. We meant to bring out exactly the point that is stated in the paper, that is, the bearing of these conferences on accident prevention.

Down in the Tri-State district, in the past two years we have had approximately 180 men—foremen, who have attended these conferences. The conferences were brought about through the cooperation of the federal board and the state boards of Oklahoma, Missouri and Kansas, with the assistance of the Oklahoma School of Mines.

We give a district prize for every two months of work without a lost-time accident—what we call our "peak flag." In the past two years there have been approximately 70 of those flags given out to the foremen in the district. We have about 187 mines in the district. Of those 70 prizes 65 were won by foremen who had attended these conferences. That seems to me to be significant.

I wish to emphasize what Mr. Wright has said. You cannot bring your foremen in and say, "We are going to teach you fellows how to prevent accidents; we are going to teach you how to be better foremen; we are going to teach you loyalty."

In this regard let me just state that some time ago I got up in one of these meetings and stated that I was a firm believer in positive suggestive methods, using positive suggestive psychology, and the main thing that interested me first in these foremanship training conferences was the fact that I thought that they used positive suggestive methods. I found out later that they do use positive suggestive psychology in putting the thing over to foremen. The conference leader will set up a topic of conversation. He doesn't tell them the whys and wherefores; they bring them out themselves. I don't think we have had anything in our work down there that has had a better result than our foremanship training conferences, and I hope that all of you will find some way of putting them across in your own district and in your own mines.

CHAIRMAN YOUNG: Mr. Miller, would you please tell us something about the Colorado Fuel & Iron Company's experience in handling foremen?

Wonderful Interest Shown by Men Underground

F. C. MILLER (Chief Chemist and Safety Director, Colorado Fuel & Iron Company, Denver, Colorado): The Colorado Fuel & Iron Company works with the federal government, the United States Bureau of Mines and with our vocational training. At the present time I have 66 classes and about three thousand students in the vocational training.

It is truly wonderful to see the boys underground, who are taking the electrical courses, call attention to the condition of wiring and various electrical appliances, which is frequently beyond the knowledge of the men who are working close to these appliances; and they are corrected. I feel that we have saved a number of injuries through these boys being able to call the attention of the electricians to conditions that exist. That is something you would hardly look forward to, but it has been done. Therefore, I say, there is nothing better than vocational training for the prevention of accidents.

Now, as I stated yesterday, each and every man must take a course in first aid before he can receive a ticket to the doctor. First of all, he must know the elements of first aid. Each man carries on his person a little first aid packet. They purchase them from the company, costing fifty cents; and should he meet with a slight injury, why, he immediately takes care of himself, and that evening he goes to the office and whatever material he has used is replenished free of charge. Then when he leaves the employ of the company they give him back his fifty cents. So a man is really out nothing, and each and every man has that little packet.

Now that may seem foolish, but in one instance we had a miner traveling out of an entryway and a rock weighing less than half a pound dropped from the roof and struck him on the foot. He limped a little bit and cussed, as he is very apt to do, and continued to work; and at the end of about ten days the foot began to give him trouble and he consulted the doctor. Well, it seems as if it had just bruised the skin a little, but the socks that he was using set up blood poisoning and in a month the man was dead. That shows that, no matter how slight the injury, it should be taken care of immediately. Therefore, we care for all injuries, no matter how trivial—if you only smash your finger it must be reported to the doctor. According to the laws of Colorado, we have a right to resist compensation if a man does not report an injury within two days, no matter how slight.

In mine foreman training we find that the men that are best for putting over the conferences are men who know little or nothing about the trade. It is for this reason when you bring in a gathering of foremen, they are very apt to chew the fat—want to talk about setting props and this, that and the other thing; whereas, a man leading the conference who knows nothing about props and other trade terms will quickly get down to foreman training. We have accomplished a great deal, par-

ticularly at the steel plant. You would be surprised to know how the men are beginning to attend these conferences. To start with, we didn't beg them. We said, "Bill, you have got to go." That was the start, and now we have come to the point where we have too many; we can't teach them; and that shows how the thing is building up.

CHAIRMAN YOUNG: Is Mr. Comins here today? I would like to have the manager's viewpoint of these foremen conferences and their importance.

W. H. COMINS (Manager, National Lead Company's Plant, St. Francois, Missouri): I am very glad to speak a few words for two reasons: I have noticed this Tri-State District has ganged together and have been putting their stuff before the meeting, and there are only two of us from the lead belt, which you know, is just south of St. Louis.

In our company, so far as this foreman training is concerned, we haven't gone very far, but we are doing a lot of accident work. When I say that in 1925 we received honorable mention on this safety trophy you will realize that we are working hard. I think in 1926 we did better, but, of course, there is this old "if"—if we hadn't killed a man. But I mean our severity and frequency rate were still better after you eliminate one unpleasant accident.

Some Positive Suggestive Psychology

I was impressed by this talk on foremanship training, which we have been a little slow in adopting. Speaking about positive suggestive psychology, brings this to my mind: Coming up on the train from St. Louis the other night, we were sitting in the club car. We left at twelve-five in the morning and things were a little quiet. A gentleman came in who was not just normal. He immediately started a conversation about Tex Rickard, Hornsby, and so forth, but we stopped that pretty soon. Then I made the remark about this slow count at the stadium. That started him and it seems that he was an ex-lieutenant of Marines, and in our conversation he said, "The morale in the Marine Corps is something wonderful," and that is where I got my inspiration about this positive psychology. He said, "A first lieutenant in the United States Marines is equal to any Major in the armed forces of the United States." He said, "Any United States Marine is equal to any three men in the armed forces of the United States." He said they taught that from the first day they joined the Marines. He said if they don't like the corps they are busted right away. He said, "We make 'em or we break 'em."

Now that is the point I am coming to on this safety business—accident prevention. We are working on this in a modified way, and when I go back I am going at it stronger. I am going to make every foreman feel sure that his company has the best accident record of any in the United States, and that he has to advertise it to the men all the time. I believe that that part of psychology is a wonderful thing, and that is why I want to take my hat off to the Marines for giving me this inspiration—that when I go back every foreman at St. Francois must believe that he has the best company and the best safety organization in the world.

CHAIRMAN YOUNG: Thank you very much, Mr. Comins.

Nobody has the exclusive use of the floor. We want every section to be heard from. Is Mr. Fred E. Middleton, Uniontown, Pennsylvania, here?

FRED E. MIDDLETON (Superintendent, W. J. Rainey, Inc., Uniontown, Pennsylvania): I have been very much impressed this morning in the matter of vocational training, and I feel I have been honored as a superintendent from the W. J. Rainey Company, by being selected to come to this National Conference.

Having been a superintendent the past 15 years, and mining over fourteen million tons of coal during that period, we have never had a fatal accident in our mine.

We have with us today Mr. Adam W. Forbes, our mine foreman, and Mr. Ben

Bradley, our assistant mine foreman, who so ably conducted that safety campaign during a period of 10 years.

I would like to say that our foremen have at all times been on their toes, from the starting time in the morning until the closing time in the afternoon, conducting that great campaign of safety first.

I feel it a great privilege to be here with these gentlemen from various parts of the United States and to listen to the ways and means they have in preventing accidents. I feel it is one of the greatest inspirations of my life, to realize that when I came to Chicago I would be able to learn, from this group, the wonderful things I now have to carry back to the bituminous mines of Pennsylvania. I want to express my sincere thanks to you, Mr. Chairman and to the gentlemen, for the hearty cooperation with which they have approached this subject, and for the manner in which the campaign was put over.

CHAIRMAN YOUNG: Mr. Middleton, I wonder if you will ask one of your foremen, who are present, to take about two minutes time in talking. He has no doubt, something interesting to tell us from the foreman's point of view.

ADAM W. FORBES (Mine Foreman, W. J. Rainey, Inc., Uniontown, Pennsylvania): I am mighty glad to be with you this morning. I am mine foreman under Mr. Middleton, at the Stewart works in southwest Pennsylvania.

We have established a great record in our mine, as Mr. Middleton told you, and we believe it to be one of the greatest mine records anywhere. We feel that the record of the W. J. Rainey Company in producing fourteen million tons of coal over a period of years without a fatality is remarkable and really entitles us to the prizes we have won.

DANIEL HARRINGTON: What is that record? Give us the details of it.

A Record of No Fatal Accidents During Ten Years

MR. FORBES: Our record is no fatal accidents over a period of ten years, mining during those years fourteen million tons of coal.

I didn't come to make a speech this morning. I came to hear you gentlemen talk. But I do want to say that we are going to push along just the same in the future as we have in the past, and we hope to keep our perfect record for years to come.

CHAIRMAN YOUNG: Is Mr. T. W. Romans here? Are any of the foremen or assistant foremen here who were in the first class down in Virginia that was conducted by Dr. Wright? (No answer.) I am going to ask one more man—one more speaker. Mr. Boardman, I would like you to tell us about the Anaconda Copper on this foreman training.

JOHN L. BOARDMAN: We conducted foreman training classes under Mr. Noel (I believe that was the name of the instructor), and we found them very successful. As pointed out by several speakers here, we got a great deal out of them other than safety, but, of course, I was most interested in this conference on account of the safety factor in the course.

One of the greatest things we got out of the foreman training conferences was that we put over to our boys, particularly our shift bosses, the fact that they were working for a mighty good corporation; they were working for the biggest mining company—the biggest copper mining company in the world, and that is good positive suggestive psychology; because as soon as these men had been through the preliminary course in foreman training they began to realize they were a part of a big organization and it certainly did wonders towards getting these men to pay attention to the things in safety that we were trying to put across.

I am very glad that we had the foremen's conferences and we expect to continue them as soon as we are able to clear up some of the things that the conferences have brought out, that we were lax in doing.

CHAIRMAN YOUNG: We have time for one more. I am going to ask Mr. A. W. MacDonald to tell us in two minutes something about their foremanship training.

A. W. MACDONALD (Superintendent, Department of Industrial Relations, British Empire Steel Corporation, Sydney, Nova Scotia, Canada): We have not yet arrived at the period where we have any actual foremanship training such as has been outlined here this morning under government auspices or under government aid; but the foremen in our mines have all to pass through the government mining schools and must have certificates from the government mining schools before they can take jobs in a mine as foremen, and in that way we find a great deal of satisfaction. These government schools are conducted by the provincial governments in the winter season. For instance, from the first of the year until the examination time in May or June, these classes are held and these foremen take advantage of them. We find that although the company has not taken any real steps towards foreman training, outside of what comes up in the conferences held daily and weekly between the mine manager, the district superintendents and the foremen, that they get practically the same instruction (I presume they do) as outlined in the paper read by Mr. Henrie this morning. I think the probabilities are that, after listening to the interesting things that I have gathered from that paper, we may and probably will give some consideration to foreman training.

CHAIRMAN YOUNG: Gentlemen, Dr. Wright will close the discussion.

DR. WRIGHT: Gentlemen, I will sum up in thirty seconds the essence of a conference.

If I have a dollar and you have a dollar and we swap, you will have my dollar and I will have your dollar. Neither of us is any better off. But, if I have an idea and you have an idea and we get together and swap, then you have two ideas and I have two ideas. That which you had you still retain; that which I had you also now have. It pays to swap ideas, but it doesn't pay to swap dollars.

CHAIRMAN YOUNG: The next paper is one that should bring forth a large amount of discussion. "Accident Prevention in Its Broadest Phases." will be presented by Mr. Eugene McAuliffe, President of the Union Pacific Coal Company.

Accident Prevention in Its Broader Phases

Eugene McAuliffe, President, Union Pacific Coal Company

It is with pleasure that I make this attempt to respond to the request of the National Safety Council for an address on "Accident Prevention in Its Broader Phases." The aims, purposes and achievements of the Council occupy a position so exalted, and so detached, as to justify every person participating in its deliberations.

As a people we have always been wonderfully responsive to the call of distress, whether such came from at home or abroad, but only within the past few years have we attempted to apply systematic preventive measures toward the reduction of those industrial accidents which, taken in the aggregate, reach appalling proportions. There has, perhaps, been shown in the past too definite a tendency to measure personal injury accidents as a collective matter and in terms of dollars and cents, with insufficient thought given to the human suffering resulting therefrom. By human suffering, I mean not only the agony that flows from crushed, bruised and bleeding bodies, but likewise the torture of soul experienced by those who are related to and who, alas, too frequently are dependent upon, the victim.

The industry that I will specifically refer to is the one with which I am identified, the mining of bituminous coal, an industry which I firmly believe offers an outstanding field for improvement in the work of accident prevention.

I will not attempt an undue use of statistics; I may even resort to what is very often disparagingly referred to as generalization. My generalizations will, however, be directed in every instance toward that which is remedial. Regardless of what may be heard from individuals speaking from the street, the political forum or from the pulpit, our theory of life, including accident prevention, should be postulated on the fact that the world and the people are growing steadily better. This condition assumes progress, and any fraction of society, however occupied, that does not move forward is failing in the task assigned to it. Much as I regret the necessity for making the statement, I am in candor compelled to say that the bituminous coal industry is lagging, not only behind our European neighbors in mine accident prevention, but likewise it has failed at home, in that other great industries classed as hazardous have made startling and commendable progress in the work of accident prevention, while little, if any, progress is being made by the coal industry. What is our coal mine accident record? Let us look at it calmly, dispassionately; it offers little that is flattering.

Death Rate per Thousand 300-Day Workers in All Coal Mines, Anthracite and Bituminous, for Four Five-Year Periods

Period	Men Employed		Average Days Active	Killed per Thousand 300 Day Workers	
	Average Actual	Equivalent in 300 Day Workers		Men Killed	Thousand Day Workers
1906-10	675,067	484,454	215	13,288	5.49
1911-15	739,169	541,489	220	12,583	4.65
1916-20	760,381	599,781	237	12,097	4.03
1921-25	811,803	484,071	179	11,077	4.58

This comparison suggests commendable progress through the first three five-year periods, with a sharp recession during the five years ending with 1925. The figures for the principal European coal producing countries for the five-year period 1921 to 1925, inclusive, together with those shown for the United States, however, offer a further and more startling comparison. Read them carefully.

Country	Average Number Men Employed	Total Men Killed	Killed per Thousand 300 Day Workers
United States, bituminous.....	652,921	8,825	4.87
United States, anthracite	158,882	2,252	3.71
United States total	811,803	11,077	4.58
Great Britain	1,175,114	5,495	1.13
France	250,026*	903*	.97*
Belgium	161,930	812	1.00
Prussia	600,964	6,227	1.86*

*For four years, 1921-1924, only.

When the number of men killed per thousand 300-day workers is reduced to a percentage basis we can more readily grasp the shocking destruction of human life suffered in our American mines as compared with the loss of life sustained abroad.

Country	Period	Killed per Thousand 300 Day Workers	
		Per Cent Ratio	
United States, bituminous	1921-5	4.87	100
United States, anthracite	1921-5	3.71	76
United States total	1921-5	4.58	94

Great Britain	1921-5	1.13	23
France	1921-4	.97	20
Belgium	1921-5	1.00	21
Prussia	1921-4	1.86	38

The figures quoted have been compiled and made public by the United States Bureau of Mines; they are the most authoritative available. To talk in terms of tons produced per fatal accident means little, if anything, and with the present trend toward mechanization and increased production per man-day such will in the future mean even less. The best comparison possible is that based on million man-hours of exposure; such, however, are not as yet generally available; the 300-day year comparison is the next best.

I have striven for years to find a valid explanation for the abnormally high death rate shown for our American mines, but with little success. It is a fact that the unit production of coal per man-day shown for our mine workers is far ahead of that reported for European workers, but that situation is largely accounted for by the difference in depth of cover, pitch and thickness of seams, and most of all in the fact that back filling, with a resultant greater extraction per acre-foot, is carried on abroad. Doubtless the greater percentage of men employed in European mines in "filling" work, which tends to remove them from the more active and dangerous zone of production, represents a saving factor, but surely no such secondary situation can be responsible for Great Britain, France and Belgium, when taken together, showing a loss of but 20.5 men to each 100 lost in our bituminous mines, or 21.8 men to each 100 lost in all American mines. We must go farther afield for an answer.

It is the mental attitude maintained by employers, employees and labor union officials generally that is responsible not only for the unfortunate accident record shown in the coal mining industry when compared with European conditions, but also for the further fact that we are not even making negligible progress toward betterment.

Discussion of the Subject of Rock Dusting

Let us touch for a brief period on the much discussed subject of rock dusting. For the information of the few who do not know what is meant by rock dusting coal mines, I will make the following brief explanation. Rock dust, consisting of shale, lime rock or other inert material, low in combustible and silica content, and pulverized sufficiently fine to admit of not less than 50 per cent passing through a 200 mesh screen, will, it is claimed, when distributed along the haulage and airways, and providing the per cent of coal dust when mixed with same is kept sufficiently low, check an explosive wave passing through a coal mine. Explosions have their beginning in the ignition of gas, fine coal dust, or both; they have birth in a relatively limited space and in the beginning cover but a limited area. The rapid expansion of the air, gas and dust mixture occupying this limited area, however, creates violent air blasts, which, traveling through the mine, stir up the coal dust that has found lodgment in the rooms and galleries, this dust when in suspension creating a most explosive mixture, making it possible for the originally small flame wave to travel through the mine, with resultant disaster to the men employed therein. If, however, the mine is thoroughly rock dusted, the pioneer air wave preceding the flame wave will stir up the rock dust as well as the existing coal dust, and if the combination of inert rock dust and explosive coal dust, when combined and in suspension, is made up of not less than 60 to 75 per cent of incombustible matter, the flame wave will die for want of material upon which to feed.

Do we seriously suffer from explosions in our American mines? Where did the theory of rock dusting originate? Has it preventive value? These are

all questions deserving of answer. The U. S. Bureau of Mines publishes annually a list of coal mine disasters. This list extends back to 1869. Until 1916 those only in which 100 or more were killed were listed, thereafter the death of 5 or more men was classed as a disaster. In this list we find a total of 118 disasters, with the maximum number of deaths for a single disaster 361. Referring to a more recent accident, it will be recalled that an explosion occurred in a new and modern mine located in Southern Illinois on January 29, 1926. *Coal Age*, page 206, issue of February 4, 1926, said of this accident:

"That there were only five fatalities with 1,235 men at work is attributed to the use of rock dust, which limited the effects of the blast to a small area. At strategic points throughout the workings, rock dust is stored in platforms easily tilted by the slightest rush of air from an explosion. It was that which filled the air with stone particles and confined the effects to the immediate vicinity of the explosion. Rock dust also is scattered on the floors of the entries, keeping coal dust from getting into the air."

If the statements of the coal company and state mining inspection officials can be accepted, it was rock dust, and rock dust alone, which prevented this mine taking first place as the scene of the greatest world coal mine catastrophe, that doubtful honor held by France since March 10, 1906, the date of the Courrieres catastrophe, when a coal dust explosion in a non-gaseous mine occurred, killing 1,100 men, the explosion traced to a blown-out shot. Courrieres was not rock dusted.

Experience in Many Mine Explosions

Has rock dusting a preventive value? We can well give thought to this most important question. In the sixteen months period, January 1, 1926, to April 30, 1927, inclusive, we have experienced 15 major explosion disasters in the bituminous mines of the United States. By a major disaster is meant a disaster killing five or more men in one accident. In addition to the 15 major disasters, two incipient explosions occurred during the same period, killing in one case one man, in another four men. In the 17 explosions, 432 men were killed. A summing up of the results presented by the 17 mine explosions indicates that the major explosions occurred in mines partly rock dusted and in non-rock dusted mines, 555 out of 934 men who were exposed escaping with their lives, a salvage record of 59.4 per cent; in the rock dusted mines a total of 2,135 men were exposed, of which 2,078, or 97.3 per cent, escaped. Rock dusting will not prevent local gas or dust explosions originating in dry and gaseous mines, but the evidence does show that rock dust, if properly applied and thereafter maintained in quantity, will prevent great, wide, sweeping, cataclysmal explosions that wreck mines, destroying all life within their path.

Where and when did the suggestion for rock dusting as a preventive of mine explosions originate? Is the theory one of recent origin and what is the background upon which it rests? These are pertinent questions deserving of answer, more so because of the fact that in many quarters the statement is made that rock dusting is an academic theory fathered by technicians without practical experience, some of whom are employed by the U. S. Bureau of Mines. Sir Humphrey Davy, English scientist, invented his safety lamp in 1815. Twelve years before, in 1803, the first suggestion of record to the effect that coal dust may have been a factor in the Walls End (Newcastle-On-Tyne) mine explosion was made. Then came the great scientific and electrical engineer, Michael Faraday, and the world renowned geologist, Sir Charles Lyell, who in 1845 connected coal dust with the propagation of mine explosions in Great Britain. du Souich of France talked coal dust as a source of disaster in 1833 and as the number of men employed in British and Continental mines grew in number, more and more explosions occurred, until Verpillieux, a

Frenchman, undertook a series of experiments that were continued for a period of three years, 1864 to 1867. Then came Vital, another Frenchman, in 1875, and Galloway, who reported his laboratory experiments to the Royal Society of London in the following year. The years passed, explosion followed explosion, but it was not until the often referred to Altofts mine explosion occurred in Great Britain in 1887 that "stone dusting" was proposed as a preventive of mine explosions.

Discovery of the Value of Shale Dust

It was there that William Garford (later knighted by his sovereign), acting in his capacity of general manager, noted the fact that the explosion waves had not penetrated naturally shale dusted galleries within the mine, and it was out of Mr. Garford's observation that the statement was first made of record that inert dust, when mixed with coal dust, would neutralize the explosive properties of the coal dust. For the sake of brevity I will pass other and equally important steps made toward the acceptance of the theory that rock dusting would serve to mitigate the loss of life sustained in mine explosions, closing the record with the statement that the Mines Department of Great Britain under general regulations, effective January 1, 1921, ordered that all mines not naturally wet should be stone dusted, unless and when treated with water, the dust in the roadways to show, in intimate mixture, not less than 30 per cent of water. With the occurrence of explosions in naturally wet mines, an amended order was issued on November 20, 1924, which, in substance, removed the exception to naturally wet mines, and the British regulations now make it substantially necessary to rock dust all mines, in as much as a 30 per cent water mixture artificially applied would, by damaging the roof, floor and ribs, make operation extremely difficult if at all possible. French and German mining commissions have made exhaustive studies of the value of rock dust, and I am informed that rock dusting is now an almost universal practice in French mines and is being rapidly extended to the German coal mines.

Study of the Causes Leading to Mine Explosions

In the foregoing I have touched briefly on foreign experience and practice. What have been the findings of our own people? In 1908 the United States Government, through the Technologic Branch of the U. S. Geological Survey, undertook a study of the causes leading up to mine explosions, conducting extensive tests in 1908 and 1909. In 1910 the U. S. Bureau of Mines was created by Act of Congress, and Dr. Joseph A. Holmes, who had been foremost in the work of Federal mine safety investigation, was made Director. Dr. Holmes was a man in whom was combined the skill of a great scientist, coupled with a splendid knowledge of mining and mining hazards, and with the newly created Bureau of Mines behind him, he at once set out to find the cause of, and the remedy for, the great loss of life sustained in our coal mines. The achievements of Dr. Holmes and his staff quickly moved the Bureau into first place, British and Continental engineers coming to America to obtain the advice and assistance of our men.

I will not attempt to list the activities started and the tasks accomplished by Dr. Holmes. He worked ceaselessly and untiringly, receiving as compensation a pittance, dying from exposure received while in the performance of his work. Men who admired and appreciated Dr. Holmes undertook the creation of the Joseph A. Holmes Mine Safety Association, an organization of men committed to mining safety methods, this body, undernourished and half forgotten, is little heard from today. Other men of high engineering and scientific ability succeeded in turn to the position first occupied by Dr. Holmes, and again

candor compels the statement that whatever the Bureau's achievements may be along other lines, it has not only failed of growth in recent years along coal mine safety lines, but as a result of the spirit-breaking depressive statements emanating from the industry it has tried to help, it no longer occupies the inspiring position attained between 1910 and 1912.

Wherein lies the trouble; has the Bureau a hold on the domain of coal mine safety work? The loss of life suffered in our coal mines, when compared with the losses sustained in British and Continental mines, suggests "Yes" as the proper answer to the question. Has the Bureau, through its representatives, sought unusual powers, or has it involved any handicaps on the coal industry?

Locked Within the Bureau Are Many Startling Facts

The Bureau is totally without mandatory powers, it has no authority to enforce its findings—it may only investigate and thereafter, when such investigation includes references to a particular condition within a given mine or mines, makes public the conditions therein found only after it has received the express consent of the owner of the property. I will hazard the statement that the Bureau's public utterances, expressed through its bulletins, represent but the tamest portions of its findings; locked within the Bureau and in the memories of its engineers, with all the secrecy of the confessional, lie facts that would make Bureau bulletins tame reading. It is no longer safe for a Bureau of Mines engineer to express an opinion (even within the confines of an engineering conference) as to the causes leading up to a catastrophe costing the lives of say 100 men, and it is only recently that a brief statement outlining the total loss of life suffered in coal mine accidents brought down on the head of the department a barrage of criticism which, emanating with an association that essays to speak for the industry, was taken up and passed on through many channels. Is it to be wondered that the Bureau, starved financially, reduced in numbers, finds in petroleum and metallurgical research and the newly discovered application of geo-physics to mineral discoveries a more pleasant atmosphere? There is merit in the theory of self-determination, but such supposes sane methods, constructive methods, the willingness to do what is fair and just. There are many notable and meritorious exceptions to the general rule, but the coal industry, taken as a whole, in its attitude toward safeguarding life, voluntarily insists on remaining in safety matters in a nebulous zone.

Records in the Bureau of Labor Statistics

To base criticism of mine safety work on a comparison of results obtained abroad might, if taken alone, fail of conclusiveness; let us therefore briefly review the progress made in certain other not too remote industries. The Bureau of Labor Statistics has been collecting a record of accidents occurring in the iron and steel industry since 1910, and it has constantly endeavored to present these statistics in such a way as to make them significant and useful in accident prevention. These statistics show that there has been a steady decline in both accident frequency and severity in the industry. From 1910 to 1925 the decline in frequency was 62.1 per cent. and in severity 51.9 per cent. This steady and quite considerable decline is also shown in all departments, with the exception of foundries. Considered from the standpoint of accident severity, machinery causes the greatest amount of damage, while handling of tools and material is the major factor in the frequency of accidents.

The coke industry is a closely related industry. The U. S. Bureau of Mines has maintained a record of accidents occurring at coke ovens since 1918, the results for the period 1918 to 1925, inclusive, shown below:

Number of Employees, Days of Labor Performed, Fatalities, and Injuries at Coke Ovens in the United States, 1913 to 1925

Year	Average Days Active	Men Employed	Days of Labor Performed	Fatalities	Injuries	Number Injured Per 1000 240-Day Workers
1913	329	12,289	40,330	12	1,200	29.64
1919	289	22,742	65,704	12	1,401	145.66
1920	319	22,124	70,597	12	1,412	114.12
1921	257	16,284	41,994	12	1,100	131.62
1922	284	15,124	42,954	12	1,118	92.77
1923	324	22,124	71,994	12	1,100	101.18
1924	303	20,414	61,994	12	1,100	75.54
1925	310	22,124	69,994	12	1,100	70.51

A weighted comparison of the figures for 1925 and 1924, the last half of the period covered by the table, indicates that the death ratio in this period was but 79 per cent of that shown for the preceding two-year period.

The Norfolk and Western Railway is a large enterprise, covering 44.5 per cent of the tonnage it originates in the United States, and is the greatest coal-producing region in the world, and a territory of considerable importance. To some extent at least it is a national industry. What is its record in the matter of accident reduction? In March, 1922, the company put an accident prevention campaign into effect; the results, based on the record for the preceding year, 1912, are set forth here.

Number of Accidents and Accident Frequency Rates (per 1,000,000 ton miles) on Norfolk & Western Railway in Specified Years, 1912 to 1926.

Year	Volume of Business Represented by Ton-Mile	Number	Total Accidents Per Cent of Decrease from 1912	Rate	Accident Frequency Rates (per 1,000,000 ton-miles) Per Cent of Decrease from 1912
1912	9,021,204,776	2,675	—	.297	—
1915	11,022,466,620	1,331	31.6	.166	44.1
1920	11,659,836,023	1,632	39.0	.140	52.9
1925	14,493,093,806	1,678	37.3	.116	60.9
1926	17,608,196,616	1,436	46.3	.082	72.4

Is the per cent of decrease in accident frequency of 72.4 per cent in 14 years worthwhile? Could the Norfolk & Western Railway afford to stand still? The answer is too self-evident. As the results shown by comparisons made from one railroad or one mine, even for a period of 14 years, may be questioned as not being fully determinative, let us take the record of all Class I railroads. Here are the figures with the roads divided into seven classes, as shown by Interstate Commerce Commission records, accident bulletins 92, 93, 94 and 95 public documents, impartially compiled on a uniform basis for a three-year period:

Casualties to Employees on Duty per Million Man-Hours, in Train, Train-Service and Non-Train Accidents, All Class I Railroads, 1923, 1924, 1925 and 1926, Compared

Year	Total Casualties	Man-Hours Thousands	Casualty Rate	Per Cent Reduction in Casualty Rate
1923	150,012	4,856,964	30.89	—
1924	122,315	4,473,186	27.34	11.49
1925	116,099	4,448,377	26.10	15.51
1926	108,746	4,557,527	23.86	22.76

By casualties is meant all accidents which are reportable under the rules laid down by the Interstate Commerce Commission, whether minor, major or fatal.

Wherein lies our difficulty? Are the men in charge of coal properties poorer citizens, are they poorer business men than those who operate the railroads, the steel plants, the coke ovens, the cement quarries and mills; are they less considerate in their attitude toward human suffering and loss of life? Such is not the case. As a class the men in charge of our coal mines represent an average cross-section of our citizenry. The industry is, however, lacking in the conduct of its business and managerial affairs. It insists on thinking, when it thinks at all, in terms of speculative sales opportunity, refusing to give thought to the creation of what might be termed a sound manufacturing and merchandising program, such as rebuilt the railroads, made the steel industry, and as an extreme example, made our American automobile industry the most highly refined industry the world ever saw. Starting at the very bottom when the automobile was "without form and void," that industry has, through the co-ordination of inventive genius, highly involved mechanization and masterful salesmanship, made strides unparalleled in the history of world invention and production.

An Unwillingness to Foster Progressive Methods

The coal industry, widely scattered and divided along labor, market and transportation lines, will always offer extraordinary difficulties toward the adoption of constructive policies, but that situation is accentuated and intensified by the fact that the men who speak for the industry decline to ally themselves with the progressive methods now generally employed by other similar industries, and the gradual strangulation of the mine safety activities of the U. S. Bureau of Mines is but one expression of this strange psychology. Where direct criticism of the Bureau's activities, as in the case of the press release before referred to, is not forthcoming from an association or an individual, attempts are made to neutralize the Bureau's public findings by giving prominence to the fact that approximately 50 per cent of the men killed in coal mines die from falls of roof or coal, generally one at a time, and the statement is made and reaffirmed that the individual worker's carelessness is the greatest factor involved. This means that we are flouting the real issue, that of bringing our mine casualties down to the record maintained by European operators or the relative showing made in other American industries.

The evil flowing from this almost generally expressed doctrine of negation lies in the fact that the certain companies (the number no longer small, and growing yearly) who are desirous of reducing accidents find it very difficult to sell even the hope of accident reduction not only to their employees, but to the operating officials in charge of their properties, the majority of whom came from the ranks of mine workers. A spirit of fatalistic indifference is in the blood, and with self-constituted spokesmen shouting, "Stand back, everybody, let us alone and we will fix things," with nothing being fixed, it is only natural that the industry is slipping backward while every other line is going ahead in the work of accident reduction.

One of our most eminent coal mining engineers, in an address delivered before the American Institute of Mining and Metallurgical Engineers in October, 1926, set forth the fact that there are 22 state legislative acts relating to the safety of coal mines and the men employed therein, all differing on one or many salient points. The U. S. Bureau of Mines, as has been said, has only recommendatory authority over coal mine safety matters, such coming under the jurisdiction of the laws of the state in which the mine is located. The laws of many states are archaic, insufficient, contradictory, conflicting—in a few instances the men, who are appointed to

insure their enforcement are fairly paid, some of these men are very competent, others are mere pawns of the mine workers union, of certain operators or of politicians. There is nothing permanent to the position; kicked out, as they all are sooner or later, the majority of these men must go back to a coal operator, a politician or the union for a job. Scientific or engineering training is a seldom required qualification. Too frequently these men come in out of a fog, passing out the same way. Such is not the character of inspection provided for the enforcement of safety regulations in British and Continental mines.

The last abortive effort toward betterment of mine safety work was brought forth for confirmation at the last session of the meeting of the American Mining Congress held in Cincinnati, Saturday, May 21, 1927. The sponsor was a man of known scientific achievement, an educator who was, it is true, but half-way within the industry, but one of the thousand who have pointed the way toward the betterment of the industry. May I quote the calm, dispassionate statement of another authority, who, like the infant's sponsor, was half alien to the industry:

An Opinion on the Cincinnati Conference

"With a mind singularly free from bias we attended the safety conference which had been called for the day following the close of the regular program of the Cincinnati Convention—a conference that merits more than passing reference. Of course, when a real safety matter is at stake we will freely admit that we are on but one side of the question—first, last and all the time.

"But this time there seemed to be no cause for choosing sides, for no one seemed to know in advance just what was the purpose of the meeting, except that it had been announced that the paper 'Shall There Be Developed a National Safety Code,' had been held over from Friday in order to serve as the key address of Saturday's conference. This did not seem to presage a battle royal, for it seemed to be right in line with what had been under way for the last few years. Nearly everyone has known of the work of the American Engineering Standards Committee and the Mining Standardization Correlating Committee which passes on proposed mining codes before they are submitted to the former body for final action.

"And so the author presented his paper. It was a good paper for it was a sensible one—he was not calling for legislative action, for laws stated the *minimum* requirements; he was not asking for Federal inspection, for inspection is a state function; he said that many laws were without good reason, citing for illustration the great variation in ventilation requirements as disclosed in J. A. Garcia's study of the matter presented last October at the Pittsburgh meeting of the American Institute of Mining Engineers; he mentioned the rock-dusting code formulated as a standard by a committee of the A. I. M. E., and a code for underground electrical equipment prepared by the Bureau of Mines; he said that many mining companies had standard codes of their own which showed not only that codes were needed, but that it was possible to construct satisfactory ones.

"The general tenor of the author's remarks seemed to be: Let us not delay any longer; let us get action and prepare definite safety codes covering ventilation, illumination, safety inspection, testing and taking down roof, and kindred subjects; these will not be laws but guides that will show clearly what the industry itself considers safe, standard practices.

"From then on there was considerable discussion, but little action—much to our surprise, for this seemed to be a program on which most men could agree, a program that has been under way for some time and simply needed a little impetus to make it move faster. As we left the meeting we were at a complete loss, and still are, for the motive that resulted in inaction. The specter of legislation seemed to bother some, but no legislation was involved. It could not have been misunderstandings, for the purpose of the author's talk seemed clear. It surely was not jealousy, for out of the men present a quorum could have been gotten for a meeting of almost any mining organization you could name."

The well-loved secretary of the American Mining Congress said a few encouraging words relative to the infant's antecedents: a representative of the Bureau of Mines made the statement that the Bureau had received requests from seven states asking for suggestions upon which to base an adequate mine safety code; certain other sympathizers urged action, but those who favored such were in a hopeless minority, and so the tenderling died in an atmosphere too chilling for anything as rare and exotic as a suggestion leading to the consideration of a mine safety code.

One of the Privileges and Duties of Government

The writer is definitely and firmly opposed to every theory leading to the government's owning, operating or even oppressively regulating coal mines; this opinion applies with equal force to railroads, canals, telegraph and telephone lines and to all public or quasi-public utilities or industries. It is, however, the privilege and duty of every well ordered government to educate and inform its citizens, including those who are in charge of a great and extra-hazardous business, upon which the nation depends for service. The government of the United States is engaged in educating and informing practically every branch of industry within its broad area, including the railroads, our great agricultural industry, our banking system and other activities of like import. The coal industry, which functions with less regularity than many other important industries, through its spokesmen demands that it be allowed to go its own way regardless of where the way leads. As has been shown, Great Britain employed in 1925 in her coal mines 1,117,828 men, killing a total of 1,126 or 1.21 deaths per thousand 300-day workers. In the same year our American mines employed 311,303 men, and of this number we killed 2,215 or 4.79 per thousand 300-day workers. Great Britain has a comprehensive mine safety law, one which is enforced. I am told, without quibbling. In any case, the results speak for themselves.

During the ten years ending with 1925 the deaths from coal mine accidents in our American mines totalled 23,147, a good sized city. Allowing but six feet as the overall length of the coffins this army of men would require for burial, such would, if placed end to end, make a thin black line 26.3 miles long. Is the picture a pleasant one? Is it not high time to attempt a betterment? The coal industry needs—

1. The formulation and adoption of a modern, scientifically prepared code of mine safety standards, writtten in such manner that they can be adopted by the several states.
2. The establishment of the principle that men chosen for the inspection of coal mines and the enforcement of safety laws should be selected for their fitness expressed through engineering education, coupled with practical experience. Such men should be well paid and retained in

office during competency and good behavior. They should be set apart from and kept aloof from the influence alike of coal operators, labor unions and predatory politicians.

3. The United States Bureau of Mines should be reinforced, numerically and financially, and the broadest opportunity should be afforded the Bureau to expand and make prompt publication of its mine safety research work. It is the only body in existence with a sufficient background to work effectively along scientific lines with the mining bureaus of Great Britain and Continent, the exchange of knowledge thus made possible multiplying three-fold the value of the Bureau.

4. The coal industry should be made to understand that the continued excessive loss of life so long experienced will no longer be tolerated, and if independent action is not taken then and then only, repressive laws should be enacted.

Cost does not enter into improved mine safety; workmen's compensation costs have been going up at a tremendous pace; in certain instances compensation insurance is now being denied the industry, the growing rate of accidents invalidating every existing rate computation.

Royal Commission of the Coal Industry

I would like, in passing, to abstract a few words from the report of the Royal Commission of the Coal Industry for 1925, as relates to Great Britain. Page 139:

"Comparisons are sometimes based on accident rates computed per million tons of mineral gotten, but output is affected by too many factors to be a satisfactory standard. For example, one hundred tons of mineral was the product of 97.7 man shifts worked in 1914, and 137 man shifts worked in 1920, an increase in the latter year of forty per cent in the number of man shifts."

This means that for the same tonnage or production there was a substantial increase, even after allowing for the reduction in the length of the shift—in the length of time which workers were exposed to accident risk. A falling off in output per man employed has the effect, therefore, other things being equal, of inflating accident rates if they are computed on the tonnage of mineral.

The very cheerful figures read by Mr. Gandy yesterday were based on tonnage produced per fatal accident. I do not think the United States Bureau of Mines engineers fully subscribe to that yard stick.

I want to read just a further short paragraph in the report of the British Royal Commission, page 192, after reciting the accident situation in British mines, the report says, under the heading: "Comparisons with Previous Periods":

"The most striking fact brought out by comparison within the past is that within the last fifty years the death rate from accidents has been more than halved among the men employed underground, and nearly halved among the men employed on the surface."

The rates were per 1,000 men employed underground, from 1873 to 1882, 2.57; from 1922 to 1924, 1.13. On the surface from 1873 to 1882, inclusive, .92; from 1922 to 1924, inclusive, .47.

I think, gentlemen, that I have submitted a sufficient number of authoritative statistical comparisons to convince any fair minded man that: First, there is room for improvement; second, that other American related industries are making the improvement and that we as coal operators, are not only standing still but the evidence would seem to point to the fact that we are going backward.

CHAIRMAN YOUNG: Mr. McAuliffe, we certainly appreciate the time you have

given in preparing this very interesting and instructive paper. The meeting is now open for discussion.

DANIEL HARRINGTON: Mr. McAuliffe has certainly given the National Safety Council's Mining Section, as well as the entire coal industry, something to think about. In addition he has taken a few pot shots at the Bureau of Mines, and has given us something to think about.

I happen to be in the peculiar position of being on the spanked end of both of these propositions, both as a portion of the coal industry, in which most of my experience has been, and as the head of the safety division of the Bureau of Mines. Unfortunately, while I think I have just as much reputation as the next fellow for scrapping, in this particular instance I don't feel at all like scrapping. I feel as though he has done what somebody else ought to have done a long time ago, as far as the Bureau of Mines is concerned. I can't say that I represent the entire Bureau of Mines, but as far as I am concerned, personally, I am perfectly willing at any time to take constructive criticism from Mr. McAuliffe or anybody else. In this instance, Mr. McAuliffe has given us what I consider absolutely constructive criticism, and I include the Bureau of Mines and coal industry in that, though, as I say, I only represent a small portion of either one.

I feel, too, that in so far as Mr. McAuliffe's criticism is concerned with the Bureau of Mines, that we in the Bureau are in pretty fair position, though we have been criticized. Mr. McAuliffe is one of the best advocates of Bureau of Mines propaganda, and he is an advocate of your Bureau of Mines propaganda in the way that it counts. He puts it into effect in the mines over which he rules, and I think he rules them pretty thoroughly, and does it by actual contact. He is a high official of mines, who knows his mines; doesn't run his mines from a chair or a desk in an office. He goes underground, and he knows what is in the mines. He knows the men in the mines; and as a result of that, Tom Jones, or Jim Smith or somebody else does not put anything over on him. The Union Pacific Coal Company, of which he is the head, uses a large portion of the Bureau of Mines teachings. Their mines use all enclosed lights. They use rock dusting. They use permissible explosives. They use a lot of other things which we have advocated for years. I feel that if other operators throughout the United States would go as far towards carrying out the things that the Bureau of Mines has advocated as the Union Pacific Coal Company does, that the mine accident record of the bituminous industry would be negligible; or if not negligible, would not be nearly as bad as it is.

Additional Experience With Rock Dusting

Now, Mr. McAuliffe has referred to a number of things in connection with his paper, other than criticism of the Bureau of Mines, and of the coal industry. One of the things I wish to bring out is some of his references to rock dusting. He shows very definitely that he is in favor of it. His mine shows he is in favor of it. But I want to call your attention to the fact that rock dusting does not mean bringing in a half a ton of rock dust today and leaving it on the road, and forgetting it for a year or two years. If you are going to go into rock dusting, do it; do it right. If you don't do it right, don't do it at all. And if you go to rock dusting, make up your mind, you are going to rock dust every day in the week, and every week in the year, and every year that you are operating a mine. If you don't do it, keep the rock dust out of your mine. You make up your mind you are going to rock dust as you ventilate and timber and haul. No mining company would feel that it could ventilate its mine today and forget it for a month. You know what would be the answer to that; the same answer applies absolutely, gentlemen, to rock dusting. If you rock dust today, and forget it for a week or a month or a year, you might as well have left that rock dust out of the mine in the first place.

And as far as the Bureau of Mines' part is concerned, so far as I am concerned, representing the safety end of the Bureau of Mines, I would rather a lot that you do not touch rock dusting at all unless you do it right.

Now, I would like to call attention to another thing in connection with the accident record of the coal mines of the United States. Mr. McAuliffe has pointed out the dark side. We have had this morning the other side of it pointed out by a representative of the Rainey Company. Here comes a man representing a large tonnage of coal, operating mines for years without a fatal accident. If an individual coal company can have a record extending over a period of ten years, why can't the industry? The "why" of it is the industry doesn't do the thing that the individual company does, and the industry can, if it will.

There is only one other point which I care to cover. I want to cover it in connection with what has been said yesterday and today. There has been a decided tendency, particularly in the general sessions of this Congress, to throw the responsibility for accidents on the individual miner. It doesn't belong there. The responsibility for accidents in the industry rests squarely and absolutely upon the mining companies, and until they shoulder that responsibility you are going to have the present day accident record that we have in the United States.

Accidents Should Be Laid at the Door of Management

CHAIRMAN YOUNG: If you will pardon the chairman for making just a few remarks on Dan Harrington's last statement.

I think that accidents should be laid on the shoulders of the management. Accident prevention work, if effective, starts at the head of the mining company. If the manager is not sold on safety and does not give safety a very important place in his operating program, the chances are very favorable that this same atmosphere will be found among your superintendents; among your foremen and among your men. Whereas, if the management is sold on safety, such as has been shown by Mr. Henrie in his wonderful paper this morning—the safety atmosphere has permeated throughout the whole Phelps Dodge Corporation, and their record is certainly something of which they can be very proud. It is something to make us all go home with the thought that we haven't yet reached the ultimate goal in our accident prevention work.

JOHN RYAN: Mr. Chairman, I certainly want to congratulate Mr. McAuliffe in having the courage to withdraw the veil and probably destroy some of our illusions.

With reference to the question of rock dusting which he has touched upon at quite some length, I can readily see how a man who has studied the whole history of the question has lost patience with an industry that has seemed to be lax in taking up a safety measure that has been so thoroughly worked out and proven. Yet, I must say one word in defense of the industry. It is that there are some excuses for it when we have men who are paid for enforcing safety, who will even go so far as to publish books and papers in condemnation of the subject and distribute them widely and freely.

They have gone so far in some quarters as to leave the impression that this whole subject has been developed and fostered by the Bureau of Mines. Yet, we have heard the history of it very completely—the history of the movement of rock dusting in Mr. McAuliffe's paper; and God knows it was started and proven long before the Bureau of Mines was ever in existence.

Now, let us briefly look into some of the records that have been made in some of the foreign countries where rock dusting has not only been practiced but has been made compulsory. It really started, I think, with the Courier explosion. That was the incentive for some very definite constructive work on the problem. Where this Courier mine is located, in the northern part of France, employing about 200,000

men underground, a very gaseous field is indicated by the fact that all of the mines are on a closed light basis. They have not killed a man by explosion of gas or coal dust since 1917. Great Britain, as Mr. McAuliffe has told you, employs better than 1,100,000 men in their coal industry. Approximately 900,000 of those are employed underground. Of the 800,000 men employed in our industry 650,000, roughly, are employed underground. Of course, in comparing the hazard of explosions, we have to confine it, or, should confine it to the underground employees. Although only a few months ago I was at an explosion in which six men were killed on the outside from an explosion that occurred underground. So even the outside employees are not entirely free from them. In a three-year period in Great Britain and employing 20 per cent more men underground, their record of fatalities from explosions of gas and dust was 35, 29 and 19. Unfortunately in this year they had an explosion which killed 52 men in South Wales, but it was purely a gas explosion. It was confined to a gas explosion by the fact that the mine was rock dusted right up to the working space. The evidence brought out that if it had not been rock dusted the probabilities were that the fatalities would have reached about 600.

To give you an idea of how thoroughly they investigate in Great Britain, the inquiry into the cause of that explosion took 12 days.

Objection to Making Rock Dusting Compulsory

Now, in rock dusting, of course, there is great objection to making it compulsory. I am against making it compulsory in this country, providing the industry will see the light and do it voluntarily. They should, and perhaps eventually will, but they will have to proceed more rapidly than they are at the present time, because not two per cent of the coal mines of the United States are now rock dusted; and of that I don't believe one per cent is adequately rock dusted.

Now, what is the cost? The average cost on the ton basis (and that is where it ought to go, because it is a fit cost for the consumer to stand), is about one-half to one cent a ton. Now, some of it will be higher, but lots of it is lower. A recent explosion which took approximately 100 lives will cost, or, did cost, approximately one million dollars in compensation and in the rehabilitation of the men. That would have paid for the rock dusting of about four-fifths of the mines of the United States for this year.

CHAIRMAN YOUNG: We have time for one more man.

MR. HARRINGTON: Why doesn't somebody in the coal industry talk—some of you coal men.

CHAIRMAN YOUNG: Some of you coal operators that are very interested in this subject, talk.

Mr. Bannister, have you anything to say on this subject?

H. T. BANNISTER (General Safety Inspector, Madison Coal Corporation, Chicago, Illinois): I was out of the room, Mr. Chairman, and did not get the full benefit of the paper. I am very sorry that I did not as I would like to have heard it.

R. DAWSON HALL: I don't know as I care to say anything in mitigation of what Mr. McAuliffe has said, because, as I think, sometimes we need very greatly to have our minds stirred up by these things. Mr. McAuliffe said that we were going backward instead of forward.

Well, that is true of Great Britain, too. It is an unfortunate situation. It is one that we need to keep in mind. There is a risk that with the number of dangers coming in, I think, especially mechanical haulage, although Great Britain hasn't gone so far as we have in that direction, there is a risk of increasing the rate of accidents. In 1873 to 1882 it was 2.24; in the next ten years it was 1.81 in Great Britain—1.39, 1.33 and 1.15. That takes us up to 1922, but now let us take it year by year. In 1913 it was 1.55; next year, 1.08; next year, 1.36; next, 1.32; 1.34;

1.39, and then it improved in 1919 and became 0.94. In 1920 it stood .088, and in 1921 it stood better than it had stood at any time, it stood .066; and then again the fatal slump which we have found in our country. In 1922 it was .095, as against .066. In 1923 it was 1.06; in 1924, 1.098, and 1925, 1.02, and 1926, 1.08. So Great Britain has been dropping backward, too. Unfortunately it is true, not only in mining but also in a number of other things. This country has a large death rate in suicides, in murders, in drownings, in a number of other features which tend to show that we have some kind of a complex which is against safety in the United States.

As regards some of the other industries which have shown such wonderful improvements, I think that has been due largely to the fact that they were neglected so long and did so little work in the safety field, that when they started to do good work they were able to reach a higher degree of success than we have been able to reach in the coal fields.

You remember our efforts in that work. They came long after those of Great Britain started, about the time of the Avondale disaster, in about 1861, if my memory is correct; and ever since that time we have had safety laws. We did not start as late as some of these other industries and consequently have not gotten so far. Yet, one field doesn't like to talk about those things and attempt to take one iota from Mr. McAuliffe's paper. It is necessary that we go ahead in safety and realize what a large field we yet have before us and what possibilities we are able to achieve. I think when you get Mr. Mosier's figures and see what wonderful results he has obtained in the way of reducing the frequency and severity of accidents, you will feel that there is a great deal that we can all do and there is a great possibility that we have not yet taken up. Even though we may not agree altogether with some of the things Mr. McAuliffe has said—cannot see them quite from his point of view—yet, at the same time, we realize that he has called attention to a very great need in the coal industry.

Steam in the Air Currents

I was talking to a man the other day down in Cincinnati. He used to be an inspector for Mr. Carl Scholz and he began to tell me about the great advantages of heating and moistening the air entering the mines. He was evidently strongly against rock dusting. He told me that this dampening went up to the very face of the works and proceeded through just as fast as the work proceeded. It also increased the temperature of the in-take so that there was not that change in temperature such as results when cold air is allowed to come into the mines during the wintertime, and the result is that many falls were stopped. He had been for years in the Fairmont region, where they had been putting steam into the air current and he believed that was the system. I told him that I thought it was very true, but putting rock dust in the mines was impossible unless you had a metallurgical mine—a mine for the purpose of producing coal for metallurgical purposes; to dust it would be to ruin it for some purposes. But I said that where a concern owned their own mines they might be able to put up with a very bad appearing product and manage to sell it to their own people; but while there was this difficulty there was no reason why the greater part of the mine should not be thoroughly rock dusted. If he thought it so important that the mine should receive this steam there was no reason why he should not adopt both principles. I asked him why that could not be done, and he admitted that he thought that was the best thing to do under the circumstances.

There is no question about it, you may not be able to put your rock dust in certain places—in certain entryways—in a satisfactory way; you may not be able to put it right at the face of the working, but if you have found steam is a splendid

thing and you have been using it, there isn't any reason why steam should not continue to be used; and I am sure that that, combined with a sprinkling of rock dust, would do a great deal toward making these mines immensely safer than they are at present.

CHAIRMAN YOUNG: I am sorry we have not more time for discussion. We will now have the report of the nominating committee.

JOHN L. BOARDMAN: The job of the nominating committee is rather difficult because we are faced with this situation: There isn't a man in the section that isn't capable of filling the various positions and there isn't a man in the section who isn't entitled to the honor. When a man has gone through the chairmanship and done so well as our present chairman, he should certainly be offered the position for another year. However, there are two reasons why we are considering something different—why we are not doing that. The chief reason is that we asked the chairman if he would serve again, and he said, "I do not choose to become a candidate." You can take that for what it means.

MR. HARRINGTON: Give it to him—make him take it.

Report of the Nominating Committee

MR. BOARDMAN: Another reason is that it has been the policy of the section for some time to change the chairmanship each year. We believe that ought to be done in order to pass the honors around and give each branch of the industry representation.

Now, we have a man who has been pulling his load for a number of years and we would like to give him the honor of being chairman for the coming year. I refer to Mr. C. A. McDowell, assistant general manager of the Pittsburgh Coal Company. We recommend that he be given the chairmanship for next year.

We want also to follow the policy of the section by providing various vice-chairmen who will advance from year to year until they are in line for the chairmanship. With that in view, we recommend George Martinson, safety engineer of Pickands, Mather & Company, as first vice-chairman; A. W. Dickenson of the Union Pacific Coal Company to second vice-chairman; J. P. Hodgson of the Phelps Dodge Corporation, third vice-chairman; and we want to fill the fourth vice-chairmanship by recommending Mr. F. C. Miller of the Colorado Fuel and Iron Company. Of course, for secretary we are confronted with a difficult situation. We have to have a man for secretary who has the time and ability and the proper connections and we can't do any better than to ask Mr. Daniel Harrington to continue.

Now, we believe that the only job in the whole business equal to that of chairman in importance, is the membership committee; and we want to recognize the excellent work of our present chairman by recommending him for the chairmanship of the membership committee for the next year. For Poster Committee, H. C. Henrie of the Phelps Dodge Corporation. Owing to Mr. Marvin's excellent service and his connection with the publishing business, we wish to recommend that he be continued as chairman of the Publicity Committee. For the Engineering Committee we wish to recommend J. M. Carmody, of the *Coal Age*; and we feel that the other committees should be filled by the incoming chairman. Gentlemen, I move the adoption of the report.

W. T. McDONALD: I second the motion.

CHAIRMAN YOUNG: It is moved and seconded that the report of the nominating committee be accepted. Are there any nominations other than those made by the committee? If not, all in favor of adopting the motion as submitted by the nominating committee, make known by saying "aye"; contrary, "no." The motion is carried. Now, I want to ask for a little information from some of you old timers.

Is it customary to vote on the nominations after the section has adopted the report?

R. V. AGETON: No.

CHAIRMAN YOUNG: I want to say that we have here a typewritten list of all those who were present yesterday and I would suggest that you get a copy of it because there may be some representatives of the mining companies here that you haven't had an opportunity to meet yet and this will give you a full list of those attending the mining section. I want to ask those who did not register yesterday to please come forward here immediately following the adjournment, and fill out one of these cards.

ADJOURNMENT.

Thursday, September 29, 1927

The third session was called to order at nine-forty o'clock by the chairman, Howard I. Young.

CHAIRMAN YOUNG: The first paper for today is to be delivered by Dr. F. W. Meriwether of the U. S. Bureau of Mines. Dr. Meriwether has been spending his time in various mining sections. I believe for the last two months he has been spending all of his time in the Tri-State Section, with headquarters at Picher, Okla.

The Effects of Mine Dust on Health

F. W. Meriwether, M. D., U. S. Bureau of Mines, Birmingham, Ala.

I won't burden you with reading a lengthy paper that I had prepared for this meeting, but will only give you a short resume of some work we did in the coal mines several years ago.

As many of you probably know, even ancient medical history records the harmful effects of dust. Some of the older writers make mention of the number of husbands the miners' wives had. We know in this day it was due to the inhalation of dust.

Within the last few years the medical profession has been making a rather close study of the effect of dust. It was early found that the higher the percentage of silica in the dust, the higher the percentage of pneumoconiosis, or lung disease. This coupled with the fact that the incidence of tuberculosis in coal miners was very low, led many investigators to believe that coal dust was harmless.

In order to prove whether this was true or not, the U. S. Bureau of Mines conducted a series of experiments or studies in a number of the coal mines in several different states. During this investigation we made atmospheric dust samples in all the mine studies. We studied the mining methods and mining conditions and the seams of coal. In addition we made 514 physical examinations where the pictures turned out good. We made, in addition, a large number of examinations in which the pictures were poor.

The data given to you is based on the 514 physical examinations. The other examinations are taken into consideration but not correlated with the good pictures.

From the result of this work, we believe that coal dust when inhaled in large quantities over a long period of time will produce pneumoconiosis. I wish to say to you that it is just as erroneous to say that coal miners are liable to contract pneumoconiosis as to say that coal dust is harmless. In other words, the harmful effect of coal dust is confined to a comparatively small number of men working in the coal mines.

This work showed that several other factors entered into the incidence of pneumoconiosis. Among the first is age. We found that a man entering the mines late in life, let us say after 40 years of age, contracted pneumoconiosis much more quickly than a man entering early in life, say 20 years of age. This is not only true of pneumoconiosis caused by coal dust, but it is also true of that caused by silica dust or silicosis.

Another factor that has entered into it is the race. As many of you probably know, the incidence of tuberculosis is greater in the colored race. We were astonished to find that the incidence of pneumoconiosis was greater in the white race. A study of the working history of the men showed that in mines employing colored labor, the white man occupied official positions or operated machinery, that

the negroes did the lower classes of labor, that in addition, the negroes would not remain at the same job for long periods of time. We made an effort to correlate the negro and the white labor, using the same position or occupation as a basis over a long period of time. We could find only a few instances of such in our work, but the data gained indicates that even where the negro and white are occupying the same position in the mines, the incidence is slightly greater in the white race.

However, as I say, the figures are very small and if we could collect statistics all over the country, this might be changed.

We tabulated the histories, the habits and especially the diseases of the men to see if the habits or diseases in prior life had any effect on the incidence of pneumoconiosis. We particularly studied the family history of tuberculosis. Apparently the family history of tuberculosis has no relation to the incidence of pneumoconiosis. We also carefully studied the effect of smoking tobacco on the incidence of pneumoconiosis. Apparently the two have no connection.

The only diseases that we could correlate with the incidence of pneumoconiosis was whooping cough and measles. Why the curve of these two diseases followed that of pneumoconiosis is rather difficult to say.

These factors probably have some bearing on pneumoconiosis, but the important factor and the one that I wish to emphasize is the occupation. These two things in connection with occupation have a very definite bearing on pneumoconiosis: First, is the length of time the man has been mining; and second, the occupation underground.

Many Years of Exposure Necessary

We found that men do not contract pneumoconiosis from coal dust until they have been subjected to clouds of dust for many years. The earliest case is about fourteen years. The average is much longer.

The second thing is that we found that only certain occupations underground were producing dense clouds of dust. We found in these particular mines where we were taking atmospheric dust samples that 97 per cent of dust on an average was produced at the face. This varied from 94 to 99 per cent in these particular mines. We found in the mines studied, that on the average, 63 per cent of the dust was produced by machinery, 34 per cent by shoveling and 3 per cent on the roadways.

Now you can readily see that only the small group of men working around mining machines, and by mining machines I mean undercutting machines, shearers and loaders, or coming in contact with dense clouds of dust, are particularly subject. The shovelers to a lesser extent than the machine man, and the men occupying such positions as timberman or bratticeman and so forth, have very little dust hazard, if any. In fact, the investigation of farmers throughout the states in which this investigation was conducted showed that the farmers had as much fibrosis as the average coal miner occupying the positions I named.

Occupation is your most important factor in its influence on pneumoconiosis. The symptoms of pneumoconiosis can be detected by an ordinary layman. The most important one is shortness of breath. You men who have slope mines will notice the older men will walk out of the slope and rest at frequent intervals. You will also notice that these old fellows have a rather large or rather a barrel shaped chest and that while resting, their neck muscles are more or less brought into play which increases their respiratory efforts. If you will question the old man, you will find that he claims he has asthma, or as he says, miner's asthma. It is pneumoconiosis.

Another important symptom, is cough expectoration. Unfortunately there is an

idea in the mines that it is necessary for a man to cough and expectorate the dust breathed during the day consequently you cannot rely too much on the cough expectoration because many of them have a chronic cough brought on by habit rather than disease.

Pain in the chest is another symptom. However, it is not so constant. In the last stages of the disease you will get loss of weight. In the early stages there is apparently no effect on the weight. The respiratory and pulse rate is decidedly increased in pneumoconiosis by exercise. The blood pressure of those having pneumoconiosis has no change. This is of some diagnostic importance to doctors. The blood pressure in tuberculosis tends to fall. With pneumoconiosis it tends to remain normal; if anything, slightly increased. We use it in our present work in the Picher District. Whenever we find a man with a low blood pressure, changes in the lungs, we always feel certain we are dealing with a case of tuberculosis or tuberculosis complicated with silicosis or pneumoconiosis.

A Marked Decrease in Lung Expansion

I could go into the physical science or methods of diagnosing pneumoconiosis, but I am certain to the laymen it would be a burden. I might mention that the most important, in other words the cardinal, physical sign in diagnosing pneumoconiosis is a decreased lung expansion, but I wish to caution this body in using this physical sign in the colored race. We early found that we could not get the negroes to expand their lungs. At first we thought it was due to ignorance, not knowing how to expand the lungs; we took the time to try to teach each individual to properly expand the lungs, and we signally failed. Whether the colored race are unable to expand their lungs with ease and readiness like the white race, or whether it is due to perverseness, I cannot say, but at least in a large number of these examinations we could not get what we call a normal lung expansion in the colored race. So in using the physical sign in pneumoconiosis, it should be used with a good deal of caution when you are dealing with negroes.

No diagnosis of silicosis or pneumoconiosis should be made on physical science and symptoms only. It should be confirmed with an x-ray picture. The x-ray picture of pneumoconiosis due to coal dust and that to the silica are very similar. The early changes and those of the later stage are practically the same, with this slight difference: that the density of the pictures is less great in coal than it is with silica, so much so that a man seeing a large number of cases of each of the diseases can readily distinguish typical cases.

In our picture clinic where we are dealing entirely with silicosis and pneumoconiosis due to silica dust, we occasionally find a coal miner from Indiana and Illinois particularly in the last few months, coming into this district to obtain employment. A number of these men have had silicosis and we can readily detect that the silicosis in those men was due to coal dust and not the dust that they encountered in the Picher field.

The conclusion drawn from this work was that coal dust when breathed in large quantities over a long period of time, and I mean years, will produce pneumoconiosis; but that the number of men in coal mines subjected to such clouds of dust was and is comparatively small, that it is largely confined to the men working on and around machinery.

That being true, the methods to control the dust hazards from a health point of view in the coal mines is much simpler than in the metal mines. In other words, by introducing water on the cutter bar of the undercutting machines, the shearers and on the loaders, you can largely kill the majority of dust produced in the coal mines. The water not only will kill the bug dust produced by the undercutting machine, but will wet the bottom and will decrease the amount of dust

produced by the shoveler in bucking out his bug dust. It leaves the bottom wet, and when the coal is blasted down, less dust will be produced in shoveling. In other words, the control of the coal dust hazard from a health point of view in coal mines is comparatively simple.

Another thing that I wish to call to your attention in stopping pneumoconiosis in coal miners is your sanitary and welfare measures. I realize that coal mines are making wonderful strides in the improvement of their living conditions. Some of the coal camps I visited in this country are not only on a par, but probably better than the average industrial plant. While this is true, there are other camps that have not made such progress. The men are living in more or less unsanitary living conditions. All business men in this day and time recognize the importance of sanitation and welfare. This also includes the constant attendance of a company physician.

We would like to recommend that this company physician's duty should be not to tend to the sick and accident cases, but to make a study of the occupation of the men underground. You often see miners trying to induce their company physician to go underground to play jokes on him, to scare him. That should not be the attitude. They should attempt to take him underground to teach him what they have to contend with each day. Every industrial physician should be as familiar with the underground workings as he is with the surface occupation of the men that he has to deal with. More than that, he should make a physical examination of every employee in that mine at least once every 12 months. This is important for more than one reason. First, it will aid in defending the company against unjust compensation claims; but more important, it will detect in the early stages physical defects as they develop. That will enable the man to obtain medical treatment and correct such defects. It will enable you to find silicosis or pneumoconiosis in its earlier stages and advise the man to leave the mine for a period of time.

In Later Years Recovery Is Doubtful

In the early stages, that is, the first stages, pneumoconiosis will remedy itself. Nature will throw off the dust within 18 to 24 months. In the later stages, especially when it becomes complicated with tuberculosis, the chance for complete recovery is comparatively small.

In other words, I wish to urge on all the mining men of the country to take the physician into his daily life as well as into his sick home. Treat him as you do the industrial lawyer. Have his daily advice and guidance on how the men should work, the jobs that they should fill and their physical and mental condition to fill the position that you wish to have filled. If you will undertake such work in your mines, I assure you that after it is once put into operation, you will never again do away with it.

CHAIRMAN YOUNG: Dr. Meriwether, on behalf of the National Safety Council, I wish to thank you for this excellent talk you have given us on this most important subject. It is very vital not only to the coal industry, but to the metal industry.

Dr. Meriwether's paper will be discussed by Mr. Daniel Harrington, Chief Engineer of the U. S. Bureau of Mines.

MR. HARRINGTON: I am rather glad to welcome Dr. Meriwether to the ranks of the bolshevists on coal dust and I am going to be rather curious to follow up what our friend, Mr. Hall, is going to say in connection with what Dr. Meriwether has just told you.

About three or four years ago I sent a paper to the American Institute of Mining Engineers on essentially this same subject and Mr. Hall printed part of it.

He came out with a very caustic editorial in connection with what was said. I am going to be rather curious until I learn what he is going to say in connection with that paper.

I wish to place myself squarely with Dr. Meriwether in practically everything he has said and I feel as though I am competent to do it in view of the fact that from 1916 to 1924 the greater portion of my time was taken up in the study of the effects of dusts on the health of underground workers. That study included not only coal dust but any kind of dust found in mines. In that study I had an opportunity to go underground and do various kinds of work underground relating to dust occurrence and its effect on health in more than 25 states of the Union, including mines which had silica dust, coal dust, limestone dust, in fact dust of almost any description that is mined underground. After about eight years of that kind of study in which I was thrown in pretty close contact with the people who are eating the dust, as the men themselves say it, I want to say that any kind of dust, I don't care what it is—limestone dust, marble dust, coal dust, hematite dust, silica dust, granite dust, any dust if breathed in large quantities is going to kill; and sadly it doesn't kill soon. It takes time. It is not a merciful form of execution, and that's about what it is, an execution.

Coal Less Harmful Than Silica Dust

There is no question that certain dusts are more harmful than others taken in relatively equal quantities. It is a certainty that coal is not nearly so harmful as silica dust. It is equally certain that not all forms of silica dust are equally harmful; but again the same rule applies, that if you get plenty of that dust, you are going to get harmful results ultimately.

Dr. Meriwether brings out the fact that comparatively few workers are harmfully affected by dust in coal mines. That is true up to a certain point, but it is also true that all face workers, which includes those who load coal under contract, those who dig coal with a pick, those who undercut the coal, those who overcut the coal, those who shear the coal—all those men are the ones who are very likely to be harmfully affected by coal dust.

I have had a number of rather odd experiences in connection with studying the effect of dust and particularly coal dust on miners. Very often you find the coal mining man, the coal superintendent or general manager, will practically tell you that you are an anarchist if you say that coal dust will harm persons who breathe it. I have had that sort of argument with general superintendents, and with superintendents. I have gone underground with those same men and have tried to get them to stay with me while I was observing the effects of dust while men were overcutting or undercutting the coal. But they would not stay in a working place during the period when the place was being cut. It was harmless, all right enough, but they wouldn't stay in there and allow their precious lungs to breathe it. That's the attitude of a large number of our coal mining men toward the dust.

In one coal mine in the West where we made a study of dust, the coal mine superintendent happened to be sympathetic with us. He happened to believe, from his own personal experience, that coal dust in itself might be harmful, and I asked him why he had that particular attitude when nearly all the others had a different view.

He said in 1913 he was superintendent of a coal mine in the West and that about two years previously they had introduced an electric undercutting machine, cutting wholly into coal. In the spring after they had had a very heavy tonnage run, the doctor of the camp came to him and said: "See here, we have something that has to be corrected. We are getting at the hospital every day four or five

of your machine men who are affected by slight hemorrhages. I am afraid it is going to be serious. They claim that the dust that they are eating (as they say it), is harming them. I wish you would look into it and see what you can find out."

So this mine superintendent was on the job. He went underground, talked to the men, stayed with them, found out that they were being affected by the dust. He talked it over with his underground officials and they finally decided that they couldn't eliminate the mining machines. The mining machines were absolutely necessary for the kind of work they were doing; so they were compelled to do something with the method of using the mining machines rather than eliminate the machines. They hit on the idea of placing water on the cutter bar and this was done in the spring of 1913. So far as I have been able to find out, they have had since that time no particular difficulty in that district as to their machine men.

R. D. HALL (McGraw-Hill Publishing Co., New York City): Undercutters?

A Talk With an Old Anthracite Miner

MR. HARRINGTON: Yes. I will give you the district—Hanna, Wyoming.

Recently I had an opportunity to talk to an anthracite miner, an old timer, a man who was 68 years of age. I was interested in his condition because I have had a bee in my bonnet for a number of years that there were some dust troubles in that region, although I had never had an opportunity to investigate them myself.

I asked him what was the situation over there. He at first didn't understand what I was driving at, but I gave him an outline along the line I am giving you now and he immediately woke up. He said that he had worked in the anthracite mines wholly on coal. He didn't drive any rock tunnels he wasn't accustomed to that type of work, that he had left the mines when he was 36 years of age. He said from the day he left the mines and before he left, whenever he climbed any sort of an incline, he had to stop to rest in order to get his breath. In other words, he had what Dr. Meriwether gave to you as one of the cardinal symptoms in pneumoconiosis, shortness of breath.

He then went on and gave me the names of brothers, uncles, cousins who had been compelled to leave the mines before they were 50 years of age, all of whom had died before they were 60 and all of whom had the cardinal symptom, shortness of breath.

As Dr. Meriwether said, it is far easier to remedy the matter of dust hazard in coal mines, as far as health is concerned, than it is to remedy it in metal mines, although it is remediable in metal mines also. If the mining companies will give their working forces the ventilation that the working forces should have, they will sweep out of the working forces a large portion of the harmful dust. If they will also put water at the working faces so the men can use it on the cutting bar or the cutting chain of the mining machines while they are cutting, particularly the top cutting or shearing machines, but also the undercutting machines, they will have eliminated probably 75 per cent to 80 per cent of the possibility of trouble from dust in the air of coal mines. In addition to that, in addition to aiding the health of their miners, they will also have eliminated a very large portion, not 75 per cent of it, however, of the hazard as to coal dust explosions.

There is a tendency at the present time to introduce into coal mines a machine which is being barred (and rightfully), from metal mines, and that is the dry jack hammer. The dry jack hammer is a machine which in my opinion should not be allowed to go into any mine. The dry jack hammer is being introduced too much, in my opinion, into coal mines at the present time. I wish to call your attention, gentlemen, particularly coal mining people, to the fact that in metal mining where they have the dust hazard and the dust trouble, the greater portion of it comes from dry drilling and particularly dry drilling of upper holes.

The coal mining people ought to keep that in mind and they should not introduce into coal mines a hazard which is being rapidly eliminated from metal mines.

One of Dr. Meriwether's statements, while true as to the district in which he was working, is not necessarily true as to all coal mining districts; and that is that it takes 14 years or thereabouts to have a man's health affected by coal dust.

I was talking about this subject with a prominent coal mining man in the West about two years ago and he gave me this sort of history. He hadn't thought about it as being particular pertinent until after we had had about an hour's discussion on this very subject. He was mine superintendent of a mine in 1912 and his mining company introduced mining machines for the first time. Previous to that the coal had been cut by the miner's pick.

About the the time of the introduction of the mining machines there were six Italian miners who went to work for him. They were apparently a higher type of the Italian race and were accustomed to or inclined to mechanical ideas, mechanical work. They chose to take up machine mining and did nothing but machine mining. The machine on the bottom cuts wholly in coal, does not cut in rock because the rock is too hard to cut, there is no possibility of cutting the rock. He said within six years of the time that these six men went to work on those machines, all six were in their graves from what he called "lung diseases," and he said there was absolutely no question in his mind but that they had died from eating coal dust, as he termed it.

Gentlemen, I know that's radical to tell coal mining people, that coal dust is harmful; and the coal mining people can substantiate their stand as to the harmlessness of coal dust by volumes of expert opinion written in the United States, England, South Africa, Australia, all over the world. Notwithstanding all of that information, all of that expert opinion, there isn't a shadow of doubt in my mind that coal dust in large quantities, as it is being breathed every day in our coal mines, is harmful.

And another thing, not only is coal dust harmful to the health, but all of us or practically all of us agree that coal dust in its influence on mine explosions, carries into their graves several hundred coal miners per year, probably 250 to 300. There isn't a doubt in my mind that coal dust breathed into the lungs of coal miners carries into their graves far more than 250 to 300 miners per year.

CHAIRMAN YOUNG: Thank you, very much, Mr. Harrington.

Mr. Hall, would you discuss the paper?

The Itinerant Miner a Statistical Problem

R. D. HALL (McGraw-Hill Publishing Co., New York City): I don't feel much disposed to say anything about the subject. All the statistics in the past have been rather favorable to the idea that coal dust was not harmful to miners. The trouble with statistics is that when a miner would get pneumoconiosis, he doubtless would leave the mines and they would say he didn't die as a miner from the disease, and consequently the statistics are quite apt to be false and misleading. That is frequently the case with statistics which are based on occupational diseases.

It seems to me that Dr. Meriwether has proved a very good case against coal mines in his statements today and there is perhaps something that we may be rather pleased to note in this direction, because if we begin to believe that coal dust is a hazard to the miner in the way of giving him an occupational disease, we will do something to correct it, doubtless; and if we correct it, we will stop a great many of the explosions which are now doing so much to jeopardize the life of the miner and the life of the men who work away from the face.

Personally, I rejoice to see anything that is true, even if it should happen to prove that I have been misled by statistics. I don't think that any of us ought to object for one moment to being shown that in the past he was wrong. As far as I have been concerned, I have never endeavored to suppress the truth. I published Mr. Harrington's paper some time ago and I understand it ought not have been published. I learned afterwards that Mr. Harrington had delivered this address without getting due permission; but we published this article and I am sure we have never desired at any time to suppress the facts when the facts were proved. The statistics were all against Mr. Harrington at that time, and I presume it is getting about time for us to make apologies to him.

MR. HARRINGTON: No apology is needed at all.

CHAIRMAN YOUNG: Gentlemen, we have twelve minutes for the discussion of this paper. Mr. McDowell, have you anything to offer?

All Top Cutters Were Discarded

C. A. McDOWELL (Pittsburgh Coal Co., Pittsburgh): I have always been very much interested in the coal dust idea and the probability of its being injurious to our men.

I might say that I have one mine in mind where we use top cutters and we have spent considerable time in this study, with the result that before I left the Davis Coal and Coke Company last year, we discarded all top cutters, took them out of the mine entirely and scrapped them. We use the bottom cutter.

What brought it particularly to our attention was the fact that we could never get men to work on the top cutters. We even went so far as to use the sprinkling system, and even that did not eliminate entirely the dust hazard from an injurious standpoint to the man himself, and from the standpoint of making it a hazard insofar as coal mining is concerned.

We found afterwards, however, that it was an inefficient program, and in that particular seam of coal we got more efficiency by the use of what might be termed the bottom cutter.

I have been very much interested in the dust hazard in another way. I have in mind a dry cleaning plant which might be a subject for discussion just a little later, as to whether or not the dust that originates or comes from this dry cleaning plant is harmful to the men working around the plant and whether it is a dust hazard. It has gone so far that at the present time I have issued orders that no smoking will be permitted on this plant. I didn't mean to bring that up at this time, but as it came to my mind, I wanted to mention the fact. If you want to start a discussion, Mr. Pollock, under your paper, you can start it.

CHAIRMAN YOUNG: Mr. Miller, you have coal mines in the West. Would you discuss Dr. Meriwether's paper for a couple of minutes?

F. C. MILLER (Colorado Fuel & Iron Co., Denver): Our medical department has not as yet been able to decide definitely that the coal dust is particularly injurious, especially in our bituminous mines. In our anthracite mines they have found several cases where the dust has proved injurious to the men. But from a chemical point of view, it seems that a percentage of dust in air is just the same as depleting the percentage of oxygen; that is, instead of working with 20 per cent of oxygen, it would be about the same as working with 16 per cent of oxygen. That is a new phase that we have only started to investigate. It was brought about in one of our mines where the conditions are the same on both the east and the west sides, but on the west side we started to humidify with the sprinkling system, and strange as it may seem, the men are able to mine more coal on the west side where the air is clear than they do on the east side where

it is dusty. The men come out at night tired on the east side whereas on the west side they come out comparatively fresh at the end of the day's work. That is a new phase of the game for you men to study.

CHAIRMAN YOUNG: Are there any other coal representatives present who have anything to say on this subject?

W. A. SIEBENTHAL (Phelps Dodge Corp., Morenci, Ariz.): I should like to ask Dr. Meriwether a question.

I have read some of Sayer's papers on silicosis and I gathered from these that the harmful dust is so small as to be invisible. Is that true?

DR. MERIWETHER: Yes. The smaller it is, the more harmful.

Dust Was Fatal to Many of the Miners

CHAIRMAN YOUNG: Are there any other questions? I would like to have this paper discussed by the metal miners for five minutes.

I just want to say one word on that. I happen to be a metal miner myself and was located in the Joplin District at the time tuberculosis was at its peak. Nineteen years ago I started mining in Cartersville, Mo., in the sheet ground section and I am safe in saying that today 75 per cent of the miners that were employed in our mines at that time have died from the effects of dust that they were working in at that time.

The operators of the sheet ground mine did not fully appreciate what could be done, and it was only through the good work of the United States Department of Health and the United States Bureau of Mines that we were shown the way out, so to speak. We did not eliminate the disease entirely. They still have trouble down there, as Dr. Meriwether has advised.

I think during the war period all of the operators down there got a little negligent in looking after the sanitation end of it, and they are paying the price today.

The abatement of rock dust is just as important to the mining industry as the prevention of accidents, because we are all working to keep our men physically fit, and rock dust certainly gradually reduces the efficiency of the workmen who are in daily contact with it.

I am going to ask Dick Ageton who is located in Miami, Okla., to say a few words on the rock dust question.

R. V. AGETON (Tri-State Zinc and Lead Ore Products Assn., Miami, Okla.): Four years ago, the Bureau of Mines sent Dr. Friend, Mr. Myers and myself down into the Tri-State District to make a study of the dust situation. The first study had been made in 1914 by Dr. Lanza and Dr. Higgins, of the Bureau of Mines, in the old field, and they found silicosis and all lung diseases like tuberculosis very prevalent among the miners of that district. That was in the old field, up in the Joplin District, that Mr. Young was speaking about.

We made most of our investigations in the Tri-State District of Oklahoma, Kansas and Missouri. We found conditions very bad. There was a great deal of dust being formed, so many dry drilling machines instead of the water type, and quite a large majority of the men examined both physically and with the X-rays showed some form of silicosis, tuberculosis, or both.

We started a campaign for the prevention of silicosis and at the present time we have the dust fairly well under control.

We found in our study that in a six-foot hole drilled dry about 60 per cent of the dust was formed in the first two inches collaring the hole, and one of the hardest jobs we had in the Tri-State District was to get the men to start the hole wet. We found that if the hole was started wet this prevented about 60 per cent of the dust.

Dr. Meriwether is in charge of a cooperative clinic in our district now sponsored by the U. S. Bureau of Mines, the Metropolitan Life Insurance Company, and the operators of the field, and from April of this year until the present time, the clinic has examined about 3,000 men, giving them complete physical and X-ray examinations. This has been done for two reasons; first, to find out the exact status of the disease; and, second, as an educational measure—as far as the men are concerned—to give them a better idea not only of dust prevention but of health and sanitation, and how to take care of themselves so that they will not get the tuberculosis complication.

I might say in conclusion that we have found there is not a great deal to do in dust prevention. It is merely a matter, as some gentleman said yesterday, Mr. MacDonald I believe, of educating 50 per cent and getting hard-boiled with the other 50 per cent.

We are doing wet drilling. All drilling is wet. We have wet jack hammers and everything else. There is practically no dry drilling in our mines. The second thing is to wet down the stopes and the laybys or partings (where the cars switch) at least twice a day. The third thing is absolutely no blasting on shift, that is, while the men are on the ground. The fourth thing is adequate ventilation, getting fresh, pure air up to the face and getting the impure air containing the dust out, so that the men do not breathe it.

Dr. Meriwether can probably tell you the exact figures, but I am firmly convinced that it would take four or five times as long to contract silicosis in our mines at present as it would have four years ago.

Mr. Young spoke a moment ago about rock dust not only from a health standpoint but from an accident standpoint. A man who has contracted silicosis, or silicosis complicated with tuberculosis, is not the individual he once was and consequently he is more subject to accident. He hasn't the pep, he hasn't the vitality, and a rock that he could have dodged three or four years ago will come down and bump him off with greater ease once he has contracted the disease.

I think it is of vital importance to prevent the formation of dust, and not only that, but to make frequent and thorough examination of your men for two reasons; first, to find out how they are physically, and second, as an educational matter.

CHAIRMAN YOUNG: I notice Mr. A. W. MacDonald is here. I wonder if he could tell us something about the work on dust prevention in Nova Scotia.

Most Mines Damp in Nova Scotia

A. W. MACDONALD (British Empire Steel Corp., Sydney, Nova Scotia, Canada): In Nova Scotia the large percentage of our mines are so damp, so wet, that we are not bothered with dust. Where we have dusty mines, we don't use mining machines, or use them very little. Where there is dust we load out of the mine as a separate operation.

Shooting is not allowed where there is any accumulation of coal dust and we haven't resorted to the watering because we are able to get rid of the little dust that we have to contend with, without going to the expense of laying pipes and carrying water into the coal face.

I have listened with a great deal of interest to Dr. Meriwether's report. We may eventually get to the point where coal dust will be a larger factor than it is today and when it comes to that point, we will, of course, take care of it.

Our mining laws are such that all of these various hazards are covered and the operator is obliged to take care of them, but fortunately so far we haven't had anything in the way of a disaster or explosion to amount to anything since 1917. And the dust problem is not, as I said before, a very great factor with us.

CHAIRMAN YOUNG: The next feature of the meeting will be a round table dis-

cussion conducted by Mr. Frank Pollock, safety engineer of the Oliver Iron Mining Company of Eveleth, Minnesota. Mr. Pollock will now take charge of the meeting. (Mr. Pollock took the chair.)

CHAIRMAN POLLOCK: I don't see why Mr. Young is leaving this place.

When Mr. Agerton gave me the job, he said I had 45 minutes to put over this round table discussion and he gave me the names of ten people, each of whom he wanted to speak for five minutes. I wrote those ten people and they are all here.

We will hear first from Mr. W. A. Rowe of the American Blower Company.

Advantages and Disadvantages of Blower Fans for Auxiliary Ventilation

W. A. Rowe, American Blower Company, Detroit, Mich.

I urged Mr. Pollock to assign this paper to someone who is more active in the mining game than the mining apparatus manufacturer, but he asked me to go ahead with it. So I did, and in order to get some data together, I wrote to Mr. Harrington, and Mr. Richardson, of Butte, particularly on the lines of the disadvantages, because you couldn't expect a blower man to tell you anything wrong with that system.

The auxiliary fans might be classified in two parts, and I think probably the first part could be covered if I just read Mr. Richardson's personal letter to me in which he states:

"Equipment for auxiliary ventilation of mines falls into two divisions:

"(1) Booster fans, used to increase circulation in remote sections, which are not dead ends;

"(2) Blowers for ventilation of dead ends, used in conjunction with canvas or metal tubing.

"The main advantages of a booster fan are, as has been stated, the circulation of an increased quantity of air in a remote section of the mine, where this cannot be obtained with the main surface equipment"; or, parenthetically, I might say, with the main surface equipment at its present speed, or water gauge where it would be necessary to increase the water gauge on which the whole mine is operating in order to accomplish the same thing.

So far as the booster fan is concerned, he says:

"The other noteworthy features of this auxiliary system are mostly disadvantages. Most important, I believe, from the operating point of view, is the fact that booster fans generally necessitate the use of an increased number of doors to control the circulation, and this is particularly undesirable on main haulage ways. The electric cable, and other equipment required to transmit power, always creates a fire hazard, particularly in heavy-timbered ground. Crushing of the timber may break the cable, causing a blowout. Where these fans are placed on the inlet air course, they frequently create undesirable high air velocities in main workings, and cause a certain amount of trouble from the dust. Doors and other stoppings are seldom air-tight, so a great amount of re-circulation of air occurs in a closed circuit. It has been my experience that the total circulation of air through a mine is seldom materially increased by the use of booster equipment."

I can hardly reconcile that with a later statement in his letter in which he says:

"While the foregoing is mainly a recital of the disadvantages pertaining to this auxiliary system of ventilation, still I do not think that in a mine of any great depth or extent, it is practicable to do effective ventilation work without the use of booster equipment."

I want to bring in the booster fan, although I don't know that it was contemplated in the subject; but the booster fan is merely a means of saving in the cost of your ventilation—that is, if you are ventilating alongside of remote workings carrying a higher pressure on that particular branch of your mining.

I think possibly the disadvantages Mr. Richardson had in mind in his outline, plus the disadvantages that might accrue with any electrical equipment at the remote corner of a workroom, were in the use of auxiliary ventilation not concerned with the primary ventilation system—that is, the blowers used in connection with canvas or metal tubing.

Metal mining is so different from coal mining it is difficult to see how we would get away without boosters, because most of the work in metal mines is done in dead ends and blind ends where there is no air circulation. Because of that you get higher percentages of CO², you get traces of carbon monoxide from the explosives. You have dust. You have high temperature and high relative humidities, all of which are lowering the capacity of the workman, decreasing his resistance against disease or hazard and all of which can be overcome by the use of blowers through tubing.

In the discussion, therefore, of the advantages of the blower system, it occurred to me like some other academic question, like you might say to a man overboard at sea, "What are the advantages of swimming or not swimming?" I think probably the disadvantages, if any, are concerned possibly with the electrical end, buying suitable electrical equipment, possibly the purchase of standard ventilation sets from sources of supply which have to do with building an industrial ventilation, which were not intended for mine use. Secondly, carelessness in the installation, in the electrical wiring, and these are troubles which I think we could turn over to the electrical man with a great deal more possibility of practical solution than to the manufacturers of the fan. That probably covers all the subject which the time permits.

CHAIRMAN POLLOCK: We will now hear from Mr. Dixon, engineer for the Jeffrey Manufacturing Company, on the same subject.

Auxiliary Ventilation

T. C. Dixon, Jeffrey Manufacturing Company, Columbus, O.

I shall not attempt to cover fully this issue of ventilation in the short period of time allotted to this subject, but I believe I have summarized the most important points in relation to auxiliary ventilation.

The use of auxiliary fans is the first change in the system of ventilation that has caused any appreciable comment in the last 75 years. As dissensions and premonitions were voiced by the people when our country changed from the horse and buggy to the automobile, so has the same objections come up when the ventilation system in the mines is changing from brattice cloth and line curtains to small fans and tubing. The old methods are known to be defective, however; no one is making such a declaration when voicing opposition to the auxiliary fans.

Under old conditions many explosions and burnings have occurred which lowered the efficiency of ventilation. The use of auxiliary fans may not entirely eliminate these troubles, but they surely are a step in the right direction if properly used.

Methods mean nothing unless carried out under proper supervision to insure the safety which is the innate right of every man working in the mine. It also means the education of the employees regarding the dangers resulting

from abuse or misuse of the equipment or plans of operation. In the gaseous mines of Pennsylvania every man in the mine knows that it is serious offense to pull down a line brattice or curtain, or leave doors open; otherwise he has not been properly instructed by the officials under whom he works. The same may be applied to auxiliary ventilating equipment.

Many of the ventilation problems today would be solved if 50 per cent or more of the total air handled by the mine fan on the surface could be carried to the working faces. The greater percentage of the air is lost through leaky stoppings and doors. By the use of auxiliary fans and permission of the United States Bureau of Mines, these stoppings could be reduced in number by changing the law requiring breakthrough's or crosscuts at short intervals. The small auxiliary fan will furnish sufficient air to ventilate efficiently headings 600 feet in length.

An Objection to Re-Circulated Air

One of the main objections voiced by a great many is that the air is re-circulated. This will happen if the fan is not placed correctly, but it is a matter that can easily be remedied and readily observed by the management or inspectors, for the relative location of the fan to the room or development roadway can be noted on the most cursory inspection. If the fan is properly placed, however, the risk of re-circulation does not exist.

There is another objection to these small fans, and that is, the sparking of the motor although I believe it can hardly be compared with a trolley locomotive as a source of danger; and if the fresh air current where they sit is really fresh and pure, I fail to see how they can prove a menace to the safety of the mine. To combat this objection, however, there has been designed a flame proof blower for use in gaseous mines.

Another objection is that the auxiliary fan will become a permanent fixture of the ventilating apparatus. The small auxiliary fan is used only until the main air current can be economically brought to the face. The use of any auxiliary fan as a permanent fixture should be discouraged in any new mine, although in some of the old mines which were developed without any thought toward ventilation, the booster fan is the only remedy by being used constantly and as a permanent fixture in a long split.

In many properties, particularly in metal mines, temperature frequently reaches 100 degrees F. and even higher. Tests have shown that the efficiency of mine workers decreases as the temperature of the air rises above 70 degrees F. This is especially true if the air is highly humid, a condition that is frequently found in deep mines. More serious than the decreased efficiency of the mine is the actual danger to health. If, through inadequate ventilation, a man must continually breath air that is hot, humid and saturated with gases or finely divided dust, he may become subject to some respiratory disease.

In all metal mines there is the problem of expelling powder gases so that the men can return to the working faces after blasting without too much waste of time. The use of small blowers and tubing is more efficient for this purpose than a compressed air line, in that it enables the men to return to work sooner.

In conclusion, I will say that by the use of auxiliary ventilation we shall rid ourselves of many uncertain and dangerous curtains and doors; by the elimination of unnecessary stoppings we shall preserve our air currents from short circuits and leakages; we shall attain closer supervision and favorable for operating by the use of concentrated methods of mining; we shall limit the number

of places by reducing the number of development entries; we shall strengthen the roof by eliminating the many breakthrough's and also, we eliminate the dangers to trip riders and motormen which are caused by curtains and door.

CHAIRMAN POLLOCK: I believe here is a point on which we could have a little discussion. I will take five minutes' time and will give it to three different men who are interested in discussing these papers on ventilation. I believe the coal miners are more interested than the metal miners.

D. HARRINGTON (U. S. Bureau of Mines, Washington, D. C.): I want to be one of them. I am absolutely with the gentleman who advocates the use of the blower fans or the auxiliary fans for metal mining and absolutely against the use of them in coal mines. In my opinion the only place they ought to be in or around the coal mine is on the surface and whenever they are put under the surface or under the ground, they become a menace immediately.

The gentleman said something about the Bureau of Mines having something to do with determining the distance apart of the breakthroughs or crosscuts. The Bureau has absolutely nothing to do with that one way or another. As to comparing the sparking of motors on auxiliary fans with the sparking of motors on trolley locomotives, they are totally different subjects, because the motor fan is put up to the face, sometimes at the face, while a trolley locomotive or a trolley wire shouldn't be, and very seldom is, within 200 or 300 feet of the face. Anybody who puts it anywhere around 500 feet of the face ought to be put in jail.

As to explosions, there have been a number of explosions caused by defective doors, by defective stoppings, by lack of stoppings. There have also been a number of explosions caused by auxiliary fans and not very long ago, and I had the opportunity to go underground and investigate the placing of auxiliary fans with the direct idea of finding out how safely they were placed, and I could write a book on the unsatisfactory placement of them as they are actually used in mines.

JOHN L. BOARDMAN (Anaconda Copper Mining Co., Butte, Mont.): Mr. Harrington didn't mention one possible danger of fans which cannot be eliminated in the manufacture. We have had one or two fires from auxiliary fans for the reason that the bushings became somewhat worn and the impeller tipped a little bit and struck the fan housing, causing sparking, which set fire to the fan tubing. Of course, that is a danger in coal mines which cannot be eliminated by electrical manufacturers.

The Matter of Motor Bearings Is Important

MR. HARRINGTON: You might also give them the instance of the moving of the fan.

MR. ROWE: I meant to cover the question of bearings before I sat down. I think the matter of motor bearings is one of the most important things aside from the sparking, and I urge all our men to advocate a ballbearing motor for that work because they are reaching the point where they are reliable. Recently a new type of bearing has been brought out by one of the large manufacturers, which, I believe, will run for a year without oiling; and I think a bearing of that type, which will run for a maximum of time without attention, is the first essential in that type of apparatus, particularly as we are getting to more and more high speed apparatus.

J. P. VICTOR (Brule Mining Co., Stambaugh, Mich.): I heard the discussion of sparking in coal mines. I have heard that at several different conferences, and the question in my mind is why they are using direct current for that type of fan in a place where they have gas.

A polyphase motor hasn't any contact of any type that will give you any trouble from sparking; and by the use of ballbearings and the proper type of roller bearings, I think, you will get away from all the troubles which were created by the

roller striking the housing; and furthermore, the proper inspection and maintenance of equipment will reduce your hazards considerably.

CHAIRMAN POLLOCK: We have a big program here so I think we had better go on.

The next paper will be given by Mr. W. J. German of the DuPont Company.

Advantages and Disadvantages of the Miner's Electric Cap Lamp

W. J. German, Technical Representative, E. I. du Pont de Nemours & Company

The subject assigned for this paper includes two topics—the advantages of electric cap lamps and their disadvantages. It will not be difficult to deal with the advantages, but the second topic will be hard to discuss, because the disadvantages of electric cap lamps are few.

I have worked underground since 1898 and have used four kinds of individual lights: first, the old oil torch; second, the enclosed flame safety lamp; third, the carbide lamp; and fourth, the electric cap lamp.

When working in mines these days with my path and my work uniformly lighted by the miner's electric cap lamp, I cannot help looking back over the past and recalling many accidents that could have been avoided had the men been equipped with electric cap lamps.

The distinctive features of the electric cap lamp are: first, that the source of light is inclosed in a glass bulb; second, that the light is automatically extinguished the instant the glass is broken; and third, that such a lamp of approved type gives uniform, constant illumination for 12 consecutive hours without being recharged. I shall not enumerate the merits of the electric cap lamp from the mechanical standpoint because it has been proved over many years that this type of lamp is efficient and practical and I wish to devote all the time allotted to me to showing how the electric cap lamp increases safety and economy in mining.

Accidents Occur When the Light Is Blown Out

In my study of transportation accidents in coal mines I have found that when brakemen or trappers are injured or killed on mine locomotives or mine cars, the accident is generally due to having their light blown out by the air currents. This is an occurrence which is only possible with open flame lamps. Air currents cannot blow out the electric cap lamp, and furthermore, the light is uniform. With an open flame light, the brakeman's attention is continually distracted from surrounding dangers by the necessity of adjusting his lamp. Obviously the work of brakemen and trappers is made much safer if they are equipped with electric cap lamps.

In the past many accidents have been due to the fact that men who were not trained and equipped to locate unexpected accumulations of explosive gas have walked into such accumulations with their open lights and have ignited the gas. This kind of accident is not only frequent in coal mines, but also occurs from time to time in other underground work. I recall my experience in the Cleveland waterworks tunnel in 1916, where 19 men lost their lives in a gas explosion. This tunnel was being excavated in soft clay just 60 feet from the bottom of Lake Erie. No one in charge of this project expected gas to be encountered, but it was, and the explosion occurred, causing tragic loss of life.

The following analyses of two samples of gas found at one time in this tunnel will give an idea of the percentage of explosive gas that may appear in a place where not any is expected.

Cleveland Tunnel Sample X		Cleveland Tunnel Sample Y	
CO ₂	0.5	CO ₂	0.6
O ₂	11.6	O ₂	11.7
CH ₄	42.9	CH ₄	45.6
N	45.0	N	42.1

The electric cap lamp does not take the place of the flame safety lamp for detecting gas but it does remove the ever-present danger that men wearing open lights will walk into that of igniting an accumulation of gas. It also greatly increases the opportunity for miners to escape after a mine explosion. Such an explosion may generate gases which will support life but which are explosive. Open lights would ignite these gases and produce a second explosion, whereas, with closed lights the miners could find their way out through the gaseous area into safety.

The Electric Cap Lamp Lessens Danger of Explosion

The electric cap lamp also lessens the chances of coal dust explosions for there is no exposed flame to ignite coal dust suspended in the air. Likewise it helps protect the miner when he is handling his explosive by removing the danger that flame from the lamp will come in contact with the explosive and set it off accidentally.

The most treacherous thing about coal mines is fires. We grow much excited when we see a building on fire and are filled with concern regarding the safety of the people inside, but there are fire escapes and many other means of getting out of a burning building. Just stop and picture a mine with several hundred men working underground miles from the entrance. A fire starts and gets well under way before the men are warned of the approaching danger. There they are, trapped. They are not burned usually, but are eventually smothered by the poisonous gases coming from the burning coal in the mine. I will mention two cases as illustration.

At the Amsterdam, Ohio, mine fire in 1919, it took several days to get behind the fire and locate the 20 men who were trapped there. We found 19 of them sitting dead in a circle behind a barricade which they had not completed in time to keep off the poisonous fumes. This fire was started by a flame coming in contact with greasy waste in a fan room underground.

In 1923 an open light in a coal mine of the Carnegie Coal Company at Oakdale, Pa., set fire to some oil which had seeped into the mine. While many lives were endangered, none were lost, but the property loss ran around \$100,000.

I dread mine fires because I visit hundreds of coal mines during the year and many times I picture the results if a fire should get under way at certain points in the mines and block off the entries, which would be the only means of escape. Mine explosions are bad, but mine fires are worse.

In coal mines it is a common practice for the men and boys in each section to have a place to rest and eat their lunches. These places are usually arranged with benches and boards covered with strips of canvas and old clothing to make the seats comfortable, and in some cases canvas is hung to protect them from the cold intake air. I can recall many mine fires that have been started at these places by open lights, which resulted in danger to the whole mine and sometimes loss of life. A miner's electric cap lamp furnishes the necessary light

for the men without any of the danger of the open flame lamp. It removes one of the main causes of mine fires. Obviously, also, the electric cap lamp greatly increases the possibility of rescue work after a mine explosion or mine fire.

The fact that the electric cap lamp gives a greater light over a much larger area than an open flame light, and, at the same time, a light that is uniform throughout the day and requires no attention, adds greatly to the safety of the miner who is so equipped at the working face, where danger is ever present and where the majority of accidents to miners occur. Especially does it aid him in detecting dangerous roof conditions and thus protect him against falls of rock or coal.

Indeed, the better illumination afforded by electric cap lamps assists the men in every operation of blasting and loading. In this day and time when most coal is purchased on the basis of the analysis of the ash content in the coal samples, and when many mines have been closed because of their failure to ship clean coal, it is a very great advantage for the coal loader to be equipped with a light that is uniform the whole day through so that the impurities can be easily located and picked out of the coal. Some of our largest coal producers who sell their coal on a low ash guarantee take care of most of the preparation at the working face.

Better Work Done With the Uniform Light

Moreover, mining has speeded up in recent years and we have in our mines high speed mining machines such as arc wall cutting machines and mechanical loaders. With this kind of equipment, it is an advantage for the men to have their work lighted with a lamp that requires no attention and causes no delay for recharging or adjusting. With mechanical loaders costing around \$15,000, a few minutes delay due to the crews' lamps requiring attention runs into much money.

The Warrior Coal Company, near War, West Virginia, equipped all their underground workers with electric cap lamps because the superintendent figured that the men could do better work with a uniform light. He also figured that they could do more work if they were not obliged to stop to charge their lamps and adjust the burners. After three years of experience with electric lamps the officials of this company state that they have profited by the change and that they would not care to go back to the old method of open lights for their men even though the laws do not require them to use closed lights in this mine.

Last, but not least, the electric cap lamp increases the miner's bodily comfort. The old oil lamp kept the miner's head hot all during the working day. This same thing is true of the present type of open light. Many good looking miners have become bald-headed because of this excess heat on their heads. If you will look closely, you will see that I am speaking from experience. With the electric cap lamp, this excess heat is eliminated and the miner feels better to do his daily work.

In summing up briefly the advantages of electric cap lamps we find:

1—The use of electric cap lamps lessens the hazard of gas explosions. This is illustrated by the record made by Great Britain in the year 1924. Approximately a million men were employed underground but only six per cent of all these underground employees used open lights. In that year 35 men were killed by explosions. Out of these men more than one-half were killed in open light mines.

2—The electric cap lamps increase the opportunity for miners to escape in case of mine explosions.

3—Closed lights greatly reduce the hazard of coal dust explosions.

- 4—Closed lights reduce accidents from handling explosives underground.
- 5—Electric cap lamps lessen the chances for mine fires.
- 6—The electric cap lamp has proved to be one of the most important pieces of equipment for entering mines after explosions and at times of mine fires.
- 7—The brighter and more uniform illumination provided by the electric closed light safeguards the miner at the working face and especially reduces accidents from falls of rock and coal.
- 8—Electric cap lamps reduce haulage accidents.
- 9—Electric cap lamps facilitate cleaning the coal at the face and eliminate costly delays of mining machinery due to charging and adjusting lamps.
- 10—The electric cap lamp increases the miner's comfort through decreasing the heat on his head.

The disadvantages of electric cap lamps being mentioned in the title of this paper. I suppose I must find some. The weight of the battery strapped on the man is the greatest disadvantage of the electric cap lamp, but men soon get accustomed to this weight and do not mind it. In the past leaky batteries have caused lights to burn but this difficulty has been practically eliminated by new types of battery cases. In fact, the slight disadvantages that I can find in the miner's electric cap lamp are so far out-weighted by the many advantages, I will not take up time and space to discuss them.

From 1908 to 1914 gas lights were extensively used on automobiles, and some of you can recall the troubles of those days. Just stretch your imagination a little and picture the traffic trouble we would have today if we depended on flame lights for our cars. You must agree that the electric lighting of our automobiles has been an advantage. Just so much of an advantage is to be gained by equipping underground workers with electric lamps instead of the open flame lights.

CHAIRMAN POLLOCK: The time is short. We will have the next paper.

Mr. Theodore Marvin, editor of the *Explosives Engineer*, will give us a short talk on the ten best accident measures he has seen during the past year.

Ten Good Safety Measures

Theodore Marvin, Editor, *Explosives Engineer*, Wilmington, Del.

I was assigned the duty of describing ten of the best safety measures that I have seen during the past year. I thought maybe the best way to do it would be to let Wilyum Jan tell it to you in cartoon form. I don't believe there is any use in even going over them, although it could be done quickly.

The first one is the matter of apparatus for holding a cartridge of dynamite so that a delay electric blasting cap can be pushed into it or can be placed inside of the cartridge without breaking the blasting cap itself. Some have such a long fuse on the end of the cap it is very difficult to push them in by force. By having a cartridge punching box which will hold the cartridge and the use of a rod to make a hole in your cartridge, the cap can be inserted easily.

Number two merely states that your explosives will be in a safer condition and be kept better by painting your magazines with aluminum paint.

Number three is the matter of a clothes fuse pin on which, if you are driving a drift, you have a number of fuse ends hanging around—you may have as many as 20 or 25. In some instances it is pretty hard for one man to light all the fuse ends quickly and get away. By use of a fuse pin, a piece of wood about 24 inches long with a split in the middle, you will thread the fuse ends, then take your cap lamp or whatever means you are going to light it and run it along the whole bunch.

It is also used to hold up the bottom fuses. If the bottom of your drift or your room or whatever blasting area there is, is wet on the bottom, you can use one of these pins to hold up the bottom fuse and connect it with the top one to keep it out of the water.

The fourth is merely a suggestion about safety pictures which are shown underground at the Oliver Mining Company. That was described last year, I believe.

The fifth illustrates the use of single leading wire instead of duplex wire to eliminate shorts. I will say it helps to eliminate shorts. It will aid considerably in eliminating fires.

The sixth shows everything which carries explosives should have a sign on it. That may perhaps eliminate some accident. People should know what is in an explosive carrier and they should know if a certain carrier is an explosive carrier and if it carries explosives.

Number seven refers more to quarries and open pit mines. If black powder is being used and the area is wet and you still want to use black powder, black powder can be placed in paraffin bags. That will keep the water and moisture away from it for a longer period than if the bags were of plain paper.

The flares shown in number eight are lighted just before your blast or your fuse is lighted, if it is by fuse and cap, and the flare burns. It is of such a length of burning which will extend over and pass the blasts. Therefore it warns people who have not been forewarned about the blast, to keep away from there.

Number nine refers to what was said this morning by Dr. Meriwether. I will read that: "Physical examination of all employees, patterned after the new clinic in the Tri-State Zinc and Lead District, Picher, Oklahoma, increases safety because men should be 'Fit to work and should fit their work.'"

Number ten is just a hint that because of the reduction in accidents and the saving of lives during the last year because of the National Safety competition, I think it would be a good hint to suggest that those who are not in it join in and help with the campaign of safety in reducing accidents.

CHAIRMAN POLLOCK: I suggested to Mr. Marvin that next year he bring with him this Wilyum Jan. We would like to see him in person. He said he would.

Next we will have Mr. MacDonald tell of a special picnic they had for a good record in one of their safety mines.

WM. T. McDONALD (Montezuma Copper Co., Phelps Dodge Corporation, Nacozari-Sonora, Mex.): I wish to assure you at the start that this part of the program was not included in the original plan, because only a few moments ago I was handed a little note stating that they would like to hear me tell something of a little picnic which occurred among the mining employees of the Montezuma Copper Company in Nacozari.

(Mr. MacDonald then related the amusing story of the picnic.)

CHAIRMAN POLLOCK: I am going to ask Mr. Bannister to give his paper on "Haulage Accidents and Their Prevention." Mr. Bannister is from the Illinois Coal Mines.

Haulage Accidents and Their Prevention

H. T. Bannister, Madison Coal Corporation, Chicago, Ill.

When they asked me to talk on underground haulage and prevention of accidents, Mr. Pollock, my good friend, said I would only need to talk five minutes. I think if you will bear with me that long I will appreciate it.

When I came on this job about nine years ago with the Madison Coal Corporation, we were having a good many haulage accidents.

After making a careful study of it, we found that there were five outstanding hazards—electrocution from trolley wire, men being thrown off the front end of motors and being run over, men being rolled between ribs in cars, men being caught by trips

breaking in two, stepping out after the front part of the trip had passed and let the back end run over him.

We started on the trolley wire first. We experimented with several different types of guards, one of them being the wood trough. We found that was very unsatisfactory for the reason that the mules going from one end to the other would pass the trough and the men would have to pass under the bare wire coming out in the evening.

We then tried rubber belting. It was unsatisfactory for the reason we couldn't get it to fit closely enough around the wire. We then tried a rubber lined linen hose. We also found that this was unsatisfactory for the reason that it collected the humidity of the mine and became a conductor itself. We standardized on a rubber hose rubber lined and rubber on the outside with a cord filling. We have to flare it at the end so the trolley wire will enter it easily. We standardized on that hose in 1922 and we haven't had a single electrocution since that time.

Our next problem was the brakeman or trip riders; cars on the back end of the trip would jump the track, causing a sudden jerk to the motor and throwing the trip rider off in front. We got up some drawings, and designed a cab for each end of the motor so that the brakeman or trip rider would have the same cab space as the operator of the machine.

No Accidents After the Cab Installation

We took them to some of the manufacturers. They laughed, but we told them we wanted the equipment regardless of the cost. I will say the cost was considerable but we have the satisfaction of knowing that since we installed the cab for the trip rider, we haven't had a single fatality, due to that cause. That was in 1923.

The law of Illinois requires manholes to be placed at intervals of sixty feet on the opposite side of the track from the trolley wire. They also require these manholes to be painted white or whitewashed, and we had some trouble with men being caught between the manholes and rolled between the ribs of the car. We decided that the whitewashing and painting of the manholes was not sufficient, so we placed an electric light on each and every manhole. The Illinois mining law requires a clearance of 18 inches between the rail and the rib. We decided if 18 inches was good, 30 inches was better, and we laid the track and widened the entrance so we got 30 inches of clearance between the rail and the rib on the manhole side. It is a rule with our company and it is rigidly enforced that if any man puts anything in the manhole, a coupling, tie or any material he may find lying along the road, if he is a company man he is discharged at once. We also have the rule that there must not be any material of any kind piled on the travel side of the track.

We then came to roof falls and sharp edges. We tried painting those white. We didn't get the results we thought we should. We went along and placed electric lights in any break in the roof where the fall has caused a sharp edge. A motor runner or a trip rider will for some unknown reason rise up in the cab and try to look over. If there is nothing there to attract their attention, they bump their heads.

We then tried several different types of markers, and we had very poor success with home-made markers. We had a fellow killed one day and I was worried; we said we would have to get ground line tail lights. I am pleased to say that the men have learned to expect that electric tail light on the back end of the trip and you couldn't push one out of the manhole until they see the tail light pass. That has been our experience in southern Illinois and in the past four years and three months of working time we have had only one man killed on our haulage.

JOHN L. BOARDMAN (Anaconda Copper Mining Co., Butte, Mont.): May I ask Mr. Bannister to give us the details of the guard for the trolley wire, please?

MR. BANNISTER: Mr. Boardman, we use a three-inch rubber hose. We have it split by the manufacturer. They can do it cheaper than we can. We cut holes at each hanger or each support of the trolley wire and the support is placed through the holes and the weight of the hose bears on the bell of the hanger.

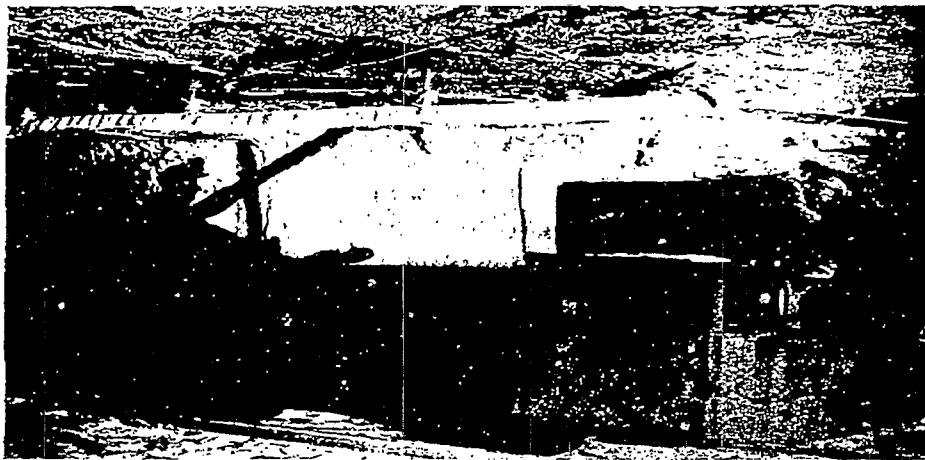
MR. BOARDMAN: Then the split parts just lap over?

MR. BANNISTER: Just lap around the wire. You cut the end off so as to make an easy entrance.

MR. BOARDMAN: How do you put it in the frogs?

MR. BANNISTER: You have to use a double hose when you come to a frog.

MR. BOARDMAN: Would it be possible to use a second-hand hose?



The home made split hose safety device on trolley wire

MR. BANNISTER: It is possible, but not advisable. If you have a good rubber hose that is rubber on the inside and outside both, that second-hand hose would be just as good as a new hose, but a linen rubber lined hose will take moisture and will become a conductor.

MR. BOARDMAN: What is the price?

MR. BANNISTER: The last price I had on this hose, if I remember correctly, was thirty-six cents a foot. You can get some for twenty cents. We get ours from a rubber company in Chicago. I would have to ask the purchasing agent who it is because all our supplies are bought through requisition. I can get you that information before we leave Chicago.

FRED E. MIDDLETON (W. J. Rainey, Inc., Uniontown, Pa.): How far does your rubber hose extend below your trolley wire?

MR. BANNISTER: It covers the trolley wire completely.

D. HARRINGTON (U. S. Bureau of Mines, Washington, D. C.): Have you written that in the form of a paper? You should write that up.

MR. BOARDMAN: There seems to be a great deal of interest in this subject, which indicates it is a safety kink of value, and therefore I would request that Mr. Bannister write it up as a special and send it in to be included in the minutes of this meeting.

MR. BANNISTER: Mr. Boardman, this kink was shown at Detroit last fall with

Mr. Forbes' picture and was discussed, but I could write a short article and have it included in the minutes.

CHAIRMAN POLLOCK: Are there any other questions?

C. A. McDOWELL (Pittsburgh Coal Co., Pittsburgh, Pa.): I would like to make a suggestion that Mr. Bannister write this in such a form that Mr. Harrington can include it in a news letter.

I would like to say, gentlemen, that Mr. Bannister wrote this up probably three or four years ago in the NATIONAL SAFETY NEWS. It was illustrated at that time.

MR. BOARDMAN: Can you give us the month?

MR. BANNISTER: It was January, 1925.

MR. McDOWELL: I used this after I saw what he had done. I used this in a Pennsylvania mine and we found it very satisfactory. It was with the company I was with formerly and we used it for eighteen months in about eight or ten places and we had no trouble whatever with it. We put it up and that was the last of it, and I am sure it was eighteen months until I left that company and it wasn't necessary to put up any additional wiring or anything of that kind. I don't know what the labor cost was. I know it wasn't necessary to go back and put up a board.

MR. BANNISTER: I will give you the reason for setting up the rubber hose guard. We had what we thought was a proficient trough guard. We just barely had room for the trolley wheel to get through safely. We were working a four-foot seam. The trip wrecked one evening just inside the door. Along came a hardheaded miner. He couldn't wait for anything. He had to get out of the mine right then. He was wet with perspiration. His own son said to him, "Father, don't go through; you haven't room." He said, "The hell with the room." He went through anyway. He shoved his shoulder up to the trough guard and got 500 volts and it killed him, and I thought right then and there that I had to get something that would cover the wire below as well as on the side, and that is where I got the rubber hose idea.

J. P. VICTOR (Brule Mining Co., Stambaugh, Mich.): Why do you use 500 volts for trolley haulage?

MR. BANNISTER: I will say we resurrected a lot of old properties that we took over and the installation was already made. This was a Kentucky property. The installation had already been made and the whole business didn't justify our changing the installation.

Electric Currents in Mines

H. T. Bannister, General Safety Inspector, Madison Coal Corporation,
Glen Carbon, Ill.

Trolley wires, feeder cables and entry circuits in general should be installed as permanently as possible with sufficient clearance to minimize danger of contact with locomotive crew, or men using the traveling way. Unavoidable conditions will frequently limit the clearance that can be obtained, but the importance of this as a safety measure should not be overlooked. Hangers should be of best type and at short distances apart, depending on conditions.

Definite rules should be prepared by the Safety and Electrical Departments which will govern the installation of all circuits, due consideration of course, being given in the preparation of such rules to the local conditions in each mine.

Although the mining law specifies guarding of electric wires only at traveling ways, yet it is equally important to guard wires where the locomotive crews pass under same. After experimenting with wooden troughs canvas covers rubber belts, etc., we have finally standardized on a 3-inch rubber hose that is split, placed between the clamps and hangers so as to hang over and around

the wire and flared open at each end to allow the trolley wheel to enter. The hose opens easily for the trolley to pass, closes again at once, and thereby affords complete protection. Since using this method of protection, we have had no cases of shock to men or animals, but previously had experienced some serious accidents, one of them fatal, where other types of protection were in use.

Section line switches are frequently installed in such manner that the locomotive crew is required to throw them as they pass. This is generally done while moving at a fair rate of speed and is a prolific cause of minor, and occasionally, of more serious accidents. Where this can not be avoided by the use of switches automatically controlled by trolley clips, the motorman should be compelled to stop his trip to throw the switch, which itself should be guarded with fibre shields to prevent injury through getting burned by an electrical arc, which has frequently happened. Protective shields of this character can be readily made and installed at the trifling cost of 40 or 50 cents each.

The Large Trolley Wheel Reduced Arcing and Flashing

We have found that under our conditions the use of as large a trolley wheel as possible reduced arcing and flashing to a marked degree, resulting in less hazard to the eyes of the locomotive crew. We get appreciably better results from the five-inch wheel than from the ordinary four-inch size generally used. At points where flashing is troublesome we have found that greasing the wire with medium cup grease greatly reduces it, and one application remains effective a surprisingly long time.

When all possible measures have been taken for the safety of the locomotive crews, attention should be as carefully given to elimination of injury to others who must unavoidably use the haulage ways traversed by the locomotives.

The most effective safety measure in this respect is provision for a separate traveling way entirely for the men, but this unfortunately is seldom possible. Where this cannot be done the provision of safe clearance between the locomotive and the ribs and timbering, together with free and unobstructed refuge places, at the legal distances, is of first importance. The refuge places should be kept well white washed, and illuminated as much as practicable, with an electric light at each one where restricted clearance or other conditions create a special hazard.

Signs should be placed at switches and curves, warning of the danger of derailments at such places.

Special provision should be made for the safety of trappers, switch-throwers, and others whose duties keep them in close proximity to the tracks. This can very effectively be provided in the way of a recess out in the rib which will afford ample protection from a derailed locomotive or car.

Fatal injuries have frequently been caused by men stepping out of a refuge place without noticing that the trip had broken in two, and then getting run down by the following cars. We have had two such occurrences in our own experience which could have easily been avoided if the men had watched for the rear end markers. The ordinary markers do not readily attract attention, but we have begun the use of storage battery rear end lamps, showing a red light, and believe the men acquiring the habit of watching for them as the trips pass. We have had no accidents from this source since putting them in use.

CHAIRMAN POLLOCK: I would like to ask whether or not your electricians work underground with the current on.

MR. BANNISTER: They do not. We have an automatic breaker on every section of the mine and regardless of whether it is trolley wire, machine wire or what it is,

the automatic recircuit breaker is thrown out and locked out and the man who is going to do the work puts the key in his pocket before he starts working on the line, if it is even putting a jumper across from one room to the other. That is a standard rule and our boss is pretty strict; if we violate some of his rules and he finds it out, we generally get off the payroll.

CHAIRMAN POLLOCK: We will continue by asking Mr. Boardman to tell us about the first aid carried on by the Anaconda Copper Company.

JOHN L. BOARDMAN (Anaconda Copper Mining Co., Butte, Mont.): I wanted to tell you all about first aid, but I haven't time and so I am going to get along with the first half of it by making a couple of simple statements.

First aid of the injured is a necessary part of the work of every mine safety engineer. First aid is very valuable not as an adjunct to accident prevention particularly but as a means for preventing the seriousness of accidents after they happen.

Now I hope that you will all grant me that and get away from the necessity of proving the case because I have other things to say. The only question then that comes up is whether you can get a great value out of first aid training by giving it to your men and paying them for taking it as individuals, or whether you can get a greater, broader interest in first aid through the conducting of first aid contests.

First aid contests have been subjected to a very great deal of criticism. Many of you men know that if I feel I have a holler coming, I holler, and I have hollered against first aid contests for several years; but here is what I have found out about them.

First Aid Contests Were Difficult to Judge

When first aid contests first started, we didn't know how to judge them. You can't judge a first aid contest like you judge a baseball game or a prize fight because there is nothing definite to judge. To judge a first aid contest, you have to have all the teams doing the same problems and have them ruled by the same man. Then you have an ideal judging.

For many years we didn't do that, and consequently there was a great deal of friction and criticism, and it was due us. Recently, however, first aid contests have been developed into a method of judging that is just about as fair as we can possibly make it.

By the way, before I go further, I want to say that having conducted and been interested in more than 100 first aid contests, I have yet to see one contest which has been deliberately unfairly judged; but up until recently I hadn't seen any that was fairly judged. I mean by that that there was no deliberate attempt to misjudge a first aid contest at any time, and yet due to the inadequacy of the system of judging the contests, none had been absolutely fair. But within recent years we have a system of judging first aid contests that works out adequately, in that the problems are made first, then a committee of judges meet, discuss that problem and work out a standard for performing the work according to the manual of instructions that is given them.

Gentlemen, that is as close in approach as you can possibly get to an individual judging of a number of teams. The judges have all agreed that that is the way to work that problem and that method of working the problem is written out fully, it is before each judge as he judges the team, the judge has no right or room for giving his personal feelings in the matter at all, it is a standard method of judging.

They have in my own home town, since this new method of judging has been made popular, made the men real sportsmen. We have no kicking, no fighting; when the contest is over, the men feel good, even the losers, and it is very successful. Therefore we have re-entered first aid contests and for the past few years we have always supported the International Meet by sending at least one team.

Gentlemen, the main part of my subject is this. We have invited the Bureau of Mines to hold the next International Congress, that is the 1928 First Aid and Miners Contest, in Butte, Montana. Perhaps I am a little previous in making this announcement because the Bureau has not decided where they are going to hold this contest, but I am doing it for the reason that I want to get before you men personally our invitation to come and see us. If I had to wait until their decision is officially made, I would have lost this opportunity.

Therefore, if you find later that the Bureau has turned us down, please excuse me, but here is the reason why we want that contest.

We are on four transcontinental railroads. We have adequate hotel facilities for handling even a larger convention than the International Contest will be. We have absolutely ideal weather in the summer time for holding such a gathering out of doors. We have hundreds of well trained first aid men who have asked me to extend you a cordial invitation. They want me to tell you that we want you to come and we will be glad to see you. We have offered the Bureau of Mines the money to defray the expenses of this contest, so there will be no soliciting from guests.

We feel we can handle the contest. We want you to come and we want you to send a winning team. Of course I want you to understand that we are going to try to win if we can. We are going to do our best to win, but if you win, it will be perfectly all right with us.

Organize for the Coming Western Contest

Now gentlemen, another advantage and the chief advantage to you in sending a first aid or mine rescue team to Butte, Montana, for the next contest will be this: The trip is so attractive that you can offer this trip as a prize for winning contests locally and you can stir up more interest in first aid than by any other method that I can think of. By comparison you may take the system which we use. We offer the trip to the International Contest as a prize for winning our inter-departmental contest. We started out about the first of January and we tell all of our employees that the first eight teams are open for volunteers. We then organize a number of volunteer teams from each of the mines and each of the departments in the smelters. These men train for a month and then go through a series of local first aid contests. The two winners from the mines, the two winners from the Anaconda Smelters and the two winners from the Great Falls Smelter then contest to see which of the six shall represent the Montana operations of the company at the International Contest.

If you will do that at home, if you will ask each of the levels in your mine or each of the mines, if you have more than one, to get up a local competition, you are going to get an interest in first aid, a voluntary interest in first aid, if you please, that you couldn't get in any other way, because you are giving these men something of real value.

Now the expense of the thing is not so great although it looks great perhaps if you look at it as a whole without looking at the benefits. This year our contests and first aid training probably cost us over \$5,000 for the month end operations; sending the team to Pittsburgh, Pennsylvania, cost us \$2,900. Just the expenses and material for the team from Butte to Pittsburgh and return, which covers also cash prizes for the local elimination contest. We paid the expenses of the team from Great Falls and Anaconda to Butte and bought the material and things like that to wear. It was well over \$5,000, but, gentlemen, when you compare this possible \$5,000 of expense with the fact that we have interested every man on the job in first aid and have trained hundreds in first aid, then the cost per unit of interest is not very great.

CHAIRMAN POLLOCK: I am going to ask Mr. Webb of the West Pennsylvania

Electric Company to give us a five minutes talk on "Mining Safety in the Coal Mine."

MR. WEBB: The West Pennsylvania Electric Company owns and operates two large bituminous coal mines, one known as the Allegheny Pittsburgh Coal, at Logansberry, and the other known as the Windsor Power House Company, at Windsor, West Virginia. They have a ready capacity of 4,500 tons of coal per day and the entire output is used exclusively in the generation of electricity by steam.

We think or we believe that we have done some fair work in safety in those properties. As an illustration of that, the Allegheny Pittsburgh Coal Company, employing about 500 men, has not had a single fatality since the year 1922. In addition, that mine has been able to operate for six consecutive months, which means approximately 180 days, without a single lost-time accident. When you say that a mine can operate six consecutive months without a single lost-time accident, I think you will agree with me that we are doing some real constructive safety work on that particular property.

Training the Workmen to Work Safely

You will wonder perhaps how we do it. Of course, it is old stuff to say we make the physical conditions safe, but we do. We even do more than that. We educate our workmen to work safely, and that's the biggest thing of all. Of course, this bituminous coal mine, which is on a sixty-seven foot seam of coal, has good roof conditions (Jack Ryan knows the conditions are rather exceptional there), but in order to make it safe we do a multitude of things to safeguard the men.

For example, we have flood lights at all cross-over points. We have plenty of manholes and we have the switch throws parallel to the track and set back three feet so no coal can fall over the cars and injure the man. We have safety bulletin boards down in the mine. But even after we do all of that and more, the big thing in reducing accidents in my mind in the coal mining industry is to get right down to brass tacks and educate your workmen. I have always found that you can strive to educate the adult but it is a pretty hard problem. The right way, in my opinion, to get at the man and educate him is through his children; and we of course have at these mines large villages to accommodate the workmen and their families. Very, very frequently I go into the schools there and talk safety to these kids. We have found that very effective because if you sell a child safety and sell it to him in the right way, then he will go home and in turn sell it to the parent. I don't mean that you can go up and stand in front of a bunch of six-year-old children and talk to them as I am talking to you. The man who does that talking has to be able to change his age and his character and his disposition and everything else and put himself directly on the level with the children he is talking to. When he does that, he will get it across, and the child in turn, if impressed, will go home and sell the idea to the parent. That has been very helpful to us in promoting safety on this particular property and the results show that it must have been worthwhile.

In addition to that, we have our safety measures and when Charley Reynolds (perhaps some of you men may know him) calls a meeting of these miners he doesn't mean maybe. Every Monday night they have a meeting and there are at least 300 miners who attend that meeting. It is a combined safety and first aid meeting and about 80 per cent educational. That is the thing that assisted this mine in operating since 1923 without a single fatality, and they were able to operate these six consecutive months without a single lost-time accident.

Down at the Windsor plant conditions are entirely different. They have a three-foot seam of coal and they have a treacherous, a notorious roof condition. Back in 1923 they suffered seven fatal accidents at that mine, which was a pretty unfortunate condition. We applied the educational principles to that mine very strenuously and the consequence has been a real reduction there also.

Last year there was only one fatal accident. This year there was but one, and that mine was able this year to go 90 consecutive days without having a lost-time accident, which shows again where the educational work can be made effective by reaching the men not only through their children in the schools but by reaching them by ways and means that are best known and properly applied by all the men present in this conference.

Of course, lots of physical conditions, unsafe physical conditions, have been corrected at this mine. For example, since 1923 approximately 15 miles of roof timbering have been put in to make that mine safer. Of course that is one big thing that has been done to promote greater safety in operation. But still, men, I maintain you cannot get away from the educational proposition. From 80 to 90 per cent of the whole thing is absolutely educational. When we educate our men to do their work safely, no matter how you do it, if you have to work through the men's children, or if you have to put it to him direct, the main thing is to get it to him, saturate him with it; and when you have him saturated with the safety idea, then you are going to be able to reduce the accidents just as we have at these mines.

A Seventeen Months Record Without Accident

BENJAMIN BROCKBANK (Castile Mining Co., Ramsay, Mich.): I listened with quite a little interest to the wonderful record that has been made by the coal mines and metal mines. I can't sit down without mentioning one of our properties and we have with us Mr. Smith or Mr. Jack who can tell about the wonderful record of the mines at Crystal Falls, Michigan. I think it is probably 17 or 18 months without a lost-time accident in the metal mines.

ROBERT JACK (Bristol Mining Co., Crystal Falls, Mich.): I can give you the figures on our records. It is 17 months without a lost-time accident and we have 70,000 shifts with 577,000 man hours and a production of 500,000 of iron ore. Our tram cars, loaded the way we load our two-ton cars, would reach from Crystal Falls, Michigan, to Chicago.

CHAIRMAN POLLOCK: Any other remarks?

F. C. MILLER (Colorado Fuel & Iron Co., Denver, Colo.): I might say the Colorado Fuel and Iron Company has introduced first aid in the schools and the boys and girls are now competing as well as the men.

MR. WEBB: That gave me a thought. We do the same thing. We teach the boys and girls in the school first aid, and last year at the Springdale mine a team of girls was brought down by the Bureau of Mines and given the test that men take. They were successful in passing the test with a very high average and were given regular certificates the same as men get; and at the time we understand that was perhaps the first girls' team in the United States to receive the Bureau of Mines Certificate.

MR. BOARDMAN: Mr. Chairman, this is a little experience Mr. Marvin might want to take down.

In Butte, Montana, we had last year eight accidents from children playing with dynamite caps. The caps were found on the streets and in the homes. So the safety men of the community put on a lecture in each room up to and including the eighth grade during the last week of the school year this spring.

To date we have not had a case of children injured by playing with dynamite caps since the lectures.

H. W. GIESSENG (Commerce Mining & Royalty Co., Miami, Okla.): I have a statistical sheet that says about six words. We have a mine in the Tri-State District belonging to the Federal Mining and Smelting Company, a Munsey mine. It isn't a large mine but it has 58,528 shifts and 23 months without a lost-time accident.

D. HARRINGTON (U. S. Bureau of Mines, Washington, D. C.): Mr. Chairman, I want to say something right now. In connection with these good records that you

people are giving us, I would appreciate it very much indeed, both as Secretary of the Mining Section of the National Safety Council and as head of the Safety Division of the U. S. Bureau of Mines, if you would send to me these records, give them to us and we will give full publicity to them and we will probably be able to get a lot of good for you and the industry by giving this information out. The trouble with us, both in the National Safety Council and in the Bureau of Mines, is that we can't get to these records. We get these records only in the safety competition which is handled by Mr. Adams and which does not include all the mining companies of the United States.

We would very much like to get all these records and we will guarantee to give you publicity on them.

GEO. MARTINSON (Pickands, Mather & Co., Hibbing, Minn.): I am very much interested in these records. I just recall, if the Albany mine, which is located at Hibbing, goes to the sixteenth of February, 1926, we will have gone six years without a lost-time accident. During that time we have shipped over 2,000,000 tons of iron ore and 3,250,000 yards of rock stripping.

CHAIRMAN POLLOCK: Can anybody beat that? I want to say that I believe the Missabe range has gone into it stronger than any other mining section on safety education in the schools. I know there isn't a week that goes by that I don't speak somewhere in the schools in Eveleth, and one thing that has impressed me a lot is that in our schools we teach swimming to all the youngsters from the fifth grade up. We haven't had a child drown in the last three years from the schools of Eveleth. Any child that graduates from the junior high school has to be able to swim the length of the tank.

Another thing we have started in our schools is to teach every pupil to run an automobile after he is sixteen years of age. You may say a youngster of sixteen years should not drive a car, but how many do? Isn't it better that these youngsters learn the road laws and how to handle a car under guidance of somebody who knows how than to go out in dad's car and try it on the highway?

If there are no more questions on this last paper, I would like to go to something that is near to my heart; that is regional conferences. This year in Duluth we held six or seven Lake Superior Councils and we had 350 men registered. I believe we had one of the best conferences that was ever held in Duluth and I am going to ask Mr. Bawden, who was chairman at that conference, to tell us something about it.

Married Women Received the Bureau Certificates

A. A. BAWDEN (Pickands Mather & Co., Ironwood, Mich.): I will say first in regard to the Bureau of Mines Certificates, while in our district we haven't issued any to school children as far as we know back in 1922 or 1923 the Bureau of Mines car in our district trained two teams of our married women and they received the Bureau of Mines Certificate.

Our company issues a first aid badge about the size of my watch that our men very proudly wear at their work, and as a token of reward we issued badges to the women getting these Bureau of Mines Certificates. Until this day one of them very proudly wears her badge on her chest whenever she goes to any social function. She is taking real good care of it.

I am particularly glad to be able to give this record of our program up there at this time because Mr. Ageton is here. He was one of the moving spirits in the organization of this chapter which was started under the Bureau of Mines and eventually it has become the local section of the National Safety Council.

As Mr. Pollock stated, at our last meeting we had in the neighborhood of 325 to 350 attendants at our conference which lasted two days that were jammed full. We

had a very good safety exhibit which was our first experience along that line. I will just go through this program in order to give you an idea of what we have been doing.

We have for a number of years had a mayor of the city in which the convention was held welcome us to the city. We had an address by Mr. Earl E. Hunter, Manager of the M. A. Hanna Company. We had a paper on "The Necessity for Mechanical Ventilation of Mines," by Mr. W. H. Carrick, safety engineer of the Corrigan-McKinney Steel Company, who was formerly an engineer with the Bureau of Mines. The discussion led by Mr. Krogdahl, mining engineer of the Oliver Iron Mining Company and formerly a Bureau of Mines engineer, was very interesting.

There was a paper on "Physical Examinations and Accident Prevention" by Mr. P. A. Carmichael, superintendent of Lorretto Mine, M. A. Hanna Company; a discussion led by Mr. George Martinson; a paper on "School Safety" by Mr. A. V. Rohweder, supervisor of safety for the Duluth, Missabe & Northern Railway; a discussion led by Mr. Joseph Wilson, assistant mine superintendent of the Oliver Iron Mining Company's Spruce Mine.

Programs to Interest the Community

We had a showing of several one-reel safety pictures; a paper on "Mine Lighting" by Mr. John F. Berteling, superintendent of Palms-Anvil Mines of the Pickands, Mather Company; a discussion led by Mr. Paul S. Kurtzman, superintendent of the Albany Mine in the Missabe District. We had a program of safety kinks covering 14 or 15 different kinks. We had felt for the last two or three years that we were being neglected by the executives; although they had been paying our expenses without any complaint, they weren't appearing at our meetings. So we had an executive session which was handled by Mr. John H. Harding, assistant general manager of the Oliver Mining Company and included talks from practically every manager of mines in the Lake Superior District.

We had a banquet at the Hotel Duluth with entertainment under the auspices of Mr. Francis J. Webb, manager of mines, Republic Iron & Steel Company.

On the second day we had a paper on "Electrical Installations for Metal Mines" by Daniel Harrington, chief engineer, Mine Safety Service of the U. S. Bureau of Mines. Mr. Harrington wasn't there in person but his paper was read. Discussion was led by Mr. A. C. Butterworth, chief electrical Engineer, Pickands, Mather & Company. There was a paper on "Blasting Kinks" by Mr. Thomas Michelle, service man of the Dupont Powder Company; an address on "Safety in Taxation" by Mr. L. A. Rossman, editor of the *Herald-Review* of Grand Rapids, Minnesota; an address on "Recent Work of the National Safety Council" by Mr. W. Deane Keefer, Chief Engineer, Industrial Section, National Safety Council, read by some other party; and an address on "How to Reach the Workman" by Mr. John P. Eib, supervisor of safety and labor, Illinois Steel Company of Joliet, Illinois.

We had a demonstration of new Foamite generators of the Foamite-Childs Corporation by the Marshall-Wells Company, local agents, and a trip to the plant of the Minnesota Steel Company as entertainment on the side.

Safety exhibits were put on by the American Optical Company of Chicago, the Elliot Service Company of New York City, Foamite-Childs Corporation of Utica, New York, Kindy Optical Company of St. Paul, Minnesota, Lehigh Safety Shoe Company of Allentown, Pennsylvania, the W. P. & R. S. Mars Company of Duluth, Minnesota, Mine Safety Appliances Company of Pittsburgh, Pennsylvania, the National Safety Council of Chicago, Safety Equipment Service Company of Cleveland, Ohio, Willson Goggles, Inc., and Pyrene Manufacturing Company.

CHAIRMAN POLLOCK: I would like to have Mr. Ryan say something about this conference. He was there as a visitor and he can tell us a few things about that.

JOHN T. RYAN (Mine Safety Appliances Co., Pittsburgh, Pa.): I attended this conference and it was my first offense. I had been invited in previous years but I had never gotten to it. I will say it was one of the most interesting and inspiring mine safety meetings that I ever attended. The particular feature of the program that appealed to me was that it was a managers' session. It was a splendid idea and the execution was good because the chairman had not only the managers, but in some cases the presidents of some of the companies.

The best feature of that, I think, was the fact that those men came there, the higher operating officials, and they went publicly on record before approximately 350 men, many of them their own employees, as to their attitude on safety and pledged themselves to support the safety movement.

Those conferences are a splendid thing. We have been conducting one in Pittsburgh under the auspices of the Western Pennsylvania Division of the National Safety Council for several years. I will admit that we haven't put the pep into it that you have up in the Lake Superior District, but we get a lot of good out of it in Western Pennsylvania.

We take a particular interest in that conference up in Duluth, judging from my observation of the one I attended.

There are many sections of the country where this regional conference could be held to great advantage and the men get a lot of good out of it, and I believe that it will stimulate the work of this section because we have an unusually large attendance from the Lake Superior District and I believe part of that is due to the interest that has been stimulated in their section.

CHAIRMAN POLLOCK: Is there any other district represented here that has had the regional conference in the last year?

THEODORE MARVIN (The Explosives Engineer, Wilmington, Del.): Don't they have them down in Birmingham under the auspices of the Alabama Safety Council? The National Safety Council meetings are held four or five times a year, I believe.

Various Other Meetings Were Held

R. V. AGETON (Tri State Zinc and Lead Ore Prod. Assn., Miami, Okla.): May I say a word on that? We tried to hold one this year but were unable to do so. We have a stunt that may help out. We have a weekly meeting every Wednesday of all the engineers in the Tri-State District and at those meetings we discuss everything that has happened during the previous week; all the safety engineers give their reports in detail regarding the number of shifts worked, the frequency of accidents per thousand shifts work and the severity of accidents, which is the number of days lost per thousand days work.

We have no specified program, but merely discuss the current events regarding accident prevention.

MR. BAWDEN: Mr. Chairman, that reminds me that I would like to add in our district we have monthly meetings of all safety engineers coupled with attendance by school superintendents, police heads and anyone interested in school, public or industrial safety. We have a dinner and discuss any subject that may be brought up for that purpose. We usually conduct those meetings without formality. On some occasions we have a formal meeting in order to concentrate on some particular item that we want to have taken care of.

CHAIRMAN POLLOCK: If there is nothing more on this subject, my part of the program is finished. I want to thank the men who helped me out in making the round table possible and I will turn the table back to Mr. Young, our Chairman.

(Mr. H. F. Young resumed the chair.)

CHAIRMAN YOUNG: Mr. Pollock, we certainly appreciate this very interesting part of our program which you have conducted.

D. HARRINGTON (U. S. Bureau of Mines, Washington, D. C.): I wish to call attention, gentlemen, to the monthly news letter which I am supposed to edit for the Mining Section of the National Safety Council. I understand that some of the members do not get the news letter. I am not informed as to the persons to whom the National Safety Council issues it. My handling of it is merely the getting together of the data and sending it in to Chicago and it is made up in mimeograph form and sent out from the Chicago office.

If you do not get copies of it, please correspond with the Chicago office of the National Safety Council and I imagine probably Mr. Keefer is the man to write to.

Another thing, I wish to call your attention to the desirability of your sending me items which are of a safety nature and which you think would be of value to the Council in general. If you will give them to me, I will put them into the monthly News Letter. I will appreciate very much receiving them.

Another Record of Almost Two Years

WM. T. McDONALD (Montezuma Copper Co., Sonora, Mexico): Just a moment, in line with what Mr. Harrington suggests and as a matter of getting this on record and perhaps as a matter of interest to some others, may I be pardoned for stating that in the concentrated operations of the Montezuma Copper Company, which includes their shops and a lot of work of tearing down old machinery, they ran for two consecutive years, less eight days, without a lost-time accident? During that time 86,040 manshifts were worked. That is a matter for your record, Mr. Harrington. I thought you might be interested as you were asking for such data.

CHAIRMAN YOUNG: Those are all wonderful records. I wish it were only possible that we had a longer time so that every one here could tell us what is in his heart on safety; but we haven't the time.

I hope that each of you feel that your time and money have been well spent in coming here and attending the meetings and that you will return to your respective companies better sold on safety, if it is possible, than you were before coming.

I want to take this occasion first, before presenting our new chairman, to thank the chairmen of the committees for the wholehearted cooperation and wonderful work that each of them has done during the year. Also I want to thank Jack Ryan for the time he has given to the National Safety Council work. I am sure all of you have enjoyed the entertainment that he has given and the program that we attended at the beginning of our session. He has one more number that he will give after Mr. McDowell makes his announcements, and then we will stand adjourned.

It gives me great pleasure at this time to present Mr. C. A. McDowell of the Pittsburgh Coal Company whom you have chosen as your chairman for the next year.

(Mr. C. A. McDowell took the chair.)

CHAIRMAN McDOWELL: I am very glad indeed that we don't have very much time because I won't have to talk very long. You know it is an honor to me to be chosen as chairman of this Section. I appreciate it very much, and I sincerely hope that we will all get together in some form or other either in conferences or by mail, if necessary, in order that we can keep up the good work that has been reborn, I might say, this year. I really think that this has been the best conference or the best session we have held for many years. I have had in mind for the last few years in attending these meetings, that we should get down to a basis like we had this year, that is, fewer papers and more time for discussion. The

first part of this year, early in February, I accepted a new position with the Pittsburgh Coal Company and by doing so naturally, as some of you men know, there was added responsibility and I was tied down, so to speak, on my new work. It was not possible for me to get to the executive meetings as called by Mr. Young and I am sorry for that, I only hope this year, since my work has taken on a little different attitude and we are, I think, making progress, that we can get together, and I sincerely hope that when the executive committee is called you men who have been selected for these different places will do your utmost to get to those meetings.

We desire to have a meeting this afternoon at three o'clock and I presume it can be held in this room, in order to have all the officers get together and probably formulate some plan for next year.

The Nominating Committee did not fill all the places and I desire to bring this to your attention. We would like to have all the officers mentioned on this paper report at three o'clock for this informal meeting.

It may be well to read your officers again:

First Vice-Chairman, George Martinson.

Second Vice-Chairman, A. W. Dickinson.

Third Vice-Chairman, J. P. Hodgson.

Fourth Vice-Chairman, F. C. Miller.

Secretary, Daniel Harrington.

Chairman of Poster Committee, H. C. Henrie.

Chairman of Membership Committee, H. I. Young.

Chairman of Publicity Committee, Theodore Marvin.

Chairman of the Slide Committee, H. G. Hensel.

Chairman of Program Committee, R. V. Ageton.

I am very glad indeed that this man has accepted the responsibility again for next year as we certainly have had a wonderful program this year, one that I don't think could be surpassed.

Chairman of Engineer Committee, J. M. Carmody.

Chairman of Statistics Committee, R. N. Hosler.

I notice on this paper "News Letter Editor." We have heard so many wonderful reports and all these records have been piling up in the last few years, and yet I have seen very few of them in the News Letter. I am going to ask that you kindly put that stuff down on paper in order that Mr. Harrington may print it in the News Letter and let us all get the benefit of it.

The Executive Committee will be appointed later. I missed one important committee. It is not listed on the National Safety Council form, but the same time I don't think any of us desire to miss a committee of that kind, that is the luncheon committee. We have a man that we all know is not very apt at putting across things of that kind and he was on the committee this year, and I think we ought to give him a chance again to see if he can make good, so I am going to put Mr. Ryan on that same committee for next year. It has been suggested that we should have an attendance committee. I am going to leave that open for the time being until it is decided just where the next National Safety Congress will be held, after which I think I shall appoint a chairman of what we might term an attendance committee. He can in turn appoint his assistants and see if we cannot get out more members to the National Safety Congress, at least within that vicinity.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Cement, Quarry and Mining Joint Luncheon

Wednesday, September 28, 1927

A. J. R. CURTIS, Chairman
Assistant to General Manager, Portland Cement
Association, Chicago, Ill.

The joint luncheon session of the Cement, Quarry and Mining Sections of the National Safety Council was called to order by the chairman, Mr. A. J. R. Curtis, assistant to the general manager, Portland Cement Association, Chicago, Ill.

CHAIRMAN CURTIS: Whether your problem is to find a substitute for gasoline, cure an illness or meet the competition of a foreign competitor, the orderly procedure is the same. First of all you must diagnose the situation, find out what the problem really means; secondly, you must devise ways and means to meet the situation the diagnosis has revealed—you must prescribe a remedy.

This procedure is adopted by anyone, consciously or unconsciously, that elects to accomplish things in an orderly and logical manner.

In safety work many industries have been taking headache medicine—doping themselves with a “cure-all” supposed to be good for what ails them. They have taken the dosage without thought about the fundamentals of the problem and without an adequate diagnosis.

The reason we have made such startling progress in safety work in the cement industry is because we have diagnosed our case and then found remedies for specific illnesses. We have done this by means of a fine system of statistical records and reports. This report system, inaugurated in 1919, shows us what and where the accidents are. The records indicate what season of the year a certain type of accident is likely to occur. They enable us to measure the efficiency of this scheme or that scheme in the promotion of safety in our plants and quarries.

Ethelbert Stewart, United States Commissioner of Labor Statistics, speaking before the Cement Section of the National Safety Congress in Detroit early this year, commented favorably on our statistical system.

“I find that statistics of the Cement Section of the National Safety Council are the very best that come to my office,” Commissioner Stewart said. “You are doing a piece of work that must inevitably result in a rapid decrease in your accident rate. I do not know whether or not you are making effective use of these figures, but they are significant and you certainly should be doing so.

“In the first place you have any industry devoted to the manufacture of one definite product—cement. Your product does not go, as would be true in the chemical industry, into everything from lipsticks to laundry soap. In gathering your statistics

you have something definite to work on and you have succeeded in doing the basic thing, that is, finding the man-hour exposure in your industry and relating your accidents to that. Statistics cannot reduce accidents, but they can tell you where the accidents occur. They can and do tell you where to apply your precautionary measures and where to spend your money. They make it unnecessary to spend money along several lines when most of your accidents are occurring along one or two lines. Comprehensive accident statistics are worthwhile and I congratulate your industry and the many individual manufacturers who are cooperating to make this statistical work so effective.

"I have been able to show others that you have reduced your accidents. Statistics form the basis for a lot of standard jokes like the mother-in-law joke and everyone thinks he can take a whack at a statistician and his statistics; but, nevertheless, if you are going to improve the accident in your plant you must know where the accidents occur and that requires statistics.

"Your statistics have made it possible for me to show others that you have reduced your accidents. I hope to impress you with the importance of continuing and further perfecting your statistical work, not only for yourselves, but for the influence it is going to have on the other sections of the Safety Council on your own and other industries."

We are so well sold on the diagnosis theory because we can take our limited means and get excellent results. We don't have to guess—we can take one direct shot and make it tell. We are able to do this because our records have revealed a specific situation—the case is diagnosed and we can take steps to remedy a definite problem that confronts us.

All mining and quarrying industries can make the same sort of case study. The experience of the cement industry points to the expediency of this method because in our industry we face problems in both of these divisions.

Let me give an example of what statistics have done and will do for us. Our records show a growth in screw conveyor accidents at a certain time of the year. For the past nine years we can trace a growth in lost-time accidents of this type at a certain period.

Instead of spreading our funds to battle all sorts of accidents at this given period we can centralize our efforts to combat screw conveyor accidents when they are again in the ascendancy. So we gathered a large number of opinions of experts on how to eliminate conveyor mishaps.

This symposium will be sent to all mills when the time comes. Plans will be made well in advance to meet the situation when it arises.

I believe that a large portion of accident success is based, as I have said before, on the diagnosing of the problem in hand and then prescribing remedies for the specific illness.

Now, we are to be favored with a brief address by a man in a position to be familiar with the inside details of the accident situation. Mr. W. W. Adams is statistician for the United States Bureau of Mines, Washington, D. C., and he has kindly consented to talk to us from the point of view of the Bureau. I take pleasure in introducing to you Mr. Adams.

Safety in the Quarry Industry

W. W. Adams, Statistician, United States Bureau of Mines, Washington, D. C.

Safety in the quarry industry is a matter of direct concern to 92,000 men who are employed in the industry and it is also of almost equally direct concern to their immediate families. Thus between 300 and 400 thousand people are personally affected by the accidents that occur in connection with the

annual production of stone in the United States and in connection with the crushing and other work that immediately follows its extraction from the earth. From 120 to 150 of these men are killed by accidents each year, and 14,000 of them are non-fatally injured.

Through the cooperation of the producing companies, the United States Bureau of Mines conducts an annual canvass of accidents and employment covering the quarrying of stone, and such subsequent work as crushing, rock-dressing, and the manufacture of lime and cement. This work began in 1911 and statistics covering the past 16 years are now available. These statistics are based upon reports furnished voluntarily by the producing companies on blank forms supplied by the Bureau of Mines. Each non-fatal injury reported to the bureau involves disability of the employee for more than the remainder of the day on which the accident occurred. In other words, the Bureau's statistics are limited to what are known as "lost-time" accidents. While many of these injuries cause the employee to lose only one or two days, some of them involve the loss of several weeks or months. Taking them in the aggregate, they average about 15 days per injury. Any company whose temporary injuries average less than 15 days each has a relatively safe plant, or is lucky, or is doing effective safety work. If deaths and permanent disabilities are drawn into the picture and given their customary equivalent weights in lost days, the average accident in the quarry industry represented a loss of 104 man days in 1925 and 94 man days in 1924. In this average each fatality and permanent total disability is considered equivalent to a loss of 6,000 days and each permanent partial disability 800 days, the last-named figure being borrowed from the reports of the Industrial Accident Commission of California until sufficient reports of this class of injuries accumulates in the Bureau's records to develop a new average.

An Intensive Study of Quarry Accidents

In addition to the Bureau's annual canvass of accidents which is based on reports from all producing companies in all states, or as nearly all of them as we can obtain, a special and much more intensive inquiry into quarry accidents has been under way during the past two years. This study is based on full and complete reports—a separate and detailed report for each accident—from a limited number of companies. Each of these companies employs at least 25 men inside the quarry. They are the companies that are participating in the National Safety Competition which is being conducted by the Bureau of Mines. Two such annual contests have been completed, namely, that of 1925 and that of 1926. One of the purposes of the safety contest is to determine which quarry has the smallest loss of time from accidents in proportion to total man hours of exposure. The quarry that establishes the best record receives a bronze trophy or statue known as the Sentinels of Safety, which is the gift of the Explosives Engineer magazine. Credit for providing the trophy and for very material aid in connection with the contest, is due very largely to the enterprise of Mr. N. S. Greensfelder, the editor. The trophy is held for one year by the winning company, and is then surrendered to the winner of the next year's contest. Each year the name of the winning company is engraved on a pedestal of the trophy and each employee of the winning quarry receives an engraved certificate of honor issued by the Bureau of Mines and signed by the director of the Bureau.

The Bureau's annual canvass of quarry accidents affords a broad picture of the accident situation as it affects the whole industry or any large portion or phase thereof; it also furnishes an annual account of the volume of employ-

ment required to produce the country's annual stone supply and of the total loss of life and limb as well as the loss in Man days that went into the cost of producing the stone. The more detailed reports furnished in connection with the National Safety Competition are usually supplied as a carbon copy of the report which the company is required to send to its insurance carrier or to the state compensation commission. In this way the Bureau is furnished with valuable detailed information on accidents with a minimum of inconvenience to the company.

It will thus be seen that the Bureau of Mines statistics of quarry accidents are collected by two methods from a common source, namely, the quarry companies. It will also be observed that the statistics differ in scope, geographically, and in the degree of detail with which the information is supplied. From these two sources of information and similar information from other branches of the mineral industry, it is apparent that quarry accidents occur less frequently and cause a smaller loss of time in proportion to number of employees than do accidents at metal mines or coal mines. In other words, quarry work is not as hazardous as coal mining or metal mining, considering each of the three industries as a whole. Moreover, differences also exist between the hazard of different kinds of quarries. Perhaps the chief distinction in this respect is between quarries that produce dimension stone and those that produce non-dimension stone. Quarries that produce crushed or non-dimension stone have higher accident rates than those that produce dimension stone. For example, the fatality rate for the non-dimension group, in and about the quarry, in 1925, was 33 per cent higher and the injury rate was 7 per cent higher than the corresponding rates at dimension stone quarries; in 1924 the rates were respectively 76 per cent and 18 per cent higher. A comparison covering all years since 1916 shows that, without exception, the group rates for both fatalities and injuries, have been higher at stone quarries producing non-dimension stone, the excess ranging from 5 per cent in 1921 to 118 per cent in 1920 for fatal accidents, and from 1 per cent in 1917 to 122 per cent in 1921 for non-fatal accidents. Moreover, possible differences in length of work day at the two classes of quarries have no material effect upon this relationship. This is shown by figures which have been compiled for quarries working uniform shifts, that is, eight hours, nine hours, or ten hours.

Increased Accident Frequency Unaccounted For

In crushed-stone or non-dimension-stone quarries, where no care need be exercised to prevent breaking the stone, it might be expected that the rate from accidents from explosives would be higher than that in quarries producing dimension stone that is intended to be used for building or monumental purposes. This, in fact, has often been the case, as shown by the annual reports which the Bureau of Mines has received from the producers of stone. It does not, however, fully account for the higher frequency of accidents at crushed or non-dimension-stone quarries. A comparison of the annual figures for the two classes of quarries during the past seven years, shows that some other classes of accidents also, as a rule, occur more often at quarries that produce crushed or non-dimension stone. Crushed-stone or non-dimension-stone quarries show higher injury rates for accidents caused by handling rock at the quarry face, also for accidents from falls or slides or rock or overburden. Haulage accidents also are usually more frequent at crushed-stone quarries. Accidents caused by falling objects, which records for earlier years showed were of more frequent occurrence at crushed-stone quarries, have been materially reduced during the past four years, and in 1925 the crushed-stone rate for this

class of injuries was actually lower than at quarries producing monumental or building stone. A somewhat similar situation prevails as to accidents from flying objects; the rates for this type of accidents have been high for both kinds of quarries, but during the past three years the non-dimension quarries have established the better record. Machinery accidents also are among the major cases of injuries at both classes of quarries, but in the past few years the crushed-stone quarries have reduced their injury rates from this cause and since 1922 these rates for machinery accidents have been lower than at dimension-stone quarries. The net advantage, however, still lies with quarries that produce dimension stone; that is to say, the injury rate covering all classes of accidents combined is still lower for the dimension-stone quarries.

Quarrying Less Hazardous Than Other Mining

Accident prevention is a national as well as local problem. It is therefore appropriate that national associations, such as the Portland Cement Association, the National Crushed Stone Association, and others, should undertake or maintain some group action looking to the prevention of accidents. In 1925, more than forty states contributed to the production of stone in the United States, and in more than 34 of these states accidents were suffered by the men who produced the stone. To the extent that quarry accidents are similar regardless of location of plants, it would seem that the national associations might with advantage undertake a study of the accident-prevention problem. It has already been said that the quarry industry is less hazardous than coal and metal mines, both as regards accident frequency and accident severity. This, however, is no more than might reasonably be expected because nearly all quarry work is done in the open daylight, whereas most of the operations at coal mines and metal mines are conducted underground, where the light, which is necessarily artificial, is often not adequate for maximum safety; also in the underground work, there is the additional hazard of falling overhead material. The quarry industry should therefore not be content if it merely maintains an accident rate better than that for the mining industry, but should strive to lower its rate from its own previous levels. This has already been done to some extent so far as fatal accidents are concerned, but not to any material degree as regards injuries of a non-fatal character.

Of the 92,000 men working at quarries in 1925, the operator's returns to the Bureau of Mines showed 52,000 working in and about the quarry pits and 40,000 working at the outside plants. About three-fifths of the accidents occurred to the men working in and about the pits. These accidents accounted for 101 deaths and 8,632 lost-time injuries. The fatality rate per thousand 300-day workers was 2.28 and the injury rate was 195. The injury rate was the highest on record since 1915, when the statistics for inside and outside accidents at quarries were first segregated. On the other hand, the fatality rates previous to 1925 were, in four cases, better, and, in six cases, worse than the rate in 1925. These figures show that more progress has been made in the prevention of fatalities than in the prevention of injuries. A comparison of these figures with those for outside plants shows that more progress has been made outside than inside the quarries, and this fact has contributed favorably to the record for the industry as a whole.

The number of days a quarry is in operation is largely a matter of contracts and weather conditions. Perhaps choice plays little or no part. Yet it may be interesting to know that it is apparently safer for a quarry to work full time than part time. That is to say, the accident rate per day diminishes as the number of days the plant is in operation increases. A quarry that is in operation a full year is likely to have a lower accident rate per day than if it

worked only half a year. This conclusion is based on statistics which the Bureau has compiled for metal mines, which indicate a relationship between accident rates and continuity of operation which doubtless exists in quarries as well as mines.

These statistics (as yet unpublished) of metal-mine accidents show that accidents occur less often when operations are most continuous—that is, the accident rate declines as the number of operating days of the plant increases. This fact was indicated not only by the figures for all classes of metal mines combined, but also by the figures for individual groups. The combined rate over a four-year period (1921-1924) for fatal accidents among underground employees was 7.69 per thousand full-time (300-day) employees for mines operating less than 100 days per year, and it was 3.77 for mines operating 300 or more days per year. The non-fatal injury rate for the former group was 675 per thousand employees, while for the latter group it was 356. Considering mines of equal or similar size, the death rate for mines employing 100 or more men underground was 8.78 for 1 to 99 days of operation and 3.71 for 300 or more of operation. When the mines were classified according to principal product, it was found that iron mines operating less than 100 days had a fatality rate of 11.92 and an injury of 836, whereas those in operation 300 days or more had a fatality rate of 3.01 and an injury rate of 174. Similarly, copper mines had a death rate of 7.58 and an injury rate of 841 for less than 100 days of operation and a fatality rate of 4.09 and an injury rate of 435 for 300 or more days of operation. These figures for metal mines were for extreme groups in respect to operating time; rates for adjacent groups indicated the same tendency, but less clearly.

Similar figures for quarries have not as yet been compiled, but we hope to be able to prepare them in the near future.

An Exposure of Over Seven Million Man Hours

The experience of 44 plants in the National Safety Competition of 1926 was classified on a monthly basis to learn the seasonal variation in the amount of exposure and the seasonal variation if any in the accident frequency rates. These 44 plants had a total exposure of 7,815,377 man hours. The severity rates were also calculated on a monthly basis, but the occasional occurrence of a fatality, with its equivalent of 6,000 days, rendered the severity rates too variable for comparative purposes. The volume of exposure, as might be expected, reached its lowest level during the winter—in January; it increased steadily through June, and held this level through July, then declined slightly but steadily through August, September and October, and continued to decline more rapidly in November and December. The maximum exposure, in June, was two and one-fourth times that of January. The frequency of accidents was smallest during the four winter months of November, December, January and February; it was much higher in other months, the average rates being about 50 per cent higher for the months of greatest activity.

In order to form a mental picture of the field that lies ahead of any prospective safety program, it may be helpful to state that so far as quarry safety rests with the operators, it is necessary to reach only a small number of companies to encompass a large proportion of the employees. Less than 700 quarries employ as many as 25 men in the pit, and these 700 or less plants employ 80 per cent of all men that work at quarries in the United States. If 50 men inside the pit are considered necessary to entitle a plant to rank as a large quarry, then such plants number less than 200 and they employ nearly

60 per cent of the total quarry workers in the United States. These facts are referred to because the cooperation of the company as well as the employees must be obtained to make safety work effective. A relative small number of companies have it within their power to give a tremendous impetus to quarry safety work that will benefit 80 per cent or more of the entire industry.

The accident rates for the whole quarry industry are but slight indication of what individual companies can accomplish. For example, the industry's accident-severity rate for work inside the pits, as nearly as it can be computed from available records, was 8.202 in 1925 and 6.931 in 1924; the corresponding group rate for companies in the National Safety Competition was 7.599 in 1925 and 7.760 in 1926. Yet in the 1925 safety contest, seven quarries out of 102 and in the 1926 contest fourteen quarries out of 118 operated their plants the entire year without a lost-time accident. In 1925 sixty plants or 59 per cent of those enrolled had accident-severity rates of less than 1 and in 1926 67 plants or 57 per cent had rates of less than 1. Thus it is seen that the group average of 8.202 in 1925 and 6.931 in 1924 for the whole industry, and the National Safety Competition group averages of 7.60 and 7.76, respectively, in 1925 and 1926 are by no means the best that individual quarries can do in the elimination of accidents to their employees. In fact, the 1926 contest showed that 97 plants, or 82 per cent of the total number, had accident-severity rates that were better than the group average; 21 plants, or 18 per cent of the total number, had rates that were higher and therefore worse than the group average. This means that 18 per cent of the companies were mainly responsible for the group average being as high as it was. Had it not been for the many good companies, the rate would have been much higher. The record, in fact, showed that the companies whose rates were better than the average had a group rate among themselves of 2.314, while the rate for those whose record was worse than the average was 38.695; 2.314 for the good companies; 38.695 for the bad companies, an average of 7.760 for both combined. The bad companies had a rate that was more than 16 times that of the good companies.

Comparing Accident Experiences Is of Value

The purpose of these and similar statistics is to make it possible for individual quarries to compare their accomplishments in accident prevention with what has been done by other companies. Any individual company may be remarkably successful in the elimination of certain classes of accidents and equally unsuccessful in combatting other types. Neither the degree of success nor the degree of failure can be known without some standard of measurement. The National Safety Competition of 1926 has shown that while all of the quarries combined had a group rate of 7.760, yet 82 per cent of them had lower rates than that figure. The rates ranged from zero to more than 200. Rates for the individual companies have been published, but in such a way that the identity of each company is concealed. Each company has been advised of its own rate and of its relative standing among all companies. Copies of a circular containing these rates are available to any company upon request. Incidentally it may be stated that the circular also contains the rates of coal mines, metal mines, and non-metallic mineral mines. All of these rates have been calculated on a uniform basis and are therefore strictly comparable. The method of compilation is simple. Any company may easily prepare its own accident records in the same way. Those companies that see fit to do so will find that they are following a practice that has become standard not only in the mineral industry, but in other industries as well. Following such a prac-

tice, any company may readily learn how it ranks with other plants of the same type or with any other industrial unit.

It is hoped that the companies represented at this meeting may find it practicable to place their accident statistics on this standard and widely accepted basis. In the event that any company establishes a safety record better than those indicated in the National Safety Competition, the Bureau of Mines would appreciate it if the company making the record would inform the Bureau of the fact. The Bureau desires to learn of cases of this kind so that suitable public recognition may be given.

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Packers and Tanners Section

New Section Officers

Chairman, WILLIAM CAMPBELL, Graton and Knight Company, Worcester, Mass.
Vice-Chairman, O. C. STERN, Plankinton Packing Company, Milwaukee, Wis.
Secretary, EDWARD E. DREWS, Libby, McNeill and Libby, Chicago, Illinois.
Poster and Slide Committee Chairman, FRED SCHWARZE, Pfister and Vogel Leather Company, Milwaukee, Wis.
Membership Committee Chairman, WILLIAM C. COREY, Delaware Leather Company, Wilmington, Del.
Program Committee Chairman, F. A. HONNELL, Wilson and Company, Chicago, Ill.
Engineering Committee Chairman, S. R. JENSEN, Armour and Company, Chicago, Ill.
Statistics Committee Chairman, DEAN MONEYSMAKER, International Shoe Company, St. Louis, Mo.
Executive Committee, THE OFFICERS AND—
N. L. BRAINARD, Swift and Company, Chicago, Ill.
J. M. EATON, Libby, McNeill and Libby, Chicago, Ill.
W. F. MCCLELLAN, Armour and Company, Chicago, Ill.

Retiring Officers

Chairman, WILLIAM C. COREY, Delaware Leather Co., Wilmington, Del.; *Vice-Chairman*, WILLIAM CAMPBELL, Graton & Knight Co., Worcester, Mass.; *Secretary*, O. C. STERN, Plankinton Packing Co., Milwaukee, Wis. *Committee Chairmen*: *Membership*, FRED SCHWARZE, The Pfister & Vogel Leather Co., Milwaukee, Wis.; *Program*, OLIVER F. W. CROMWELL, Central Leather Co., Ridgeway, Pa.; *Publicity*, CHARLES BONCHOLT, Hammond Standish & Co., Detroit, Mich.; *Poster*, W. F. MCCLELLAN, Armour & Co., Chicago, Ill.; *Statistical*, DEAN MONEYSMAKER, International Shoe Co., St. Louis, Mo.; *Engineering Representative*, S. R. JENSEN, Armour & Co., Chicago, Ill.; *Executive Committee*, THE OFFICERS and N. L. BRAINARD, Swift & Co. Chicago, Ill.; J. M. EATON, Libby, McNeill & Libby, Chicago, Ill.; LLOYD F. ALLEN, The Rath Packing Co., Waterloo, Iowa.

Tuesday, September 27, 1927

W. C. COREY, Chairman

President, Delaware Leather Company, Wilmington, Del.

The first session of the Packers and Tanners Section of the National Safety Council was called to order at nine-thirty o'clock by Past-Chairman W. F. McClellan, Armour & Co., Chicago, Ill.

Secretary of Labor Davis said before the New York State Industrial Congress:

"Every six minutes, on every day of the year, there is a fatal accident of some kind in America. Every day in the year there are 63 deaths from industrial accidents. One hundred and five thousand persons annually are permanently partially disabled. Think of the economic loss to the nation, and the sacrifice of individual happiness. And most of these accidents, if not all of them, are unnecessary, or would be unnecessary, if we were as much concerned with human welfare as we are with our property and dollars. These accidents are the penalty of our carelessness, thoughtlessness and neglect."

To hear that makes us very much depressed in spirits.

Then we read the report gotten out by the National Safety Council, compiled from reports sent in by 11 of the tanneries—with employees averaging 5,748—and we find not a single death for the whole year of 1926.

We note that the average accident frequency is increased in 1926 by 4.6 and the severity is slightly decreased.

I believe it is the frequency rate you will have to match if you are going to ward off the hidden costs of accidents.

I am going to make my talk brief because I am to be followed on this program by a man who has made an enviable record in accident prevention—Mr. Fred Schwarze, of the Pfister & Vogel Leather Co., of Milwaukee.

No-Accident Campaigns and Contests

Mr. Schwarze's company had a five year experience which produced for them last year, when they began to insure their accidents, a rate of approximately 78 cents. The basic rate is \$1.61. Perhaps Mr. Schwarze will oblige us with a history of how he did it.

As we go casting about for plans to improve our "no-accident" records it seems but natural that the no-accident campaigns should receive a great deal of our attention. The men who have conducted those campaigns are still for them. Their results have been astonishing.

Nowadays everything to be successful must be a game. I don't like to believe that we are dealing with child minds, but if the game wins, game it must be!

Perhaps you may have said at times: "Why is it I never get hurt? I'm around the plant subjected to nearly as many hazards as the others."

Isn't it a fact that most of your employees are manual workers—they work with their hands—little thinking has to be done after they are experienced—and yours is a mental job. Your mind is nimble—you always think before you act—therefore you never get hurt. You see, I've just been sneaking up on you with this "mind" business.

In 1914 there was a business depression. President Wilson said "it was mostly psychological." And he was right. All panics are psychological and they spread like wildfire.

Accidents will be found to be mostly psychological if traced to their sources. You've heard men say when an accident happens: "Well, there'll be two or three more now." And they believe it—they expect it—and, of course, they get what they expect.

If you've got any pessimistic assistants working with you, get rid of them, get them something else to do. They're in the wrong job. Surround yourself only with optimists—those who expect only the best—and then watch your records improve.

I believe, if I were managing a plant, that's the first thing I'd do—get rid of

pessimists, or tell them to change their habits of thought. You know *right now* a half dozen people in your plant who are a detriment to the place because they don't *think* right.

Do you think a pessimist wrote your slogan: "Nothing takes the place of leather?" Not on your life—he was an optimist—every inch of him.

Perhaps some of the blame for accidents might be traced to the employment department—hiring and placing left-handed people on right-handed jobs. You know what I mean—not fitted for the job. Hiring and placing is surely a job for an expert.

I believe every man takes with him wherever he goes his mental atmosphere. I cannot find a better word. I'd like to say "aura," but that doesn't quite tell it.

I believe his mental atmosphere affects everybody with whom he comes in contact and if when he goes around the plant he feels "lower than a well-digger's assistant," he'd better stay away from the employes until he feels better.

Don't you suppose that a ~~man~~ ^{man} who goes around with spirit and plenty of optimism is going to influence a ~~lot~~ ^{lot} of people to be likewise? Surely he is. It's wonderfully contagious. No pessimist ever conducted a successful no-accident campaign.

You hear some fine things about Milwaukee once in a while—about its monster Foremen's Safety school. How does that school happen? It's because the town has a big quota of optimists and some of the best ones run that big school. Optimism is the biggest factor in cooperation.

Look at Lindbergh—the supreme optimist! Every ounce of his preparation was filled with the "I can and I will" spirit. He didn't think of the ocean below him. He kept thinking Paris, Paris, all the time. If he'd had a couple of gibbering pessimists with him you know what would have happened. They'd never have been heard from.

Now, gentlemen, I want to give you my tribute to "Safety Men." It is called "Who Are These Men?" I give it to you in all sincerity and with the hope that it may help to inspire you to greater achievements during the coming year?

Who Are These Men?

"The test of a man's worth to his community is the service he renders to it."—Roosevelt.

Before me lies a picture of the signing of the Declaration of Independence—just ordinary men doing what seemed to be their ordinary duty.

There is nothing in the picture to indicate the immediate jeopardy in which their acts placed them; nothing to show belief that theirs was a deathless deed or that foreshadowed the love and veneration in which they would be held by succeeding generations.

This picture brings to mind thousands of men whose duty today is to save the priceless gift for millions of their fellow-men—the precious gift of life.

I speak of Safety Men—men whose lives are consecrated to saving and protecting other men from the hazards of occupation—Safety Men, who, by word of mouth, by their writings, their public addresses, daily are inculcating in the minds of millions the desire to work safely, for their own benefit and for the welfare of those who work with them.

Bludgeons of discouragement and adverse circumstance have not caused these men to falter or to surrender their ideals. They have been inspired and sustained by a never-failing hope that ultimately success would be theirs. Economic values interest these men; but it is spiritual values that grip them.

They are the essence of cooperation—these men. Filled with that spirit, they erect great bulwarks against the ever-threatening tides of accident. They are the heralds of a new day, whose dawn will show a minimum waste of life and limb.

No monument is needed for these men—no marble shaft to pierce the blue of heaven. Greater is their living memorial; the millions of lives saved—the countless homes kept happy.

By their acts they give a new interpretation to civilization—a broader translation to human brotherhood.

Dedicated to the Safety Men of America.

CHAIRMAN McCLELLAN: We will now open the meeting for discussion. I will start it. I would like to ask to what you attribute the 4.61 per cent rise in frequency rate?

MR. SMITH: I just quoted that figure from this pamphlet of statistics issued by the National Safety Council. I imagine a good many of you have seen these statistics in regard to the annual number of industrial accidents.

CHAIRMAN McCLELLAN: Are there any other questions to ask Mr. Smith? Mr. Schwarze, you are a tannery man.

F. SCHWARZE (Pfister & Vogel Leather Co., Milwaukee, Wis.): Regarding the favorable experience of my company, the market rate and the credit given to our risks, I want to say that early in the safety movement, during 1911 when the workmen's compensation act went into effect, our company recognized the fact that we were dealing with labor of a rather low standard of intelligence and that mechanical safeguarding was the principal asset in lowering accidents. That factor, together with a continued administration of a safety policy by the management and subordinates, has been responsible for our favorable experience.

I might add that after one year of insurance under the experience rating plan of Wisconsin, we have been able to gain an additional 10 per cent reduction over the figures quoted by Mr. Smith.

CHAIRMAN McCLELLAN: The next speaker will be Mr. Dean Moneymaker, safety supervisor of the International Shoe Company, St. Louis.

Common Accidents in the Tanning Industry and Suggestions for Eliminating Them

**Dean Moneymaker, Safety Supervisor, International Shoe Company,
St. Louis, Mo.**

It is indeed an honor to be called upon to express our experience concerning injuries that have occurred in our tanneries, and which may help some one in preventing an accident to an employee. It would be a great deal easier for the writer to talk on accidents which occur in a shoe manufacturing plant; however, we ask that you bear with us in this discussion.

As the majority of you no doubt know there are several different classifications of tanneries. It has been my experience to deal only with tanneries manufacturing leather made from sheep skins and those manufacturing upper leather from cow hides. In a measure the general process is the same, though the time elapsing before the finished product emerges is considerably longer and goes through a great many more processes, in the case of the cow hide, than it does in the sheep skin. However, in both instances the machinery and processes are very similar.

In the tanning industry there is a great deal of heavy machinery in use, therefore necessitating a great many mechanical guards, many of these guards requiring exquisite engineering skill to develop.

Getting down to the task of pointing out the most common accidents which occur in this industry, it has been our experience that, as in all other classifications, there are only two, mechanical and non-mechanical. The former being accidents received by machine operators, and in most cases preventable.

One of the machines that has caused us much sorrow and several severe injuries has been the embossing or large hydraulic Sheridan presses, and it has been only after considerable work that we have been able to minimize this hazard to a minor degree. This machine is usually operated by two employees; one being called the feeder, who places the skin in the machine, the other the receiver, or the one who takes the skin from the machine, and each working on opposite sides of the machine. Usually it is the receiver who controls the machine, that is, tripping and causing the presses to come together. We at first tried a guard which worked on the up and down motion of the press, an iron pipe affair, so attached that when the machine was tripped it would push the operator away from the jaws far enough that their hands could not be caught in the press. This in a measure proved successful, though the possibilities of its being ineffective were too great.

A Simple Guard the Final Solution

We also tried a guard which was placed on the lower jaw of the press, and when the machine was tripped it would push the hands or arms out of the way. This proved too complicated, as it was too easy to get out of order.

The last and most effective, and the guard which we are now using on this machine, is nothing more than a strip of plate glass attached to the plates of the press, which does not obstruct the view, and is only far enough apart to slip the skin into the plates before they come together, and is not far enough apart to allow the fingers to come under the jaws of the machine. Since installing this guard we have not had a single accident on this machine, and are told by the workers that it would be impossible to get caught.

Another type of machine which has caused us considerable trouble has been the jacks. There are several types of these machines. Not being an expert in the tanning business, I cannot give you the names, but I am familiar enough with them to know that generally speaking they all operate in a very similar manner. That is, an arm moves backward and forward with a motion which is intended either to brush, knead or glaze the skin in process. The skin is usually rotated under this blade, brush or glazier on a table, of course, with instructions to the operator to keep the hands away from the point of operation. However, many times they get careless and, as the old saying goes, "play with fire," and get their hands caught under this knife or other machine part with the result, a badly lacerated or mangled hand.

We have in use at the present time a guard on the rolling jack which has proven somewhat effective, though not so effective as we would like. It is merely a skirt or curtain made of iron piping, which comes around the arm down to within a short distance from the table, so that if the operator, conscientiously or otherwise, gets his hand too close to the point of operation, he comes in contact with this guard, and, of course, is reminded of the danger, and in that way is constantly kept informed of the possibilities of being injured. We are still working to perfect a guard for these machines, though we have been told by many it was impossible to do so.

There are many more machines used by the tanneries, though our experience has been practically negative with most of the others.

The large drums in the drum room have given us some trouble, and about the only method of safeguarding we have found of any value is to have the space relative to the drums fenced off, either by movable gates or other easily manipulated protection that will keep employees away while the drums are in motion.

Most accidents in the tanneries, however, are due to falls on account of the very slippery condition of many of the floors, because of the necessity of their being wet a great part of the time. Of course, in the fleshing rooms and the vat rooms the floor is always wet, and practically all the employees wear rubber boots. The only method we have been able to devise for this condition is to keep the floors as well drained as possible, and in the aisles in some instances where trucks and other movements are required to have slightly raised platforms to travel about on. While this does not eliminate the slipping hazard entirely, it minimizes it by keeping floors as dry and well drained as possible.

Trucking By Hand Caused Many Strains

Up to a short while ago, practically all of our trucking had been done by hand. This caused a great many hernias and other strains, and only after considerable experiment with different kinds of trucks, both hand and power, it was found that practically all trucking could be done by power trucks. Therefore these electric haulers were installed, and since then, over a period of about two years, we have had only two or three reported hernias, where previously it might range as high as six or eight.

Another constant worry has been the more or less minor injuries which have developed from the tacking room by tacks flying into the employee's face and eyes, or because of the tacks falling to the floor and being stepped on, often causing quite serious infections. In our sheep skin tannery (and we see no reason why it could not be developed in all tanneries) we have a specially constructed arrangement for both the tacking boards and the manner of handling them. I do not know whether it is a new idea or not, but it has eliminated almost entirely our worry of injury to those in the tacking department. The following is about the construction:

Each board has fastened on the end and in the center a half inch or three-quarters inch iron pipe which extends about twelve inches from the board. When the board is ready for the tacking on of the skin it is placed on the track or runway, which is just a little wider than the board, and allows the board to be rotated or shoved by the two pieces of pipe resting on this track, the track, of course, being a little higher than half the width of the board. This allows handling without the necessity of lifting the weight of the board, and not only increases the output, but the physical effort is greatly reduced. To get away from the great number of tacks which are scattered about over the floor, below each truck and about the same width as the board there is a depression of about six inches, which is in the nature of a trough, and as tacks fall or are removed from the skin they fall into this trough, and are very easily gathered up, very few falling out onto the floor where they will be stepped on. The runways between these tracks are sufficiently wide for two operators to work back to back without being in each other's way.

We find also that a great many of our employees were prone to use either soft soled shoes or shoes with the soles practically worn out. This matter was given attention, and it has been found that now since the employees are

required to wear substantially soled shoes that there are very few accidents from stepping on these nails.

As to the tacks flying into the employee's face, we are requiring the employee to wear goggles and are furnishing them of a light, clear vision type, which eliminates the big majority of these accidents, though occasionally in the use of these goggles we do have an eye injury.

Regarding falls of persons other than those on slippery floors, falling objects, and so forth, about the only suggestion that we could make concerning this constant hazard is to see that the equipment is always kept in first class condition, that the plant floors, stairways, and so forth, are kept clear and free from objects, and always well lighted. We have had a considerable number of accidents due to falls of persons on stairways. Our feeling in eliminating this hazard has been that in 99 cases out of a 100 it is due not to a defect or lack of light, but is due to either running or horse play. This, as in all accidents, whether mechanical or non-mechanical, can be lessened only when the employee has acquired the safety sense; that is, acquired the habit of doing things in a safe manner and feeling their responsibility in the having or prevention of accidents.

We believe, and have successfully found that safety education is by far the greatest means of eliminating accidents in every respect. For a period of nearly a year now we have been editing monthly a very effective safety news sheet, which is nothing more than a six to ten page mimeographed booklet, giving records, statistics, articles, cartoons and other safety material, which is put up in a manner that is usually attractive to the foreman on the job. In our opinion safety work must develop and be impressed on the minds first of those in authority, such as foreman, assistant foreman, or overseer, with the constant check up of both mechanical and mental hazards which may be present, and as each problem develops it must be handled in a way that will suit the needs of that particular problem.

Mechanical and non-mechanical conditions can only reduce accidents where efficient guards are used and employees are properly trained to carry out instructions or mentally trained to sense a hazardous condition immediately and see that it is remedied.

Goggles to Avoid the Flying Tacks

CHAIRMAN McCLELLAN: The meeting is now open for discussion of this interesting paper.

H. F. WINTER (Griess Pflieger Tanning Co., Chicago): The point was brought up that to avoid tacks flying into the eyes, the workmen all wear goggles. Do these workmen wear the goggles during the entire time they are tacking or just when they are stripping?

MR. MONEYMAKER: Our experience is, that they will wear them only when they are stripping; that is, when they are knocking the tacks out. We have tried to get them to wear them all the time but we find it almost impossible, and consequently we have limited it to that period when they are knocking the tacks out of the skin, and we find that that practically takes care of it.

MR. WINTER: That has been our experience, too.

CHAIRMAN McCLELLAN: Do you use a machine called the fleshing machine in your operations?

MR. MONEYMAKER: Yes. We have it guarded and we have had very little, if any, trouble with it.

CHAIRMAN McCLELLAN: That is—where the rubber roller comes up against the top roll, you have a guard?

MR. MONEYMAKER: I say we have a guard. I don't know how to express it, but we depend more on the operator than on any guard. As to having a specific guard, we do not. We have tried out a number of little contraptions with which I am not thoroughly familiar, but they haven't been as successful as the man on the job.

CHAIRMAN McCLELLAN: In other words, you depend on the human element to operate it. You have no mechanical guard.

MR. MONEYMAKER: No. In our experience over a period of six or eight years I know of only one accident in our tanneries with that machine.

L. M. FORBES: (Editor of Hide and Leather, Chicago): On your bossing presses have you ever tried a tube-handled control on the releases? I raise that question because I wonder how the operator handles the skin, how he gets in there to handle it.

Problem on the Bossing Presses

MR. MONEYMAKER: The only method we have found of any benefit is merely a little paddle with which to reach in there and straighten it out from the other side—that is, the side from which it is taken.

MR. FORBES: The receiver releases the press?

MR. MONEYMAKER: He uses the paddle to straighten it out, then it is necessary to trip it off to straighten it out and then it is tripped again. It slows up the work but it is mighty costly if a person is hurt, and we would rather slow the work up.

CHAIRMAN McCLELLAN: We have two-handed controls on our presses.

MR. FORBES: I have seen it laid across with a stick and at the top there were two loops hanging down and if you took hold of only one loop it wouldn't release. You had to take hold of both in order to bring the plates together. I wonder if you have ever seen that or have tried it out?

MR. MONEYMAKER: No.

MR. FORBES: It seems to me to be quite an effective stunt except that occasionally the operator takes the two handles together in one hand and continues to operate with the other hand.

CHAIRMAN McCLELLAN: We have that contraption where the operator has to put up both hands to operate and we have found cases where he has tried the two together. We stopped it and have had no further trouble.

MR. FORBES: Would it be feasible on a glazing machine to work that plate glass principle and just run two pieces of plate glass above the bolster and parallel to it?

MR. MONEYMAKER: I can't say.

CHAIRMAN McCLELLAN: I would like to ask Mr. Schwarze to explain that guard which Mr. Moneymaker was speaking about.

MR. SCHWARZE: On the splitting machine Mr. Moneymaker referred to, there is a strip of metal which can be made of galvanized iron, copper or brass. It is attached to the head of the machine proper and an adjustment must be made to keep the guard strip down at a determined level. The minimum opening should be maintained between the feeding plate and the bottom of the guard strip. It affords this protection: A man feeding in there would have something to catch on to if his hand should slip. In addition, the guard has an edge turned over a rod to stiffen it and that little protection permits a finger hold.

In splitting bull hides, which are extra heavy—stock probably $\frac{5}{8}$ of an inch thick—we provide a gate guard that lays on top of the machine which simply drops down and supplements the guard behind it. You feed through it and the guard rail lays between the thumb and index finger.

CHAIRMAN McCLELLAN: He also spoke about a glazing jack.

MR. SCHWARZE: I don't know. I had in mind to ask Mr. Forbes about protection on glazing jacks. The working plane of the crank iron is right in the plane where you would have to put your plate glass.

The matter of illuminating a glazing jack is not very difficult. We tried 20 years ago to light them up but it wasn't successful. When the Mazda lamps came along we thought our difficulties were multiplied, but they were lessened. We put them on a glazing jack operating at 160 revolutions per minute and kept the jack well lighted.

In front of me is a bulletin on a guard for a glazing jack. It is a wooden strip member construction in which the jack or the agate moves back and forth. To get the light right on the leather strip we paint the inside of that gird with aluminum paint and supplement it with a half shade and get good results.

In regard to the slipping hazard which Mr. Moneymaker mentioned, I might add that only recently we have tried out putting in a granulated mixture in our cement and it is working out satisfactorily. Previously we had been furnishing our men with rubber boots equipped with leather soles and heels.

CHAIRMAN McCLELLAN: Our next topic is by Mr. Fred Schwarze, manager of the Labor Department of Pfister & Vogel Leather Company, Milwaukee, and also past chairman of this section.

Safety's Influence on Production in the Packing and Tanning Industries

Fred Schwarze, Manager, Labor Department, Pfister & Vogel Leather Company, Milwaukee, Wis.

In trying to meet the requirements of my subject I find that while our processes are very similar in a good many respects as regarding the handling of a hide after it is taken from the animal, it is equally true that they differ as widely, and this paper will therefore necessarily be confined to generalities, with the reservation that specific matters be taken care of in the discussion which may follow. As an example, I might state that live stock is an unknown quantity in the tanning industry, whereas it is a major item in the packing industry. I have never known of the presence of a "hog" in the tannery unless it be in the form of a "ham sandwich."

In presenting this paper the speaker desires to assure any reader that it can be accepted as a fact that the influence of safety on production in the packing and tanning industries is fundamentally no different than its influence in any other industry or field of endeavor, inasmuch as the principal of safety practice is basic from an economic standpoint. This statement is made with due regard for the humanitarian element which enters with the application of safety measures in any form.

While it is recognized that the packing and tanning industries have inherent conditions peculiar to the nature of these industries, yet in a major sense our problems are no different than those of any other industry inasmuch as both cause and effect will yield to efficient counter efforts, i.e., "Most problems can be solved."

In using the word "Safety" in the title of this topic it is accepted as meaning that preventive methods to conserve human life and limb are being applied, together with the necessary humanitarian interest and sincerity, and are coupled with the highest possible efficiency.

In sensing the meaning of the word "Production" it is accepted that it is to cover the complex procedure which starts with the entering of raw materials used in process and concluded with the final dispatch of the finished product to the market for the use of the ultimate purchaser or consumer.

The definition of the word "Production" is without doubt acceptable, whereas the intent and possible attainment of "Safety" efficiency in any plant is not

only subject to improvement but in a good many cases the represented standard of safety may be questioned. In the face of questions a good many explanations may be justly stated in the defense of apparent hazards.

In establishing the proper standards which control the application of labor to production, due consideration must be allowed for every facility in the physical and mental make-up of a plant, and which are necessary to carry on production in a safe and healthy manner. These factors are without doubt recognized by competent industrial engineers who may be responsible for production standards.

The conservation of health is recognized as essential, as is the necessity for safety against injury, and likewise the element of fatigue must not be overlooked.

Nevertheless, in the face of every possible effort there continue to remain in our industries hazards which to date have not yielded to the sincere endeavor of plant management to eliminate them—it being generally agreed that they are only being carried along with the expectation that the future will offer relief; and when one reviews the progress made in the safeguarding of equipment during the past 15 years he will find that numerous simple safeguards explain the elimination of hazards which for a long time appeared to be insurmountable, and it is only reasonable to expect that hazards which are permitted to exist today will yield to similar development tomorrow. Fortunately those hazards represent a minority in our industries and their seriousness is generally appreciated.

The types of hazard just mentioned are termed by the writer so-called "justifiable" hazards, and will only be tolerated when their necessity qualifies protection in the absence of a proper remedy. To guard against accidents in the face of such hazards it is essential that only the best type of labor be adapted to perform any necessary duty in connection therewith, and proper placement of employees is the best accepted protection.

The So-Called "Justifiable Hazards"

Justifiable hazards are maintained in some industries and other fields of endeavor. To eliminate such hazards without substituting an equally efficient method would, in a good many instances, hamper the process or procedure to such an extent that full efficiency would mean an aggravation of some economic factor and would possibly lead to a far greater element of distress than if the original hazard had been permitted to continue.

I quote a statement of Rear Admiral Simms, retired, U. S. Navy, in a speech delivered before the National Safety Congress at Cleveland, Ohio, wherein he stated that in connection with increasing the efficiency of U. S. Navy gun crews several hundred per cent. the hazards were also increased, thereby involving an annual loss of life which was in excess of previous experience; however, a sacrificing of efficiency in U. S. Naval gunnery would mean the lowering of the defense ability of our nation, and everyone will readily agree that maintaining efficiency, as Rear Admiral Simms quoted, was the most conservative procedure in the end.

Similar exposure in connection with police duties and the combating of conflagrations, coast guard rescue work and other similar pursuits offer an element of exposure to hazards, and it is readily seen that if these efficient institutions be set aside to avoid the hazards to which the personnel are subjected, then the result would be distressingly bad.

While the examples cited are probably more pronounced than hazards existing in industry, yet the relationship is very close, inasmuch as the men following all of these pursuits are doing so to gain a livelihood for their families and

themselves, and it is also evident that every endeavor is made to gain for the wage earner the protection to which he is entitled.

In spite of conservative allowance by management to permit a fair and safe labor policy, and a fair day's pay for a fair day's work, there will always be manifest the desire of workers to earn the highest possible wage and at a probable sacrifice of safety. The latter tendency is contingent on the wage plan in effect in a plant and is least present among the so-called day workers, and increases with the application of piece work and wage incentive plans. I refer to the chance-taker, who seems more desirous of increasing his pay check than his span of life.

The management of a plant may furnish the finest of buildings, the best of raw materials and equipment, supplementing them with a personnel qualified to produce the finished product. The management may further establish a safety policy incorporating the highest ideals. However, such good intention and policy will not administer themselves. Safety must be subscribed to by all employees of a plant, and must be maintained by the management and supervisory staff so that its standards as prescribed will not be allowed to depreciate and become an established but not a maintained institution. This is a responsibility which rests principally with the foremen.

The supervisory staff (inclusive of foremen) directly responsible for the men in any plant are the men who can best effect a favorable influence on production by reflecting efficient and safe supervision into the ranks of their workers and also insisting on an equally safe and efficient reaction; it being an accepted fact that such practice sponsors reaction down the line to the humblest worker.

Numerous measures to instill an interest in safety have been advocated, such as individual campaigns, competitive campaigns between departments, shops or other divisions; however, the final results of a good many of such campaigns may be questioned. However, any medium of education which will make a safe thinker of a worker will automatically make a better producer of him.

To eliminate a hazard before an accident occurs is without doubt the safest practice, and not to permit a hazard to continue after an accident has happened is probably the next best. Prompt investigation of every accident will in almost all instances reveal the true cause or consequent hazard.

A safely managed plant may not always be an efficient plant and vice versa. This statement is qualified by the fact that where former primitive craftsman methods have yielded to modern mechanical speed production methods, additional hazards have accompanied increased production efficiency, and likewise in a good many instances increased production methods have reduced the hazards. The latter condition being especially true in the metal industry with the introduction of automatic feed machinery replacing hand feed methods.

Exceptions can always be cited and will have to be dealt with on their merits; however, I believe that when we say, "production efficiency and safety go hand in hand," and that "without safety you cannot operate efficiently," these statements can be maintained.

Let us review the past 15 years of progress in both the safe and efficient development of our industries, and I believe that we will recognize that to go back to the former standards of safety and production would be out of the question.

Also a comparison of our industries with other diversified industries will indicate that we have developed many new ideas and products for the need of mankind, and that our institutions compare with the best as safe and sanitary places of employment and production.

ADJOURNMENT

Wednesday, September 28, 1927

The second session was called to order at nine-forty o'clock by Past Chairman W. F. McClellan.

CHAIRMAN MCCLELLAN: The first order of business this morning is the election of officers. Mr. Schwarze, have you the slate?

Report of the Nominating Committee

Chairman, William Campbell, Graton and Knight Company, Worcester, Mass.

Vice-Chairman, O. C. Stern, Plankinton Packing Company, Milwaukee, Wis.

Secretary, Edward E. Drews, Libby, McNeill and Libby, Chicago, Ill.

Poster and Slide Committee Chairman, Fred Schwartz, Pfister and Vogel Leather Company, Milwaukee, Wis.

Membership Committee Chairman, William C. Corey, Delaware Leather Company, Wilmington, Del.

Publicity Committee Chairman, Charles Boncholt, Hammond Standish and Company, Detroit, Mich.

Program Committee Chairman, F. A. Honnell, Wilson and Company, Chicago, Ill.

Engineering Committee Chairman, S. R. Jensen, Armour and Company, Chicago, Ill.

Statistics Committee Chairman, Dean Moneymaker, International Shoe Company, St. Louis, Mo.

News-Letter Editor, Lloyd F. Allen, The Rath Packing Company, Waterloo, Iowa.

Executive Committee, The Officers and—

N. L. Brainard, Swift and Company, Chicago, Ill.

J. M. Eaton, Libby, McNeill and Libby, Chicago, Ill.

W. F. McClellan, Armour and Company, Chicago, Ill.

CHAIRMAN MCCLELLAN: You have heard the report. What are your recommendations?

S. R. JENSEN (Armour & Co., Chicago): I move the slate be adopted as read. (The motion was seconded and carried.)

CHAIRMAN MCCLELLAN: Mr. Campbell, as you have been elected chairman, I will ask you to step up here and conduct the meeting.

I might say that Mr. Campbell has well earned the honor of being elected chairman. He has been a faithful attendant at all Safety Council meetings for a number of years.

(CHAIRMAN-ELECT CAMPBELL assumed the chair.)

CHAIRMAN CAMPBELL: The first subject on the program is "Keeping the Safety Committees Interested," by Mr. Louis Barr, Safety Inspector of Armour & Company, Kansas City, Mo.

MR. MCCLELLAN: Mr. Chairman, I think we will have to call on the next speaker. I understand Mr. Barr was in an automobile accident last week. A copy of his paper was forwarded to Mr. Corey and Mr. Corey hasn't shown up. Mr. Owen is trying to see if he can get a copy of it.

CHAIRMAN CAMPBELL: The next paper is by Mr. J. M. Sandel, Chicago, Ill.

Rehabilitation—An Important Factor In Accident Prevention Work

John M. Sandel, Chicago, Ill.

Many people think of rehabilitation work as supplementary to other phases or activities that are a part of the safety engineers work, but as a matter of fact, rehabilitation of the injured worker is the thing that no one should ever overlook. When you have secured the cooperation of the employees of the plant in wearing goggles, devising guards, and recommending and practicing safe methods of doing each individual job, certainly you do not want to leave to others the sole responsibility of preparing that man who is injured for gainful work again. When you take a hand in it yourself and see the possibilities that are inexhaustible for so much good to be accomplished, never again will you care to be satisfied with compliance with legal requirements alone. You are going to do all you can, and persuade your companies to "go a little further" than they "have to."

The first aim of the safety engineer is to prevent accidents. In my younger days, I remarked to the chief surgeon of one of the companies I was associated with that I was going to do my work in such a way that all the physicians would be back in private practice and be glad to be there. Our ideal is 100 per cent safety in the plant; some of us achieve it for short periods, but we still have the accidents. As soon as the accident occurs and the injured needs medical attention, the work of rehabilitation must start. It must start not only in the case of the serious accident, but the trivial accident as well.

The first step in rehabilitation work occurs when the injured man comes for the first medical or surgical treatment after the injury. A nurse or doctor should look the patient over very carefully, particularly to ascertain if there is any impairment of the function of any member of the body. A good rule is to have the patient move the injured member in all directions and execute all of the movements possible. Then you will know if there has been any injury to the tendon or to the nerves, two things which will prolong disability and which can be quickly and effectively attended to at the time of the first treatment. If any injury to or a severance of either a nerve or a tendon is discovered, a good surgeon should be secured at once.

I am going to mention many things that can be done for men who are disabled, but I want to say at this point that the most valuable thing that can be done at any time is the work that a high grade surgeon can accomplish. Prompt and effective work of a skilled man on the operating table will do more than massages, light, artificial appliances or education for anyone who has been disabled in any kind of an accident and, what is very important, surgery will accomplish all of this sooner than other methods. Any experienced industrial physician will tell you this and will be able to give you more typical examples of good results that I am going to cite. Here are a few cases that have come to my attention.

The walls of a building had been completed and the next thing was to place the roof trusses. The work had to be done with block and tackle because of structural conditions and the trusses could not be hoisted directly over the point where they were to be set. Timbers were erected to support a 15-inch I-beam which would take the trusses when they were hoisted to the required height, the idea being to transfer the load (truss) to a traveler on the bottom web of the beam after it was hoisted. The transfer was made, but some of the braces supporting the I-beam failed, and the left leg of the bricklayer foreman was pinned between the I-beam and some structural steel. When the man was picked up, any one could have taken a pair of shears and cut the lower part of the leg off as easily as any cloth could have been

cut. But instead, the whole man was taken to a hospital and operated upon that night. The bone had to be shortened a little in order to enable it to knit as the ends were badly splintered by the crushing action. But that foreman is on the job today, walking with a slight limp and a thick soled shoe, but he is every bit as good as before his injury, both as regards his earning power and his ability to serve his employer efficiently.

Here is a more wonderful case that is not yet completed, but has all the earmarks of going to be a 100 per cent success. A nurse was administering first aid when she pricked her finger on a needle. She gave it prompt treatment, but an infection set in which finally resulted in the loss of use of the entire hand. It was her right hand, and she could not have obtained other work as she was right handed. She was awarded compensation for the loss of use of her hand and the compensation board in the state was of the opinion that nothing further could be done for her. It would not allow any additional treatments. Her employer, who operates in a number of states, brought her to this city and had an operation performed. The surgeon found that the tendons and the nerves had sloughed, and he had a most difficult job ahead of him. Working with the smallest instruments, the surgeon finally secured ends of tendons that were of some use and still able to function, and transplanted tendons from the foot to the hand. The present result is partial use of the hand, with assurance of complete use in another few months with constant exercise that it should receive. Such a case is an inspiration to all safety engineers and physicians who must deal with injured employees.

Transplantation of the Nerve is Even Possible

Not only is tendon transplantation possible, but nerve transplantation is possible. If a nerve has become sloughed, it is possible to attach a transplanted nerve to another nerve outside the affected zone so that a nerve will serve a double purpose. In other words, where two nerves supplied by nature have lost their function and they lie close together, it is possible to make one transplanted nerve do the work formerly done by two.

When the surgeon has not been called in, the work of rehabilitation is long and difficult. All present from the packing industry need not be told of the men who have severed tendons and nerves in their occupations, and as a consequence have experienced impairment of function of the injured member and their entire earning power. Many a man in a packing plant has been severely cut with a knife and has lost the use of fingers and hands. Most of these men have had their disabilities so long that they cannot be helped by surgery even now. But there are enough examples of what can be done for similar disabling accidents that our present workmen need not go through life in the same way as the old timers, and need not be handicapped.

Some of the states and the national government have made some provision for the rehabilitation of men who have met with disabling injuries in industry and in war: I cannot say how many have or what states have done so. I know of the work of the Bureau of Rehabilitation of the Department of Labor and Industry of the Commonwealth of Pennsylvania, which was established by an act of legislature during the session of 1919. By this time, the Bureau has handled several thousand cases and has done very good work, and has been able to secure the cooperation of several organizations within the state as well as employers.

The Pennsylvania act is weak in that the appropriations are insufficient to permit high grade surgical work to be performed. Considering the volume of work before the bureau and the subjects that require their services, high grade surgical work would require nearly triple the amount of money now appropriated. To secure this would be almost an impossible task—but, have you had any experience with legislators?

The Pennsylvania rehabilitation act limits the application of the act to a physically

handicapped person resident of the state of Pennsylvania whose earning power is destroyed by an industrial accident occurring in that state. The Bureau of Rehabilitation is notified by the Bureau of Workmen's Compensation or by the Workmen's Compensation Board, all in the Department of Labor and Industry, whenever any person is a subject for rehabilitation, when the bureau investigates the case and takes whatever steps they can considering everything. If a man has suffered a dismemberment and artificial appliances are needed, they are provided by the state if the man cannot pay for them. Where a man can pay a part of the cost of the appliances, this is required. When a man requires an education to secure a new occupation, the act permits the bureau to pay not more than \$15 per week for 20 weeks.

Some Early Accomplishments of the Pennsylvania Bureau

Through the efforts of the bureau, the work of rehabilitation of the physically handicapped is carried on by means of vocational and trade schools and by the assistance of the Bureau of Employment of the Department of Labor and Industry in finding a new occupation for the man. In this way, some persons receive an education who otherwise wouldn't, which has its influence on the members of the injured man's family. The resources of the public school system, any vocational school, associations such as the Y. M. C. A., are utilized as much as possible. Whenever employers operate a school or will train a man in a new occupation, such available facilities are never passed by. Schools of this kind are a very valuable aid to those registered, as practically all have been injured in industry, and those schools simplify the problem in towns which have only the one industry.

Some of the early accomplishments of the Pennsylvania Bureau of Rehabilitation are the following:

- Truck driver lost leg; was trained in telegraphy.
- Hands lost operating a machine; received a business training.
- Laborer lost an arm; was taught to operate a machine after being supplied with an artificial appliance and earns more money than before the accident.
- Foreign speaking laborer lost leg; was educated and given employment as interviewer in employment department handling men of his nationality.
- Agricultural laborer lost a leg; was taught to wind armatures.
- Coal miner loses a leg; becomes an auto mechanic.
- Maintenance machinist lost hand; trained as a calculating machine operator.
- Eyes lost; trained as a stenographer using a phonograph dictating machine and touch system typewriting, or as a piano tuner.
- Brakeman loses leg; becomes a locomotive engineer on a narrow gauge locomotive.
- Laborer loses leg; becomes a bench assembler in an adding machine manufacturing plant.
- Girl operator of a punch press loses several fingers; trained in clerical work.
- Laborer lost arm at shoulder; received lump sum settlement of compensation award and established a small store to support dependents and studies telegraphy and wireless operation evenings.
- Horseshoe blacksmith loses an arm and is returned to his former occupation with the aid of an artificial appliance.

All of this work is to be highly commended; the disabled men are far better off than without the training and other assistance given, but each case represents months of effort of various kinds to get the subject gainfully employed. Expert surgery will nearly always return the disabled to their former occupations within a much shorter time, and the amount the restored are handicapped in their earning power is very little. The man who must work with his hands and who has no executive ability needs all that can be done for him or he is at a disadvantage in competing for a job in the open market. When industry refits a man for his own or another

occupation after a disabling injury, the gain in loyalty and good will cannot be evaluated. So, wherever possible, get the surgeon on the job quickly, and if this is not done, look over your plant to see if there is not some place where the man can be placed, and then train the man for the place. This is not socialism or any other ism; it is good business.

I can find no better way of summarizing this whole question of accident prevention and rehabilitation than the expression of one of the best known industrial physicians of this city, which was made some years back and which is good yet. That is—

1. Hand in hand with all efforts in rehabilitation must be a greater effort in conservation; we must prevent increasing industrial casualties.
2. Medical and surgical procedures must be directed toward the maximum functional restoration as rapidly as possible so as to be useful in the future.
3. Hospitals for rehabilitation work only are needed so that convalescence will be most favorable, and because it is better to have occupational therapy, physical therapy, games, training and study under surroundings that are pleasant and harmonious, and away from the usual situations at medical and surgical hospitals.
4. Handicapped persons must be placed on the basis that physical qualifications plus occupational qualifications equals the job.
5. Medical supervision and vocational supervision are needed to make a good job of this work.

The State Stands Expense of Rehabilitation

CHAIRMAN CAMPBELL: Are there any questions to ask Mr. Sandel? I am sure he will be glad to answer them.

MR. McCLELLAN: Under your rehabilitation plan, do the employers of that state—presume it is Pennsylvania you are talking about—contribute to a fund to train the injured or do the employer themselves train them?

MR. SANDEL: Many employers do not contribute. The state stands the entire expense. The first appropriation at the time the Bureau of Rehabilitation was established was \$100,000 for two years. I can't say what additional appropriations have been made. Of course, additional ones were necessary for \$100,000 would never have carried on the work since 1919.

Of course, where the industries cooperate with the Bureau there is some expense to the industry, and often the industry is glad to share it. I think every one of you, if you were speaking for your own company as I speak for a number of others, would say that the company would be glad to do all it could for the man, and where it can get the assistance of the state which has specialists in the work to give the man suggestions, I think the industry would be glad to pay what small cost is necessary in order to do what it can for the employee.

MR. McCLELLAN: Is that carried on by the Bureau?

MR. SANDEL: It is carried on under the supervision of the labor and industry department.

MR. F. SCHWARZE (Pfister & Vogel Leather Co., Milwaukee): I would like to ask Mr. Sandel what his experience indicates is the attitude of the unfortunate employee who has been injured. Do you find generally that these men are cooperative and sincere in their endeavor to get back to some employment, or do you find that they feel the world owes them a living?

MR. SANDEL: Of course there are all kinds of people in the world, Mr. Schwarze, but I would say in the majority of cases, the adjusters of the Bureau of Rehabilitation in the Department of Labor and Industry have been able (not right at the start, but after talking to the man a while), to convince him of the advantage of taking some training, where it is needed to fit him for another job. Their hardest

work, of course, is in the mining towns and in industries like the chemical industry, where there is only one industry in the town and the man and his family have lived in that one place all their lives; and he doesn't want to go elsewhere. It is a hard task to find something for him to do, for he is not fitted to continue his old job. But in the larger centers of population there isn't a lot of difficulty and the adjusters of the Bureau have been able to get the injured man in a good frame of mind and willing to cooperate with them.

CHAIRMAN CAMPBELL: Are there any more questions?

Unfortunately, Mr. Corey couldn't be here today. We have a Round Table listed on the program next. I have a paper which I was going to read, and if Mr. McClellan will be so kind I will ask him to read it.

The Qualifications of a Safety Engineer

William Campbell, Safety Inspector, Grafton & Knight Manufacturing Company, Worcester, Mass.

Many of you gentlemen hold positions which in addition to your safety duties require you to employ the men of your shop. For that reason you should analyze yourself, as well as the applicant you interview. I am, therefore, listing the qualifications which I consider essential in a successful safety engineer.

1. *Knowledge of safe practice.* Of course, a general knowledge of what constitutes a safe machine or a safe condition is essential, but with all the diversified industries, it is impossible for any one man to be sufficiently acquainted with all the manufacturing processes to immediately pass on the safety of them. However, there are certain basic principles in safety engineering, the same as in other engineering, and if he knows these basic principles he can shortly get the details of the business.

2. *Knowledge of human nature.* Human nature being so different, every person cannot be handled the same. One man may be driven, another may be led, and still another will follow an order by simply being told. Therefore, to get men to play safe a successful safety engineer must know which method is most effective. Whether it is better to appeal to a man's reason, or to threaten him with discharge, or to picture misery and suffering in order to get him to follow safe practices, the safety engineer should be able to decide. In this he must use what is commonly known as tact, for the wrong approach will often lose a man to the safety cause. The safety engineer must have the right approach, just as much as the salesman.

3. *Personal characteristics* of a safety engineer. He must also be sympathetic. It is sometimes unpleasant to have to listen to the troubles of a workman when you have plenty of your own, but it is often worth a lot in future safety dividends.

The successful engineer must have a likeable personality and a quality of leadership, for men will follow those in whom they believe and trust, and a pleasant personality combined with a sensible mind will make for this leadership.

He must not be afraid of getting his hands dirty. Many a would-be safety engineer has been a failure because he felt his position to be very important instead of letting others feel its importance. It has been said that you can't teach safety from behind a desk, and I know of no truer maxim. The office of a safety engineer should be the whole shop, and he should spend most of his time in this office. Neither can you teach safety by writing letters. Personal salesmanship is the most successful method.

4. *The right mind* for a safety engineer. Three of the attributes necessary to successful safety engineering are judgment, initiative and vision. To these I would also add a fourth—an analytical mind.

The question of judgment often enters into safety work especially in mechanical

safeguarding for many suggestions put up to the safety engineer are foolish from a mechanical standpoint, and the safety engineer must be able to recognize the good points and cull out the bad ones. At the same time in discarding the bad or impracticable suggestions the question of tact must enter in, and the suggestor left feeling right, and not sore.

Initiative is a very important quality in any job, but in safety work it is all important for many of the old ideas in educational safety work are "done to death" and the successful safety engineer is the one who thinks up some new way of teaching safety, and puts it across.

One of the most important qualifications for a good safety engineer is to be able to get things done. I have seen more embryo safety boosters lost to the cause by the fact that their suggestions for safety were not promptly carried out than for any other reason. This is partly a management proposition, but the safety engineer should fight for the carrying out of good ideas and not let them die an early death or lose a good booster by not carrying them out promptly. If the idea is not good let the suggestor see why, but don't simply put it aside to be forgotten, for the author will not forget.

Finally, the safety engineer must have an analytical mind and be able to take the accident reports and diagnose the plant's trouble from this report, and act on the results. In fact on starting safety engineering that should be his first task. The analysis of these accidents, together with a close inspection of the plant, should at least do away with the accidents due to lack of mechanical safeguards, provided, of course, action follows by furnishing these safeguards.

The Returned Employee May Expect Preference

CHAIRMAN CAMPBELL: The meeting is open for round table discussion.

R. A. FAUST (Fred Rueping Leather Co., Fond du Lac, Wis.): Mr. Schwarze's question as to how the employee acts, whether he feels the world owes him a living or not, is interesting. How does the company treat the employee who has come back feeling that preference should be shown him?

MR. SCHWARZE: First of all, there is no choice as far as we are concerned, for the Workmen's Compensation Law of Wisconsin prescribes what our obligation is. We have to meet that obligation. Fundamentally, when we meet the obligation of the law we have met everything. But there is a moral obligation. After you have contributed to a man's hard luck in the way of compensation payments, partial or permanent disability benefits and other incidentals, they can be materially helped, as Mr. Sandel has suggested in his paper, and it is good business. It has a very beneficial reaction in building up the morale of the plant, and, as he says, it isn't an "ism," although a good many "isms" look at what the employer is doing. If the plant doesn't do just what the "ism" thinks it ought to do, you have the negative reaction of the plant. Generally under those conditions the "isms" know just what ought to be done. They are very cooperative regarding their "ism" but they are not as cooperative generally in establishing the preventive measures which will prevent the condition.

We felt under the old civil law liability, prior to the instituting of the compensation act of Wisconsin, that there was more of a moral obligation on a man-to-man basis and in a good many instances the employers of Wisconsin and other states gave the injured man a life job. Possibly you refer to the reaction that the man feels the boss owes him a life-time job.

We bumped into that question very severely and found that we had to differentiate as to what the employer's and the employee's obligation was. We take care of a man whenever possible and continue to take care of him so long as he shows loyalty, but we can't have a streak of red in the organization because there has been a

streak of hard luck. If you take an inefficient man and couple him up to some minor job when he has no loyalty, you contribute to that condition in a material way. We have held that loyalty among veterans and disability employees is a first requisite. Efficiency is purely secondary.

MR. McCLELLAN: I would like to ask some of the members what their experience has been in "No Accident" campaigns. For instance, in our plant we have carried on semi-annual and annual campaigns when we gave prizes of hams as an inducement to the employees to work toward "no accidents." They wore safety buttons continuously during the campaign and they didn't know who the winners were until the campaign was over.

I would like to know what some of the others do to stimulate safety in their plant.

I am familiar with the safety policy of Swift & Company, but I thought perhaps some of the leather companies might have some ideas which they could offer to the packers as to how they carry on this educational work.

CHAIRMAN CAMPBELL: In Worcester we have meetings which run for eight weeks. We try to get all the foremen to come to those meetings and it is quite a job. The management gives them tickets for a banquet on the last night if they continue to go to the meetings. This year we are going to give them all banquet tickets to see if we can get them all to go. I don't think you can do anything with safety committees if you don't have the foreman behind it. The foreman is the key-stone. If he wants to buck it, you might as well not have a safety engineer. They have to work together.

Safety Must Be Made a Real Part of the Job

MR. McCLELLAN: I realize that. The foreman is the key man. What I want to know is, what you do to educate your foremen in the plant. You have to help the foremen to educate the men. That is what I want to know—just what do you do to stimulate interest among the foremen?

R. A. FAUST (Fred Rueping Leather Co., Fond du Lac, Wis.): I still bear out Mr. Campbell's remark. We have a foremen's club which meets once a month to discuss the best methods of instructing the men. That is our system. We broadcast to the men direct.

MR. McCLELLAN: I know that. We have foremen's meetings, too, and we have a club which is composed of foremen and superintendents. But do you really think that your foremen get the message at these meetings and go back and present it in such a way that it will filter through the minds of the other employees? The foremen are too interested in production.

MR. SANDEL: Some years ago, when I was with the National Safety Council, I was asked to help one plant which had a sick safety organization. In this particular case I found that one of the reasons for the lethargy was that the superintendents and overseers of the company did not insist that the foreman make safety a part of their job. Safety to the foremen was just something incidental. The company thought the idea was good and were carrying insurance, but they thought they weren't saving as much money as they should.

One of the suggestions I made to the company was that they charge the cost of the accidents which occurred in the different departments to each particular department just as they did other costs.

They held one meeting at which the foremen were told that the safety movement was going to take a new lease on life in the plant. I believe from their attitude that most of them thought it was going to be the same old stuff because they were all just about half asleep. The superintendent said that they were going to do something now; then the vice-president got up and said, "From the first of next month all accident costs are going to be charged to you fellows right here. If an

accident occurs in your department you are going to bear the cost of it. It is not going to be charged up to overhead." You should have seen the men wake up.

NURSE (American Seating Company, Grand Rapids, Mich.): We have a cabinet and a senate and a house of representatives. I am a member of the house of representatives which is made up of the rank and file. We have one, two or three representatives from each department—men who are laborers in the department. Along with various other things that come up in the house meeting, the question of safety is pushed very, very far.

For instance, last month I gave each representative his own report of days lost due to sickness and accident. He made his own report and carried it back to his foreman and it was posted in his department.

We do various things like that. We alternate and try to have a different report each month. We have the chairman of the safety committee of the house and senate make an inspection every month.

MR. McCLELLAN: I know something of your plant and about the work you carry on in the doctor's office. Your plan is somewhat similar to ours. We have the same thing only we don't call it the house and senate.

The Physical Examination Required

NURSE (American Seating Co., Grand Rapids, Mich.): We do one other thing. No man is employed until he has had a physical examination, and, of course, that comes in the first aid work. After the man is examined and is ready to leave the first aid, we tell him what the safety movement in our plant means and that the men in his department will not welcome him unless he cooperates with them in keeping a clean safety record. It means a lot to the new man. He may smile at first, but we encourage him to come into the first aid with little things from an ordinary cut to an accident. Sometimes when he comes in with a small cut or a sliver or some minor thing we often bring them up before the crowd and say, "Here is an example of what we are trying to do. He pays attention to these things because he has learned their value, and that is what we want you to do."

MR. SCHWARZE: I am very much interested in finding out how some of the members educate their foremen who do not speak the English language. We have represented in our organization approximately 20 nationalities and the number of languages necessary to converse with those nationalities would probably approximate 12. I believe the larger packing houses in Chicago are confronted with the same thing. I would like to know how you put your campaign across.

MR. McCLELLAN: I think I can answer that question this way. In the packing industry, especially in our plant, where we have around 10,000 employed, we have almost any nationality you could ask for. For instance, we seem to be getting many Mexicans. In one department we have quite a number of Mexicans. We have a foreman there who can speak and read Spanish. Some ten years ago we did away with all foreign language signs. In other words, we compel everybody to read and write and speak the English language. We print all signs and bulletins as well as the plant newspaper in English only.

CHAIRMAN CAMPBELL: We have had the cooperation of the public schools in that matter. During each noon period, from a quarter past twelve to one o'clock, they send four or five teachers to our plant. We have mostly Italians, and it is surprising to see the headway they make in a year. Most of the teachers are women, who come equipped with a blackboard, and it is astonishing to see how those foreigners pick up English. The city of Worcester supplies the teachers and if the men are willing to devote their time they can learn the English language.

MR. McCLELLAN: We tried out the same thing. We conducted a school after working hours, only we didn't carry it under the term of education, but under the

"Americanization plan." In other words, we taught them a little history—the first president, etc.—and certain current topics, and helped them to write their papers and in that way helped them with English. Of course nearly all of our plant is Americanized now and that school has been discontinued.

MR. SANDEL: Years ago the Union Carbide Company at Niagara Falls used to take the National Safety Council posters and paste them on cardboard. They would then gather the men who spoke a foreign language into one group. One man who could speak the language of that group and who had been at the plant the longest and knew something of the safety work and what was being done, would tell the rest of the group just what the poster meant and in that way the men soon came to recognize what the word "danger" meant, and they picked up other words here and there. It enabled the safety department to get their message across a little better to the foreign workmen.

Handling Sulphuric Acid by Pipe Line

MR. SCHWARZE: I am confronted with a problem and I have come down here to present it and to probably get the remedy. It is the hazard in connection with the handling of sulphuric acid by pipe line under air pressure of approximately 40 pounds. The usual arrangements is a series of two valves so that in case one goes wrong the other is there for safety. In a good many cases both valves will go at the same time. What have you men done to combat that hazard? Do you take the air pressure off the line at night, and if you do, how do you guard against disintegration of the iron tanks on account of the moisture?

S. R. JENSEN (Armour & Co., Chicago): It seems to me that question is rather mechanical and it is pretty hard to give any advice unless one goes over the ground and sees the conditions. What pressure do you have?

MR. SCHWARZE: Forty pounds.

MR. JENSEN: You couldn't run with less?

MR. SCHWARZE: Hardly.

MR. JENSEN: Is it always at night that it lets go?

MR. SCHWARZE: At night and on Sunday.

MR. JENSEN: You evidently are building up more pressure at that time. How are your safety valves? Do you have some sort of a safety attachment?

MR. SCHWARZE: The danger is not due to air pressure. It is due to the valve letting go. By having air pressure on there the acid will continue to flow at the point of discharge of the valve. By releasing the air pressure only such acid as may be in the line will be discharged, and the contents of the tank will remain intact, whereas the air pressure on the tank will empty the tank.

MR. JENSEN: What kind of valves do you use?

MR. SCHWARZE: They are a patented, lead-lined valve.

MR. JENSEN: You may have to go to special construction.

MR. MCCLELLAN: It seems to me that that could be overcome by having a line in service with a tank which would have a relief line on it and if it did lose acid this other tank would catch whatever acid got away. Are your tanks lead lined?

MR. SCHWARZE: No.

MR. MCCLELLAN: Why wouldn't it be a good idea to lead-line your tanks instead of having the air get at them?

MR. SCHWARZE: It is a matter of practical construction.

MR. MCCLELLAN: They are closed vessels?

MR. SCHWARZE: Yes. The reason for the valve breaking is that foreign matter gets in below the seat and cuts the lead.

R. A. FAUST (Fred Rueping Leather Company, Fond du Lac, Wis.): We use a siphon pump, which pumps it up to the reserve tank above. Of course it requires

probably four or five weeks to replace it with that little pump. We don't have any leakages through corrosion.

MR. SCHWARZE: We have pumps on the high levels and the low levels.

MR. MCCLELLAN: Mr. Schwarze, I wonder if it wouldn't be a good idea to write to the Tanners' Council at New York on that question. It seems to be a tanners' proposition. I am not familiar with tannery operations. I think probably they have had some experience in that matter and they might have some pamphlet which they could forward to you.

CHAIRMAN CAMPBELL: George Keene, of Swift & Company, brought to my attention that he thinks this section is very small. He has been attending these sectionals quite regularly and he is of the opinion that the section ought to take in all the leather industries, harness and saddlery, the boot and shoe workers, tanners and the meat packers, because in that way the meat packers have something in common with the tanners. The hides come from the yards and go to the tanneries and there are quite a number of machines in the tanneries that we are quite familiar with that they have to use in the packing industry.

MR. SCHWARZE: (Pfister & Vogel Leather Co., Milwaukee): I had a thought which struck me yesterday morning after the meeting that I think I should contribute for the benefit of our members. It was in connection with the remark of Mr. Moneymaker regarding the use of a glass visor as a protecting guard on an embossing machine. That same feature has been used by us successfully in connection with the clipping machine in stamping out sole leather. I think you have a similar machine in the belting business. The visor does not permit the hand to go over the top and eliminates the hazard of getting the hand between the beam and the top of the die.

CHAIRMAN CAMPBELL: At present on that machine we have no guard at all. We have a long table and the man couldn't possibly get his hand in.

MR. FAUST: How much space do you allow between the visor and the lower beam?

MR. SCHWARZE: I want to be correctly understood. We are not using the plate glass visor on an embossing machine at this time. We use the visor on the clipping machine. On our guards we would have to afford the same clearance as we would on any other machine. We allow one inch to an inch and a quarter, depending on the nature of the stock.

MR. FAUST: All we use is a dead-line bar across the front, which is painted on the style of a barber pole, having a shelf 18 inches wide, so that the operator in grasping the skin will necessarily strike the bar.

We have had three serious accidents in the last four months on the embossing machines, which cost us possibly \$600.

MR. SCHWARZE: We have had one accident in the past two years on our embossing machine. We are using different types of guards, depending on the kind of stock. What we have done in the last year to comply with the Industrial Commission's orders on safety was to provide an interlock between the shifter lever on the operator's side and the feeder's position. The accident we had happened while the plates were being changed and the guards were removed. We made a rule that if an operator has an accident on his machine while the guards are off he no longer operates the machine for our company, and have posted that rule, in a little frame with a celluloid facing, right before the operator on his side and right before the feeder on the feeder's side. It is lettered in a size to conform with normal vision for that distance. If the man says he can't read the print his eyesight is below normal and he shouldn't work on an embossing machine.

ADJOURNMENT

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Paper and Pulp Section

New Section Officers

- Chairman*, W. J. PEACOCK, Northern Paper Mills, Green Bay, Wis.
Secretary, N. H. BERGSTROM, Bergstrom Paper Company, Neenah, Wis.
Vice-Chairman for Canada, A. P. COSTIGANE, Ontario Pulp and Paper Makers' Safety Association, Toronto, Ont., Canada.
Vice-Chairman for South, G. W. PHILLIPS, The Champion Fibre Company, Canton, N. C.
Vice-Chairman for Middle West, M. G. HOYMAN, Kimberly-Clark Company, Neenah, Wis.
Vice-Chairman for East, W. A. GLEASON, Hammermill Paper Company, Erie, Pa.
Vice-Chairman for Paper Box Manufacturers, H. C. SACKETT, Alton Box Board and Paper Company, Alton, Ill.
Engineering Representative, R. M. ALTMAN, Marathon Paper Mills Company, Rothschild, Wis.
Poster Committee Chairman, AMEL UMBERHAM, Fort Howard Paper Company, Green Bay, Wis.
Membership Committee Chairman, J. H. SLATER, Escanaba Paper Company, Escanaba, Mich.
Publicity Committee Chairman, D. D. THIRKIELD, Sorg-Oglesby-Smith Paper Company, Middletown, Ohio.
Statistics Committee Chairman, E. E. GRANT, The Crystal Tissue Company, Middletown, Ohio.
Contest Committee Chairman, A. SCOTT DOWD, The Paper Industry, Chicago, Ill.
Committee on Health Research Chairman, J. J. PLZAK, Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis.
- Regional Directors:*
Maine—ALVIN RECORD, International Paper Company, Chisholm, Maine.
Massachusetts—N. F. BARTLETT, Hollingsworth and Vose Company, Boston, Mass.
Michigan—C. E. TORRANCE, Bryant Paper Co., Kalamazoo, Mich.
New York—C. H. O'CONNELL, International Paper Company, New York City.
Ohio—KENNETH L. FAIST, Champion Coated Paper Co., Hamilton, Ohio.
Pennsylvania—E. J. GAYNER, Scott Paper Company, Chester, Pa.
Wisconsin Valley—F. H. ROSEBUSH, Nekoosa-Edwards Paper Company, Port Edwards, Wis.
Fox River Valley—W. F. ASHE, Thilmany Pulp and Paper Company, Kaukauna, Wis.

Retiring Officers

Chairman, W. J. PEACOCK, Northern Paper Mills, Green Bay, Wis.; *Vice-Chairman*, M. G. HOYMAN, Kimberly-Clark Co., Neenah, Wis.; *Secretary and News-Letter Editor*, AMEIL UMBERHAM, Fort Howard Paper Co., Green Bay, Wis. *Committee Chairman: Program*, M. G. HOYMAN, Kimberly-Clark Co., Neenah, Wis.; *Engineering Representative*, A. P. COSTIGANE, Ontario Pulp & Paper Makers' Safety Assn., Ont., Canada; *Regional Directors of Conferences, Contests, Membership and Posters*: ALVIN RECORD, International Paper Co., Chisholm, Me.; N. F. BARTLETT, Hollingsworth & Vose Co., Boston, Mass.; W. A. GLEASON, Hammermill Paper Co., Erie, Pa.; G. W. PHILLIPS, The Champion Fibre Co., Canton, Ohio; WALTER L. MEAD, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.; ERNEST AUGUSTUS, Mead Pulp & Paper Co., Chillicothe, Ohio.; R. S. TURNER, West Virginia Pulp & Paper Co., Mechanicsville, N. Y.; JAMES M. MURRAY, International Paper Co., Gatineau, Quebec, Canada.

Tuesday, September 27, 1927

W. J. PEACOCK, Chairman

Head, Department of Personnel, Northern Paper Mills, Green Bay, Wis.

The first session of the Paper and Pulp Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, W. J. Peacock, head, department of personnel, Northern Paper Mills, Green Bay, Wis.

Registration cards to obtain the names and company connections of all present were passed, following which the chairman called for general introductions, and suggested that all present, in order to get acquainted, take seats together by states. Divisions of the room were indicated and the delegates were soon shaking hands as new-found neighbors.

Registration List

Aetna Life Ins. Co.—E. H. Casavant, Hartford, Conn.; Alton Box Board & Paper Co.—C. G. Patterson, H. C. Sackett, Alton, Ill.; American Writing Paper Co.—James Murdock, Stanley Skypark, A. S. Wilson, Holyoke, Mass.; American Paper & Pulp Ass'n—D. C. Everest, Rothschild, Wis.; Appleton Vocational School—H. Heitig, Appleton, Wis.

Bergstrom Paper Co.—N. H. Bergstrom, Neenah, Wis.; Bird & Son, Inc.—F. H. Bird, R. W. Westcott, Chicago, Ill.; B. D. Rogers, E. Walpole, Mass.; Bogalusa Paper Co.—W. H. Jennings, Bogalusa, La.; Brown Company—J. J. Tellington, Berlin, N. H.; Bryant Paper Co.—C. E. Torrence, Kalamazoo, Mich.

The Celotex Co.—H. T. Bond, Marrero, La.; Champion Coated Paper Co.—K. L. Faist, Hamilton, O.; Chrysler Corp.—W. A. Beehill, O. F. Lehman, Detroit, Mich.; Consolidated Water Power & Paper Co.—C. R. Boyer, Appleton, Wis., Otto Erdman, J. J. Plzak, G. R. Stearns, Wisconsin Rapids, Wis.

Eastman Kodak Co.—John W. Newton, Rochester, N. Y.; Employers Mutual Benefit Co.—A. Kroes, Wausau, Wis.; Escanaba Paper Co.—R. W. Haddock, J. H. Slater, Escanaba, Mich.

Falls Mfg. Co.—Hugo Boldt, Frank Cota, Oconto Falls, Wis.; The Flint Kote

Co.—George Martin, Chicago Heights, Ill.; T. R. Bickford, Rutherford, N. J.; Fort Howard Paper Co.—Amiel Ueberham, Green Bay, Wis.; French Paper Co.—E. R. Breeher, Niles, Mich.

Robt. Gaylord, Inc.—E. Ahrenhoerster, St. Louis, Mo.; Great Western Paper Co.—E. A. Kennedy, Ladysmith, Wis.

Hammermill Paper Co.—W. A. Gleason, Erie, Pa.; Hollingsworth & Vose Co.—Nat F. Bartlett, Boston, Mass.; Hope Nat'l Gas Co.—Ralph A. Gawthorp, Clarksburg, W. Va.

Indemnity Ins. Co. of North America—M. J. Steinman, Philadelphia, Pa.; Independence Co.—I. F. Jones, B. H. Remaly, Philadelphia, Pa.; Industrial Commission of Wisconsin—P. A. Russell, Madison, R. D. Scoon, Superior, H. F. Menzel, Oshkosh; International Paper Co.—Alvin F. Record, Chisholm, Me., John Lundregan, C. H. O'Connell, New York City.

Kalamazoo Vegetable Parchment Co.—W. E. Walker, Kalamazoo, Mich.; Kimberly-Clark Co.—A. G. Briggs, Chas. H. Bujer, A. R. Ellis, M. G. Hoyman, G. Heeslaker, George McElroy, Harry Oehlke, A. W. Redlin, Edw. Zultlow, Neenah, Wis., L. W. Rhodes, J. P. Rucinski, Niagara Falls, N. Y., S. F. Shattuck, Neenah, Wis.

Lincoln Pulp & Paper Co.—John L. Leslie, Merritton, Ont., Can.

Mead Fibre Co.—Geo. Milhorn, H. R. Lady, Kingsport, Tenn.; Mead Pulp & Paper Co.—Ernest Augustus, L. O. Bonner, Chillicothe, O.; Michigan Mutual Liability Co.—E. H. Vallur, Detroit, Mich.; Mississippi Valley Structural Steel Co.—J. K. Stafford, Decatur, Ill.

National Safety Council—G. E. Burns, C. E. Pettibone, Chicago, Ill.; Nekoosa-Edwards Paper Co.—Franz H. Roscbush, Port Edwards, Wis.; Northern Paper Mills—W. J. Peacock, Green Bay, Wis.

Ontario Pulp & Paper Makers Safety Ass'n—A. P. Costigane, Toronto, Ont., Can.

The Paper Industry—A. Scott Dowd, E. B. Fritz, Betty E. Williams, Chicago, Ill.; Peoples Nat'l Gas Co.—L. M. Ayers, Pittsburgh, Pa.; Provincial Paper Ltd.—F. M. H. Cushing, Thorold, Ont., Can.

Rhineland Paper Co.—Geo. Roller, Rhineland, Wis.; River Raisin Paper Co.—J. N. Freeman, Monroe, Mich.; Riverside Fiber Co.—H. C. Kruegh, Appleton, Wis.

Sorg-Oglesby-Smith Cos.—D. D. Thirkield, Middletown, O.

Thilmany Pulp & Paper Co.—J. B. Delbridge, Kaukauna, Wis.; Thunder Bay Paper Co.—Albert Zagar, Port Arthur, Can.; Titanium Pigment Co.—F. A. Smith, Mr. Sherman, Carondelet, Mo.; Tomahawk Kraft Paper Co.—O. F. Duns, Tomahawk, Wis.

Union Bag & Paper Corp.—Stuart H. Brown, New York City.

Wausau Sulphate Fibre Co.—C. M. Green, Mosinee, Wis.; West Virginia Pulp & Paper Co.—John H. Crest, Luke, Md.; Wisconsin Vocational Schools—H. G. Noyes, Appleton, Wis.

Youngstown Sheet & Tube Co.—W. F. Siemen, Youngstown, O.

Reports of Various Committees

Brief verbal reports were then made by Secretary Ueberham, who said that his main activity was the production of news letters; M. G. Hoyman, for the program committee, suggested that the program would speak for itself. W. A. Gleason, for the poster committee, said that this service must be largely voluntary as suggestions are required directly from the mills to make posters effective. He urged members to develop their local talent and to get in touch with the Poster Editor of the National Safety Council with their ideas.

The chairman called attention to the poster exhibit around the room, the result of cooperation of mills responding to the news-letter suggestion. He followed with a story of the founding and growth of the section, covering a period of 12 years,

showing how the present size and influence of the section are due to the far-sighted leadership of former chairmen and loyal members. The first meeting in Philadelphia, 1915, was due to the efforts of S. F. Shattuck, of Kimberly-Clark Company, backed by G. E. Williamson of the Strathmore Paper Co., R. B. Robertson, of Champion Fibre Co., H. W. Taylor, of Dill & Collins Co., E. P. Gleason, of Nekoosa-Edwards, R. S. Turner, of West Virginia Pulp and Paper Co., A. G. Richardson, Laurentide Co., W. H. Williamson, Finch-Pruyn Co., Henry W. Stokes, York Haven Paper Co., F. W. Calvert, Scott Paper Co., F. P. Klund, Hammermill Paper Co., John M. Taylor, Diamond State Fibre Co., G. T. Kamps, Riverside Paper Co., and representatives of several allied industries, backed as a whole by several insurance companies. Friendly assistance was received also from the New York State Department of Labor, and other state agencies. Mr. Peacock commented that every paper company present at the organization meeting had remained in active cooperation with the section ever since, and all of them are in the 1927 cup contest.

The chairman showed how the section membership had increased from 30 individual mills, in 1916, to 201 company-members, controlling at least 300 mills. The activities of the section, from the first, led up toward the year-round program of 1927. Today the section is kept busy fulfilling the vision of its founders. Attention was directed to the session of Thursday morning, when the section, as a committee of the whole, would study the affairs that belong to the Paper and Pulp group. Reference to that session in these transactions will disclose the present program. In his final word Mr. Peacock said:

Now a Major Section of the Council

"You are now in a major section, major in size, in activities and in leadership. Let's feel the bigness of the thing, a section which is certainly on the map in the National Safety Council; but especially let us take it upon our minds as a charge and an inspiration to see possibilities as significant today as they appeared to the founders in 1915. We have reached the possibilities of success, viewing the section as a unit only, meeting once a year, but we have only begun to see what can be accomplished in the states and natural regions of our industry. Already one of these regions, the Fox River Valley, has held annual safety meetings with an attendance and mill representation numerically larger than the parent section. What can be accomplished also in New England, in Ohio, Michigan, the South and the far West simply waits for leaders with vision and initiative. One thing certain, the day is not far distant when the section will require the services of a full-time executive secretary, to assist in developing our regions.

CHAIRMAN PEACOCK: I will announce the Nominating Committee: Nat. F. Bartlett, W. A. Gleason, R. S. Turner and E. A. Kennedy. These gentlemen will please complete their report and present it tomorrow morning. Please see them meanwhile with your suggestions.

Are there other reports to be heard before we proceed to the program?

F. H. ROSEBUSH (Nekoosa-Edwards Paper Co., Port Edwards, Wis.): I would like to suggest that our Nominating Committee nominate officers with the idea that they will serve for two years. The first year they would serve actively; the second, in an advisory capacity. By that process I believe we would have a permanent organization of officers.

CHAIRMAN PEACOCK: Are there other suggestions? The presiding officer for the morning's program is Mr. W. A. Gleason, affectionately known as "Uncle Walt," former chairman of the section, safety engineer of the Hammermill Paper Company, Erie, Pa., one of the founding companies of the section.

(Mr. Gleason then took the chair.)

CHAIRMAN GLEASON: We have on our program as the first number this morning

a paper by Mr. Alvin F. Record, supervisor of safety and sanitation of the Otis Mill, International Paper Company, Chisholm, Maine. The fact that he has been selected for this important position by the International Paper Company is assurance enough that he can get results, but in addition, we know Mr. Record as competing very strongly for the cup.

Accident Analyses, Records and Costs

Alvin F. Record, Supervisor of Safety & Sanitation, International Paper Company, Otis Division, Chisholm, Maine

In an age when facts, figures and statistics are essential to the operation of any business, what modern manufacturing concern would attempt to do business without keeping a very accurate record of its costs of raw materials, labor and all other items, no matter how small, entering into the cost of manufacture, as well as an itemized cost of its various processes and departments? Suppose at the end of the year the profit and loss account of the balance sheet shows "red" or the profits are unsatisfactory as compared with previous years or with industry as a whole. The alert executive is thereby warned that there is trouble coming, that something is amiss. With the aid of his accounting and statistical departments he immediately sets out to ascertain just where the difficulty lies. If his system functions satisfactorily he will find the changes in his material and labor costs in each process and in each department as well as all other items entering into the question which will furnish him with a basis for wise changes in policy and possibly personnel.

What is true with business in general is also, in an equal measure, true with any accident prevention plan. The man on the job directly interested in the prevention of accidents cannot but be deeply impressed with the necessity for, and the importance of, accurate accident statistics, whereas, those not coming into contact with the compilation and application of such statistics sometimes are apt to undervalue their use and importance. The collection of figures which have no practical value, is, of course merely a waste of time and effort and it is quite necessary to sort out much interesting but otherwise useless materials. However, proper statistics to the man on the job are what the thermometer is to the physician and the compass to the mariner. They eliminate guess work and furnish certainty without which we cannot secure the results for which we strive.

Statistics should be compiled, first, to indicate the relative hazards and danger points in the mills where they are to be used; second, to determine and measure the results of accident prevention work being carried on; third, to stimulate interest and competitive effort in accident prevention work as between plants in the same industry and also between mill departments; fourth, to show the costs per department or per unit of production as far as the actual known expense is concerned, such as medical and compensation expense.

Facts compiled with these objectives in view and studied intelligently and applied should go a long way in assisting the safety overseer to point out causes of unsatisfactory experience and enable him to offer suggestions for overcoming them.

The accompanying charts illustrate the method used by the International Paper Company in preserving its accident history, analyzing experience and tabulating the cost in dollars and cents.

In making up and keeping any set of records it is first necessary to collect full information on each individual case from the time medical attention is rendered until the employee has been discharged from treatment and has re-

Figure 1 shows the form used for first reporting injury, giving full history of the injured and his injury. This report is the basic report, containing all the information necessary in making up subsequent reports.

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Figure 1. Form for reporting an injury.

Lost time is figured, beginning the day following the accident, and ends with his actual return to work, excepting in case of a total and permanent injury where an arbitrary penalty of 500 days is charged in addition to one calendar year of actual lost time, and in case of a fatal accident 1,000 days.

Take, for instance, the question, "How Long Employed By Company?" When this information is tabulated from a number of accidents over a continuous period, it will be surprising to learn how many new employees and men transferred to new occupations will show up as injured. Correction of this condition will largely revolve around the question near the end of the report, "Was Employee Instructed in the Proper Method of Doing His Work?"

Such questions as, "Place Where Accident Occurred?," "Was Light Good?," "How Can Such Accidents Be Prevented?," "What Steps Have Been Taken"

INTERNATIONAL PAPER CO.
MANUFACTURING DEPARTMENT

RECORD OF ACCIDENTS AND COSTS

MONTH OF Feb 1927 MILL NO. 4 NAME Offis

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Figure 2. Detailed report covering record of accidents and costs.

INTERNATIONAL PAPER COMPANY
MANUFACTURING DEPARTMENT-INDUSTRIAL BUREAU
SUMMARY OF ACCIDENT EXPERIENCE ALL MILLS 1926

Relative Standing	Number of Employees	Accidents		Days Lost	Penalty Days	Total Days Lost	Days Lost per 100 Employees	Lost Time Accidents per 100 Employees
		Fatal	Lost Time					
1. Otis	918		12	209		209	22.81	1.31
2. Fort Edward	406		16	337		337	83.00	3.94
3. Milton	37		1	32		32	86.50	2.70
4. Niagara Falls	520		26	510		510	98.07	5.00
5. Webster	119		9	124		124	104.19	7.55
6. Winnipissogee	146		10	182		182	109.63	6.02
7. Glens Falls	229		25	296		296	128.82	10.91
8. Montague	188		13	255		255	135.63	6.91
9. Wilder	218		28	352		352	161.46	11.92
10. Hudson River	826	1	40	560	1000	1660	200.96	4.84
11. Fall Mountain	149		14	340		340	228.18	9.40
12. Picoesfield	342		88	902		902	263.74	25.73
13. Cadyville	85		18	265		265	311.76	21.17
14. Glen	537	1	57	728	1000	1728	321.78	10.51
15. Three Rivers	988	2	71	1051	2000	3051	328.77	7.65
16. Lake George	190		21	744		744	391.57	11.05
Operating Mills	5856	4	447	6986	4000	10986	187.60	7.63
Mills Not Operating								
Wood Falls	13	-	4	60		60		
Solon	2	-	-	-		-		
Van Buren	3	-	-	-		-		
Total 1926	5874	4	451	7046	4000	11046	188.04	7.71
" 1925	5082	2	429	7143	2500	9643	189.74	8.44

Relative Standing based on total days lost per 100 Employees which includes Arbitrary Charge of 1000 days for Fatal Accidents.

COMPARATIVE SUMMARY					Increase	Decrease
	1925	1926				
Number of Employees	5082	5874	-	792		
Lost Time Accidents	429	451	-	22		
Total Days Lost	9643	11046	-	1403		
Total Days Lost per 100 Employees	189.74	188.04	-	-1.70		
Lost Time Accidents per 100 Employees	8.44	7.71	-	.73		
Fatal Accidents	2	4	-	2		

Figure 3. Relative standing of the mills.

to Carry Out Above Recommendations?" are all pertinent and when followed up most certainly will turn the spot light on conditions which usually can be remedied and which certainly will go a long way toward the prevention of future accidents of the same type.

Figure 2 is a detailed report covering "Record of Accidents and Costs" and seems to be practically self-explanatory, listing and recording each item of expense connected with each individual injury.

Orig. Ac 241
Pages

Paper and Pulp Section

321

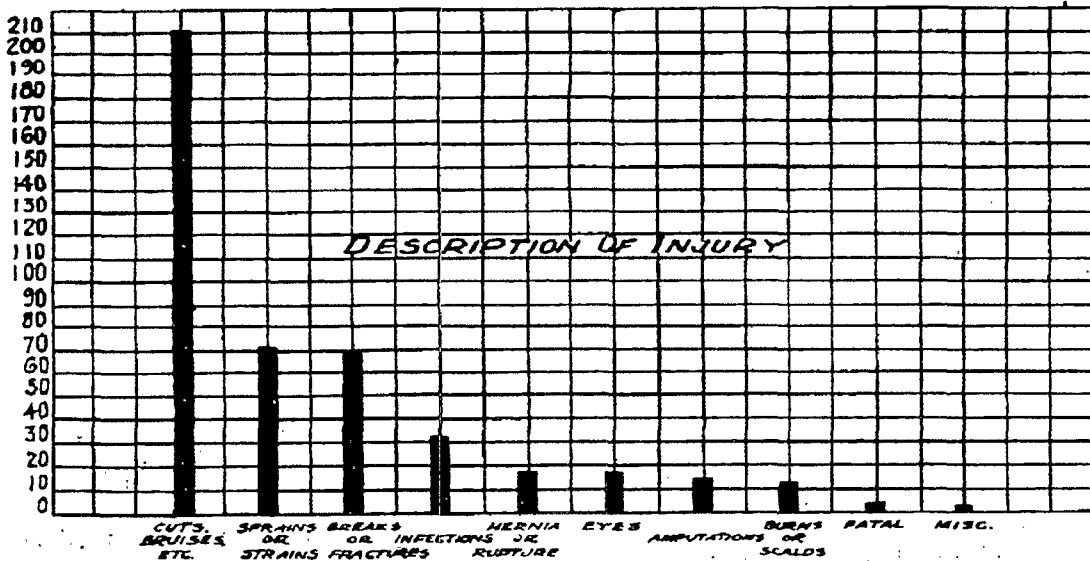
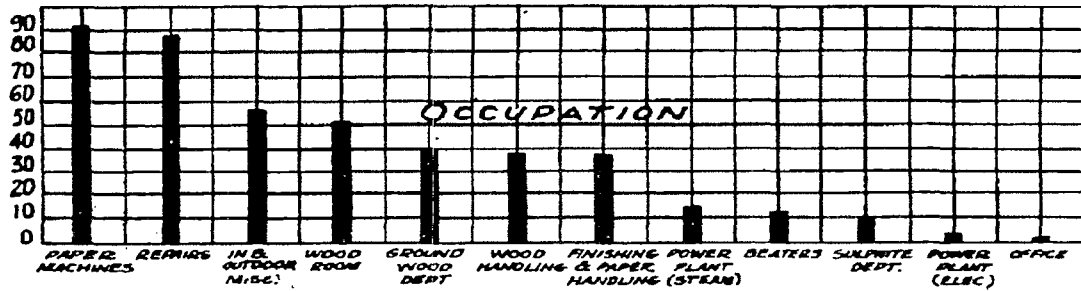
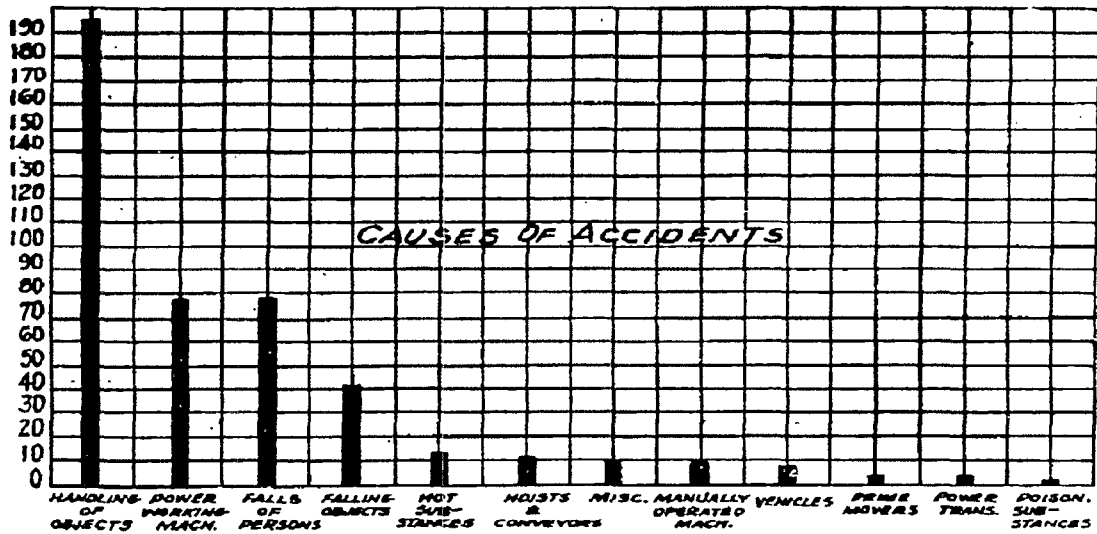


Figure 4. Analysis of the last time accidents.

This form is used at the mill end and serves the purpose of placing before the interested parties the story of each month's performance, as far as the number of accidents, lost time and cost is concerned. Our mills use this information in a variety of ways. It is especially handy in keeping up curve sheets on each of these items to indicate progress or the reverse. It is put into the form of monthly reports to the supervisory force and made the subject for bulletin posting. Most important of all, it keeps the mill executive posted on just what progress is being made by his safety organization.

The quarterly and yearly reports, as compiled and sent out from our general office, are especially valuable in that they point out and analyze hazards and danger points within different mills; measuring the effect of prevention campaigns and stimulating interest and competitive efforts between mills.

Figure 3 shows the first of these reports.

This gives the relative standings of all mills based on "Days Lost per 100 Employees" and also shows "Lost Time per 100 Employees." This report is issued quarterly for the first nine months of the year, the last one covering the whole year's experience in which penalties are charged for the fatal and permanent and total disability accidents. This illustration shows one of these yearly statements. The comparative summary is specially included to show the company's progress from year to year as a unit.

A Remarkable and Valuable Analysis

Figure 4 gives quite a remarkable analysis of lost time accidents over the yearly period. The upper section of this chart shows, "Causes of Accidents" in graphical form. Causes are divided under 12 headings and show how our accidents happen.

The section in the middle marked "Occupation" shows where our accidents occur and plainly indicates where preventive efforts should be centered. This classification is also divided into 12 distinct processes entering into paper manufacturing.

The last graph covers "Description of Injuries" and indicates what injuries resulted from accidents. The practical use of this information comes from such items as "Infections," which indicate on their face lack of proper first aid; "Eye Injuries," the lack of proper eye protection, etc.

Figure 5 is a more detailed edition of the preceding form. Each mill of the company is designated by a number, and it shows at a glance where each of its plants are meeting with difficulty and where extra efforts should be put forth. By comparison each mill can check its accidents with those of sister mills of equal size with respect to "How," "Where" and "What" has occurred.

Another is a Comparative Accident Experience Chart covering the past four years, namely 1923 to 1926, inclusive. This shows the individual experience of each of the larger operating units together with the average for all mills. The black columns show the actual time lost per 100 employees, while the columns in outline show the arbitrary penalties charged for Total and Permanent Disability and Fatal Accidents. This pictures quite vividly the effect and results of the company's efforts to prevent accidents in their mills.

This gives a general idea of this company's method of recording its accident costs and records, as well as the analysis of its experience which seems to be standing the test of time and which it considers of much benefit in efforts to eliminate industrial accidents.

The test of any set of reports or analyses comes with its practical application. When a period shows up unsatisfactorily and comes to the attention

INTERNATIONAL PAPER COMPANY
MANUFACTURING DEPARTMENT - BUREAU OF SAFETY & SANITATION
ANALYSIS OF ACCIDENT EXPERIENCE - YEAR 1925

MILLS BY NUMBER	1	2	3	4	5	6	9	10	13	14	15	16	17	22	24	28	31	TOTAL
OCCUPATIONS:																		
Wood Handling	3	0	4	1	9	0	1	0	0	1	0	12	6	1	C	C	0	38
Wood Room	5	0	0	C	8	0	C	0	0	1	3	1	27	5	1	0	0	51
Ground Wood Dept.	2	0	9	1	6	0	0	0	1	0	C	9	0	8	3	1	0	40
Sulphite Dept.	0	0	0	0	7	0	0	0	0	0	0	0	2	0	0	0	0	9
Beaters	0	1	0	1	0	1	0	0	0	2	0	2	1	0	4	0	0	12
Paper Machines	6	4	15	1	9	10	4	3	2	5	3	14	10	0	6	0	0	92
Finishing and Paper Handling			3	0	2	4	0	3	1	2	0	7	12	0	3	0	0	37
Indoor Misc.		1	2	2	0	6	0	1	0	0	2	3	0	1	0	0	0	18
Outdoor Misc.	4	4	3	1	2	0	3	2	4	6	0	5	8	1	3	0	2	48
Power Plant (Steam)	1	0	1	0	3	2	0	0	1	1	2	2	1	0	0	0	0	14
Power Plant (Elec)	0	0	0	0	0	0	0	0	0	0	0	1	2	C	0	0	C	3
Repairs	4	6	3	5	11	3	1	1	4	3	4	15	18	2	6	C	1	87
Office	0	0	0	0	0	0	0	0	0	C	0	C	1	C	0	C	1	2
TOTAL	25	16	40	12	57	26	9	10	13	21	14	71	88	18	26	1	4	451
CAUSES OF ACCIDENTS:																		
Prime Movers	0	0	0	0	1	0	0	0	0	1	0	1	0	0	0	0	0	3
Power Trans. App.	1	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	3
Power Working Mach.	5	6	7	1	12	4	3	3	1	3	1	16	5	4	6	1	0	78
Manually Oper. Mach.	0	0	2	0	0	0	1	0	0	0	0	3	1	2	0	0	0	9
Hoisting Apparatus	1	0	0	1	1	1	0	0	1	0	0	4	1	0	0	0	1	11
Vehicles	0	1	0	0	0	0	0	1	1	0	1	2	1	1	0	0	0	8
Hot Substances	2	0	0	0	2	0	0	1	1	0	1	1	5	0	0	C	0	13
Poisonous Substances	0	0	C	0	C	0	0	0	0	0	C	0	1	0	1	C	0	2
Falls of Persons	5	3	6	4	15	9	2	1	0	3	2	10	9	4	4	0	1	76
Falling Objects	3	2	3	2	3	2	0	2	2	4	9	7	1	1	0	0	0	41
Handling Objects	8	4	15	3	22	8	2	4	7	12	5	22	57	6	14	0	2	196
Misc.	0	0	3	1	1	1	1	0	0	0	0	3	0	0	0	0	0	10
TOTAL	25	16	40	12	57	26	9	10	13	21	14	71	88	18	26	1	4	451
DESCRIPTION OF INJURY:																		
Amputations	0	1	3	0	2	1	0	0	0	1	0	1	3	C	1	1	0	14
Cuts, Bruises, Lac.	10	5	16	4	25	12	4	6	6	12	6	41	42	11	11	0	0	211
Breaks and Fractures	4	2	4	4	10	8	1	0	2	4	3	13	6	1	4	0	3	69
Sprains and Strains	4	6	9	3	13	2	0	2	1	3	3	6	11	2	5	0	1	71
Burns & Scalds	2	0	0	1	2	0	0	1	0	0	1	3	3	C	0	0	0	13
Eyes	2	1	2	0	1	1	0	0	0	0	1	0	8	0	1	0	0	17
Hernia and Rupture	0	0	2	0	1	1	1	1	0	0	0	2	5	2	2	0	0	17
Infection	3	1	3	0	2	1	2	0	4	1	0	3	9	2	1	0	0	32
Fatal	0	0	1	0	1	0	0	0	0	0	0	2	0	0	0	0	0	4
Misc.	0	0	C	0	C	0	1	0	0	0	0	1	0	1	0	0	0	3
TOTAL	25	16	40	12	57	26	9	10	13	21	14	71	88	18	26	1	4	451

Figure 5. At a glance the relative position of each plant is seen.

of the plant executive and his safety overseer is called in for explanation, it is then that his system should justify its existence. He should be able to say to the executive that the trouble lies at this or that point, that a certain number of new employees have received injuries in a certain department, which indicates the lack of proper supervision; that there has been several stumbling or slipping accidents at another point, which might indicate poor housekeeping; or that several infections have developed at another point, indicating lack of

first aid attention. The executive by confronting his department heads with this information certainly is able to place responsibility, and it is indeed interesting, when this is done, to see the little curve indicating progress tip its way downward again to the point where accidents, with the suffering they cause and the expense they make, will be a thing of the past.

CHAIRMAN GLEASON: I don't believe there is any question in our minds that the keeping of records and making analyses of them are what count now.

In traveling around to the different mills, you hear safety men say, "You know, I can't get any cooperation from the superintendent. I can't get any safeguards, I can't get any help at all in accident prevention work."

If you have a set of charts showing just what the cost of accidents per ton of paper is, you are going to get results, because any business today operates from the ledger side.

Are there any questions you want to ask?

G. S. STEARNS (Consolidated Water Power & Paper Co., Appleton, Wis.): Do you have a competitive method to create interest in establishing a basis of comparison?

MR. RECORD: No. It is a matter of pride between the different mills to excel one another. The first chart is a comparative chart, showing standing of the various mills.

Quarterly Reports Are Made to Each Mill

F. A. SMITH (Titanium Pigment Co., Carondelet, Mo.): In regard to the separate mills are they advised each month of their standing, or are they only advised at the end of the year?

MR. RECORD: They are advised quarterly. The last report is the annual report which covers everything.

JOHN W. NEWTON (Eastman Kodak Co., Rochester, N. Y.): Do you handicap mills? Some of them may be operating under more dangerous conditions than others.

MR. RECORD: We figure the lost time on one hundred employees, which takes care of that.

MR. NEWTON: There is a difference in relative hazards. The new mills are far superior to the mills that have been in operation for a long period of time.

MR. RECORD: We have no way yet of handicapping them. All the mills are operating on a mutual basis.

MR. ROSEBUSH: I would like to ask what items enter into the accident costs?

MR. RECORD: Just the compensation, medical bills and incidental expense connected directly with accidents.

J. J. TELLINGTON (Brown Company, Berlin, N. H.): I notice you penalize the mills for fatalities.

MR. RECORD: In the case of fatal accidents, an arbitrary penalty is charged at one thousand days.

A. P. COSTIGANÉ (Ontario Pulp and Paper Maker's Safety Association): I would like to ask if there is any connection between the records you keep and the insurance company?

MR. RECORD: The International Paper Company carries their own insurance.

MR. ROSEBUSH: I had that in mind when I asked the previous question. What would your idea be of figuring those costs if insurance was carried by an insurance carrier?

MR. RECORD: I should say that if any one carried insurance and wanted to show cause of accidents they could just eliminate the premium they are paying for insurance.

G. S. STEARN (Consolidated Water Power & Paper Co.): Do you keep data on "near accidents"—accidents that might result in something serious.

MR. RECORD: We make no penalty, only in so far as costs are concerned. The only "no lost time" accidents that are taken into consideration are those where a medical expense is involved.

ERNEST AUGUSTUS (Mead Pulp and Paper Co., Chillicothe, Ohio): In our plant where an injury may be simply a case of sickness, we make a record of it and try to estimate what that cost is. Or, where an injured man may come in five or six times for redressing an estimate is made of that cost.

JOHN LUNDRIGAN (International Paper Company, N. Y.): We have a chart that unfortunately isn't quite ready, a very simple one, and in it we show the information for each individual mill—not only the cost per ton, but the cost per individual employee on account of accidents. The cost includes everything that has to do with the accident. The administration or routine of industrial accidents and the paying out of pocket are entirely separate, being carried on by two different departments.

Without giving the exact figures, our insurance premium in Massachusetts, the only state where we are compelled to hire out insurance, on our small mill in that state, is between \$3,000 and \$4,000. This premium is supposed to be better than others. The actual money paid by the insurance company is around \$500.

Someone has said that there is a difference in relative hazards in the new mills and the old ones, but note what is happening in our Three Rivers Mill in the Province of Quebec, which is supposed to be the last word, as against Record's mill, which is a very old one. On account of the unusual requirements with respect to the Compensation Law, the costs in the Canadian mill are much more in proportion. There are no boards and no commissions; we have to go directly to the courts. To go about a legal settlement of a case, when a man is incapacitated for a single day, we have to have our document signed by the judges of two separate courts. You can't go to the courts without a lawyer, and that usually incurs an expense of \$40 to \$50 before you are through with one of them.

A Duty to Study and Correct All Accidents

As to the cost of insurance, we are confronted with this in seven states and in the Province of Quebec. I do not have the exact figures with me but I think you will agree that about \$3.25 on each \$100 of the payroll is about the average paper mill cost. Our office carries the item of insurance at seventy cents. We have individual mills that carry their insurance at forty-five cents. Mr. Record's mill is one of them. That account is carried by the department of insurance and taxes. Allowing ourselves the difference between average premiums and our actual costs we have as a result a surplus running pretty well into two million dollars.

In our General Instructions No. 75 it is one of the duties of the mill to study and correct any cases of near-accidents. Our safety organization takes the same steps in bringing these things to the attention of the management as though a man had been killed.

In accidents that do occur involving no lost time, that 339 form which you just saw must always be made out. When the question arises, "What can be done to remedy such accidents?" we say, "What have you done to carry out your own recommendations?" If those questions aren't answered, we shoot the report right back to the mill. We want to know, and to be in a position to let other mills know, what ideas some of the other mills have developed.

As far as literature is concerned, we have had several inquiries as to whether or not these instructions issued by the International Paper Company were available for distribution. This subject of accident prevention is covered so completely, that we probably have 100 pages of instructions in these different pamphlets. The International Paper Company does not have the printing facilities to supply them, as everybody at the convention would want one, the trade journals would want them; and

I tell you frankly that the principal reluctance we have is that we're afraid these people won't use them when they get them. We have a long way to go—probably farther than we'll ever reach, but we have done a great deal in the cutting down of preventable accidents in our ten years of experience in this work.

B. D. ROGERS (Bird & Son Inc., E. Walpole, Mass): In the first record that was shown, was it the medical department that made out that report?

MR. RECORD: It originates in the first aid department. It is filled out there to the extent of the injury, and states how the injury occurred.

MR. ROGERS: My point in bringing this up is that we have made a very complete form, and we put it entirely up to the foreman. In that way, the foreman has to know about everything that happens. Do your foremen enter into it?

MR. RECORD: Only in so far as an accident or near-accident is concerned. The safety supervisor is supposed to interview the man personally and find out all about it.

MR. ROGERS: Our method is to put it up to the foremen and they are responsible more or less for the accident. I believe that since we have instituted this very complete form, we have gotten the foremen to realize the very valuable function of this report.

MR. RECORD: We have a small foreman's report which is turned into the first aid room. It does not go into the detail, but just shows they were notified of the accident.

MR. ROSEBUSH: May I state our own experience in that line? We will not accept an accident report unless the foreman's name is signed to the report. There is another report made by the nurse, so we have a double check.

MR. LUNDRIGAN: We say to the mill manager, "This safety supervisor is your safety department, and part of our staff, and he is responsible for seeing that this information is put together. The foreman is on record, the nurse and doctor and witnesses are on record, but we must pin it down to some individual to see that the report is complete. This report is not complete until it is signed personally by the mill manager himself.

CHAIRMAN GLEASON: I think that is covered in our mill too. She (the nurse) makes out the report and then turns it over to me. I then send it out to the foreman to get his comments.

The next speaker on the program is Mr. B. D. Rogers, manager, Labor Bureau, Bird and Son, E. Walpole, Mass. Mr. Rogers is supervising some 2,700 or 2,800 employees, and anyone with that to do has a program on his hands.

Plant Inspection and Safety Committees

B. D. Rogers, Manager, Labor Bureau, Bird & Son, East Walpole, Mass.

This paper on Plant Inspection and Safety Committees will center around the methods which we feel have proved fairly successful in our plants.

The first point, and one that I believe everyone interested in the safety movement agrees upon, is that the best, or even satisfactory, results can be obtained only when every member of the working organization is heart and soul in safety work. By that I mean the owners, the management, the supervisors and the workers. Everyone in the organization is jointly responsible for the success and promotion of safety as an integral part of any mill.

In our company the safety organization consists of a central safety committee, five local plant safety committees and the safety inspector.

The function of the central safety committee is to direct and keep alive all matters pertaining to safety. Its membership consists of the general manufacturing manager, assistant manufacturing manager, plant engineer,

superintendents of all plants, chief engineer, safety inspector and manager of labor bureau.

Our local plant safety committees consist of from ten to fifteen members depending upon the number of departments or workers in those plants. The superintendent of each plant is the permanent chairman of the committee. The other members include both foremen and workers. Appointments are made every six months by the central safety committee upon recommendation by the superintendent. Usually a member continues on the committee for a year so that only one half of the committee changes at one time.

Our safety inspector is directly responsible to our general manufacturing manager and, hence, his work is directive and official. His inspections are regular and continuous, and deal with:

Points Covered by Inspections of Safety Inspector

1. *The elimination of accident hazards through unsafe conditions and careless practices.* This means the recommendation of safeguards, safe working conditions, repairs to dangerous equipment, etc., and the correction of working habits of men and women who do not follow safe practices.

2. *The maintenance of safe working by cooperation with the foreman.* The inspector should see that the safety idea is always kept before the men. If a machine has a guard, he should see that it is used or kept in place. If a safety rule is established, he should see that the rule is followed at all times. If he condemns any equipment, he should see that it is repaired or destroyed. Every new employee is interviewed by the inspector during his first week of employment.

3. *The follow-up and investigation of accidents that do happen.* He receives a report of every accident that occurs and he should follow up these reports with a thorough investigation of the accident, which means inspection of the place where the accident occurred, talk with injured man, with the foreman and further interviewing of many others who might give light on where, how, or why the accident happened. His report covers his own views regarding the accident and he should make recommendations as to how its recurrence can be prevented.

4. *Co-operation with insurance and other outside agencies.* The safety inspector should at all times accompany representatives from the state departments and insurance companies who come to inspect the plant. By doing this he can not only point out to the inspector the work done in the plant, but he can receive from him many ideas and anecdotes from other plants that will help him in his work.

5. *Fire prevention.* In some plants the same man handles fire inspection who handles safety. Except in a small plant, this is not the best arrangement. The safety inspector should have enough to do in working on all the phases of safety unless, of course, he works in an industrial Utopia where all hazards are guarded, no one is careless, and there are never any accidents. Safety work in plants employing 1,000 workers or more is a one man job. It is not a job for a man who must devote part of his time in trying out fire extinguishers, testing fire alarms, or filling in on other odd jobs. If he is to be heart and soul with safety, he must do safety work and nothing else.

As I have said before, the safety inspector should report to a high official in the company, the higher in authority the better for him and for safety. He should not be forced to argue with a foreman of a department as to whether a guard is needed on some machine or not. If he, the inspector, after thorough investigation believes that there should be a guard, his word should be backed up solidly by his superior.

Everyone in the plant down to the lowest worker should know that what the inspector says goes—not that he should be feared, but he should above all things be respected.

The work of the plant safety committees, on the other hand, is of utmost importance in selling the safety idea to the workers throughout the organization. The suggestions made by the members of the plant committees should and do receive careful consideration. If a safety committeeman makes a suggestion that is adopted, it so appears in the records, and when possible is given sufficient publicity so that all workers will know that the committeemen are on the job and that their work is backed up and appreciated by those in authority. To bring up a good suggestion, have it receive only grudging attention, and then see the same idea later adopted as coming, say, from a foreman is discouraging to any safety committeeman and may result in it being the last suggestion that he ever makes.

Plant Safety Committees Meet at Least Once Each Month

Plant safety committees should meet regularly at least once a month, oftener if necessary. In our plants the names of committeemen are posted in the departments in which they work so that all employees know who the safety man is in their section. We also publish pictures and names of all committees in our plant paper so that they are known to everyone and we encourage their fellow-workers to go to them with their safety suggestions.

The method of plant inspections by the safety committees vary in our different plants and from time to time. In some committees two or three members are delegated to act as unofficial inspectors for that month, while in others all members of the committee are delegated to inspection tours. These men are released from their jobs for as long a period as is necessary to make the inspections and a report of their findings and recommendations is made at the meetings. I believe that our most thorough investigations and best recommendations are received when we ask for an inspection on special things such as cranes and chain falls, tractors, trucks and trailers, elevators, dangerous pulleys and belts, etc. In that way the committeemen are looking for specific things instead of everything in general and better results are obtained.

We feel that our plant is well taken care of so far as mechanical safeguards are concerned. The plant committeemen know this very well and are told that it is not the number of guards and other changes that a man suggests that determines his value as a safety man, but rather the example he sets by his own actions and the advice he gives his fellow-workers every day as he goes about his work.

When a new member is appointed he is sent a personal letter from the central safety committee reading something like this:

We are very glad indeed to notify you that at the last meeting of the central safety committee you were appointed a member of the _____ safety committee.

We ask that you assist in every way possible to make our plant as safe a place to work in as there is anywhere, that you caution any employee at any time who is doing an unsafe thing or working in a manner that may endanger himself or others.

Your committee holds regular meetings each month, notifications will be sent to you, and it is part of your job to attend every one of these meetings.

There are many ways in which you can assist in keeping your fellow-workmen from getting injured. Many of them you know, and others will be taken up at your committee meetings. Remember that over 90 per cent

of our accidents, in fact of all accidents, are caused by carelessness of the individual. Very few are caused by machines. Therefore, it is necessary to continually keep the safety viewpoint in everyone's mind.

We are enclosing a safety button which is the badge of the safety committee and we hope that you will wear it at all times.

When a workman is serving on the committee, we try and interest him in safety work so that when his term is up he becomes a true disciple of safety. Consequently, when the membership is changed, another personal letter is sent to the member which reads somewhat as follows:

As is customary at this time, we are changing some of the members of our safety committee and appointing several new members. Your place on the committee has been taken by one of your fellow-workmen.

You know, from your activities on the committee, that it is by getting every one's interest in safety that we can accomplish the most good. Consequently, we want you to continue to do everything in your power to help make our plant the safest place in the world to work in.

We know that from your experience on the committee you realize what a tremendous loss accidents are and how easily they can be prevented, if we can only keep the men thinking about being careful. We believe we can depend on you for your continued interest in this very important subject which effects every single man and woman that works for Bird & Son.

The Safety Committee Sometimes A Court

At the plant committees all accidents are carefully gone over and discussed. We have at times had the safety committee sit as a court of judgment on workers who have been injured. The injured man, his foreman and others concerned with the accident are brought before the committee. All sides of the case are heard. The committee discusses any questions and finally passes judgment on the cause and responsibility of the accident. This decision is sometimes posted on the bulletin board or otherwise given publicity. Allowing the committee authority to set any real punishment is questionable, but it is certain that by bringing this before the committee it impresses the worker with the idea that his fellow-workers and the company are taking it as a serious matter.

The safety committeemen can be of invaluable aid in general everyday cooperation in safety work. If horse-play starts in the absence of the foreman, it is the safety committeemen who can tactfully say, "Easy, boys, or somebody will get hurt," or if he sees an unsafe practice being carried on he can easily bring it to the attention of the worker or the company and have it stopped. Further the committeemen have good ideas on safety publicity. If you are having a "no-accident" week or month, form a publicity committee of local safety committeemen. They will often bring forth excellent ideas for publicity on such occasions. It is also a good idea in such cases and even in the general run of safety publicity to give the safety committees credit by signing notices, posters, etc., as coming from them.

At our plant we have designed a safety seal showing our safety button, a man representative of our safety committees and the words "The Sign of Vigilance." This sign appears on monthly record sheets of accidents, on a little safety newspaper published during the month and in the corner of a series of safety posters that we are issuing.

In general, while the foreman is frequently the authoritative link between the officials of the company including the safety inspector and the men in the

mill, the plant safety committees are the cooperative links invaluable when used in the right way.

K. L. FAIST (Champion Coated Paper Co., Hamilton, Ohio): Is there any remuneration given the Safety Committee?

MR. ROGERS: No, we don't pay them for the time spent in the committee work. It is part of the work, and they are taken off their regular jobs to do it. We do have a great many safety meetings, say in Boston. There is a series of 10 or 12 meetings. The safety committees are taken to those meetings. Busses are chartered to take them in, and a very large number go. In that way, we try to give them a good time as well as the safety influence.

MR. FAIST: This committee man who makes a tour of inspection—is that arranged at such a time as is convenient, or at some special time?

MR. ROGERS: They are told to make an inspection by the chairman of the committee.

J. J. PLZAK (Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.): What type of inspection do you make for example, on a hoist or shaft?

MR. ROGERS: The safety inspectors do not make a thorough inspection, but they do see that the cables and guards are O. K., and that the safeguards are being used, and the like of that.

MR. PLZAK: Do you have any such inspection that is practically a general overhauling of the machine?

Reasons for the Regular Inspection Plan

MR. ROGERS: Well, the reason that we make the inspection is this: In one of our factories, we handle paper rolls weighing something over five thousand pounds. On the drum of one of the cranes where the cable was installed, just a little solder was used, and one of these rolls went down, narrowly missing three or four men. Since that time, we have made a regular inspection on cranes, hoists, and so on. We have an outside elevator inspector and a regular mechanical inspection probably three or four times a year.

CHAIRMAN GLEASON: Do you concede that point that the safety committee takes the place of the regular inspection by people who are qualified to make inspection?

MR. ROGERS: Don't ever give up special inspections. I am glad you brought that out. We certainly can't hold the safety committee responsible for a bad cable on an elevator or crane or anything of that sort.

MR. PLZAK: I brought that up because we have quite a bit of vibration continuously, and those of you who know that this metal becomes crystallized, know that it is a very dangerous thing. An inspection once a week cannot reveal that crystallization. How do you go about finding that out?

MR. ROGERS: I don't know just what is done on line shafting and so on. We have a master mechanic to look after such things.

MR. SHERMAN (Titanium Pigment Co., Carondelet, Mo.): The practice in some mills and railroads is to anneal or use a heat treatment for certain pieces of equipment subject to crystallization. I don't know how you would go about that.

CHAIRMAN GLEASON: I think Mr. Rogers' point was a good one: Never release the men entirely from the safety committee. Make them feel even after their time is up that they are a part of it.

An idea that came to Hammermill, following the Cleveland meeting, might be mentioned. We had some five or six superintendents at the Cleveland meeting. When they went back, each one gathered all the foremen around him—a force of about 25 or 50 people. He made them go through the entire department, and the results were very good. They got something from each department. As a result the departments were cleaned up, and the safety record improved to just that extent.

Mr. C. K. Boyer, Interlake Pulp & Paper Company, Appleton, Wis., will speak on "Standard Guarding and the Papermill Safety Code."

Standard Guarding and the Papermill Safety Code

C. K. Boyer, Interlake Paper and Pulp Company, Appleton, Wis.

If you will turn to almost the first page in this Code, Rule No. 11, you will read, "The purpose of this code is to provide reasonable safety for life, limb, and health." If that code had nothing in it except that statement, I think the work placed on the code and the expense put in it would be fully justified. Its purpose is to protect healthy people from industrial diseases, to save sound bodies from becoming peg-legged and empty sleeved, and to reduce bills for flowers which too well depict the widow's faded interest in life as they wither away on top of a newly made "mill accident" grave.

Of course, the Code doesn't suit all of us. I don't think all of the Code would suit any of us. No single code can meet all of our ideas or individual experiences with industrial hazards. How many of you have read this Code?

(The majority had read it.)

Good. There are some mills in the United States and Canada that do not know yet that the Code was brought into existence a year ago, after working upon it for two, three or four years. But you have the Code, and it is your business to read it. Don't criticize the Code without reading it, at least. Let's be honest with ourselves. Let's comply with the rules we cannot criticize fairly to ourselves. Do this much, and before long our mills will be veritable show places of safety guards and safety methods. Let's pay for our privilege of criticizing by coming across with the safety measures which we must admit to ourselves are fully justified.

Standard guarding, as described in various state and Federal Codes, is no longer mere guess work nor a mere pretext to give state inspectors or sentimental safety enthusiasts a job. Rather, the matter of industrial and public safety has become so large and vital that it requires big men to do the safety job. Nor is standard guarding any longer a fancy luxury designed to catch the eye of a visiting welfare worker or social uplifter. Rather, standard guarding is a positive method of cutting production costs by eliminating medical bills.

Our modern high speed world of industry demands fool-proof working conditions as near as possible. A modern paper mill means taking a sheet of newsprint 20 feet wide through a series of press rolls, over four dozen hot dryers, through a 300-ton calender stack and on to a reel that never stops, at a speed of 18 feet per second.

It demands that chlorine gas, the poisonous terror of the World War, be handled in 15-ton carload lots in the very midst of a large city. Catch the full significance of that. It means the generation of steam in modern high pressure boiler plants, steam at 450 pounds pressure and *so highly superheated* as to endanger ordinary pipe metal and set fire to exposed woodwork with a tiny invisible jet of leaking water vapor.

Such hazards as these are actual consequents of modern speed, efficiency, economy and progressive paper mill engineering. Paper must be made thus to keep up with the competitive march with other industries. Hence, we cannot remove the basic causes of these hazards, but must safeguard them with the best engineering brains and practical experience obtainable. Safeguarding such hazards must be accomplished by tried and proven methods, set forth in standard systematic codes made available for all to read. Without such codes, which are simply the up-to-date records of results of practical past experience, each of us, when faced with industrial hazards new to us as individuals, would be compelled to repeat experiments already tried by other mills. Doubtless we would reach our solution after maiming or killing some one of our workers.

Hazards so great can no longer be dealt with in ways that are haphazard. Experienced industrial workers, executives and genuine welfare workers who have faced this responsibility for human life in the spirit of the Golden Rule, produced such codes. Such men have learned from experience that railings of a certain height and construction will best protect elevated passage ways. They have observed that a simple toe-board placed along the edge of such an elevated structure will prevent a stray bolt or nut from breaking an unsuspecting head beneath. They have recorded the rather simple fact that any belt nip or gear pinch point that can be reached by a man's fingers at the end of his arm should be shut up too tightly for those fingers to slip through. They have observed that any sharp projection on a revolving shaft will catch clothing and hence they banished the murderous set screw of Noah's day in favor of the countersunk set screw.

In short, "There's a reason" for every rule in these standard guarding codes. They are not arbitrary statements designed to arouse antagonism, but are common sense analyses of typical danger points with practical ways of eliminating the hazard. Therefore, don't condemn any coded safety rules without first analyzing the possible reason for its creation. Generally, your own study will reveal that the safeguard suggested will mean not only added safety, but greater production and lower production costs.

Standard Guarding Codes Are Simplified Common Sense

The standard guarding codes were common sense applied to all industries. Industries are becoming specialized and hazards are becoming specific and peculiar in their nature. Hand barkers whittle off the fingers of wood room men only, so a specialized code suggests mechanical means to turn the blocks of wood. Chip bins are peculiar to pulp mills, so our special code prescribes safety belts and chains to prevent the digester helper from being buried under tons of chips or boiled to pieces in a hell of steam and sulphurous acid.

The chemical industry, from its recent war experience, suggests gas masks to protect the acid makers and bleach plant operators from brimstone and chlorine gases. Medical skill points out that personal cleanliness and fresh air will help prevent lead poisoning from use of litharge in lining digesters. The code might add that careful periodic medical examinations and blood tests will generally give sufficient warning, so that workers may be treated in time and changed to other work, if necessary.

The whole Pulp and Paper Code could be analyzed, but this would be a useless task. The fact is, we have standard codes and a special code that contain an immense amount of safety information and based upon actual experience. It is for every foreman, every safety man, every mill executive to know the contents of these codes. It is for these men to realize their personal and moral responsibility to use these coded safeguards intelligently to protect the worker and the community life. Such responsibility accomplished means lower production costs, fewer hospital bills, and a friendlier feeling of the community toward the industry. It also adds many genuine safety workers to the honored list of those who help make real the Constitutional guarantee of "Life, liberty and the pursuit of happiness to all."

MR. PEACOCK: Mr. Altman just the other day wrote a letter emphasizing the statement I gave you earlier in the meeting, that the American Engineering Standards Committee is now ready, if they have the full approval of the Section, to issue this Code as an approved standard.

CHAIRMAN GLEASON: Is there anyone else who has a question?

MR. ROSEBUSH: I think that the years of study that have been put on the Code, and the use to which it has been made show that we are ready to back it up. I move this Section give their approval to its use as suggested by Mr. Peacock.

CHAIRMAN GLEASON: It is properly moved that this Section give their approval to its use as presented. Do I hear a second?

(The motion was seconded by Mr. A. S. Wilson.)

CHAIRMAN GLEASON: Are there any remarks?

C. M. GREEN (Wausau Sulphate Fibre Co., Mosinee, Wis.): I don't see why we don't have time to read it.

MR. BOYER: As chairman, Mr. Peacock arranged to have in the room today a copy available for everybody who wished to have one. Perhaps those of you who did not know the Code was in existence are to be criticized for not knowing about it. It was the hope that we could get the consensus of opinion of the paper and pulp mills in the United States and Canada—we wanted to get their reactions before adopting this Code as a National Code.

A Careful Reading of the Code Recommended

Just by way of establishing my criticism, one rule says that a grating with mesh not larger than eight by eight inches should be installed at the outlet of the chip bin to the digester. You try to fill a 17-ton digester through an opening of this size and you will find that it can't be done. The Code should be pretty nearly fool-proof before turned over to production men. It is better not to have any law than to have a law and see it broken.

JOHN LUNDEGREN (International Paper Co., N. Y.): I have not read the Code in some time, but I have read it, as I had something to do with the original preparation. If we haven't already done that, it might be wise to have a practical committee to separate this Code into what might be termed "arbitrary" and "advisory" requirements.

To fill a digester in the manner set forth in the Code seems to us to be ridiculous. There are several provisions having to do with incunning nips in different places on reels and winders that we don't consider practical, and we believe they can be improved upon.

CHAIRMAN GLEASON: I remember at the time we were working on this Code, we asked for suggestions and asked members to go over this thing, and we did incorporate all these things as far as possible. We had a meeting with the Bureau of Standards man and thoroughly discussed all phases of the Code.

MR. LUNDEGREN: Do you know whether this tentative Code is ready for adoption by the Government?

MR. PEACOCK: Mr. Altman has a letter from the American Engineering Standards Committee saying that they are ready to accept this form as an approved standard providing we will sign the thing as representing our Section. Mr. Altman doesn't want to take that risk. He was aware of such criticisms as Mr. Boyer has brought up.

CHAIRMAN GLEASON: Let's push this thing through under efficient criticism. Are there any further recommendations?

N. H. BERGSTROM (Bergstrom Paper Company, Neenah, Wis.): Would there be any objection to submitting this to the Superintendents' Association to get their sanction?

CHAIRMAN GLEASON: Did I understand you to make that a motion?

MR. BERGSTROM: I suggested that, but I will make it a motion. It could be presented to this Superintendents' and Technical Association for their approval or criticism.

CHAIRMAN GLEASON: Gentlemen, before you entertain that motion, we have another motion moved and seconded that we give our approval to the Code in its present form. Is the maker of that motion willing to withdraw it?

MR. ROSEBUSH: I withdraw it suggesting that we turn it over to the Superintendents' Association.

CHAIRMAN GLEASON: If we are not ready to adopt this code, let's appoint our own committee and get to work on it before we turn it over to anybody.

MR. BOYER: I didn't mean to be severe in my criticism, or I wouldn't have talked for it with all my heart and soul and mind. It is simply this: We must keep in mind the fact that the code can never become fixed. Even the Ten Commandments have passed through a long period of reconstruction. We are even trying to tamper with them today. We ought not to try to make a fixed code. Progress is made through criticism and reconstruction. We should have some provision for changing or revising the Code, and adding to it. Whatever action we take now, we ought to keep in mind that we can recommend other rules and changes.

MR. ROSEBUSH: You gentlemen will notice on the front page of this printed booklet that the Washington Government Printing Office has sent this out through the Department of Labor, I presume to all the paper mills in the United States. Would it not be wise for us to carry this discussion into our next session and talk it over in the meantime. It seems to me that it is going to involve more than we can settle here. Before the Congress is over, we may be able to get together between sessions and come to some definite point in the matter.

CHAIRMAN GLEASON: There has come a request that we vacate this room as soon as possible.

MR. BERGSTROM: I make a motion that this matter be laid on the table until tomorrow.

(The motion was seconded and carried.)

ADJOURNMENT

Wednesday, September 28, 1927

The second session was called to order at nine-forty o'clock by the chairman, W. J. Peacock.

CHAIRMAN PEACOCK: There is a matter of business left over from yesterday, and I want to suggest, gentlemen, before we go into this matter that today's program must begin at ten o'clock. This is the matter of the Code. Is anyone ready with a resolution?

F. H. ROSEBUSH (Nekoosa Edwards Paper Co., Port Edwards, Wis.): I suppose that the gentlemen who raised objections to the Code yesterday have read it since the meeting and are ready to make comments upon it. I think that we should allow this Code to go through. Like any text-book, it is open to revision. No one expects that this Code is going to be final. It is a guide by which the safety engineers can learn to guard their machinery. Five years of work have been put on this Code by a competent committee, and it has been printed by the Government. I make a motion that we allow this Code to be accepted as our standard, with the understanding that within 60 days any criticism sent in that is designated as proper criticism shall be accepted.

JOHN LUNDRIGAN (International Paper Co., N. Y.): I second that motion.

CHAIRMAN PEACOCK: Are there any remarks?

(The question was called for.)

CHAIRMAN PEACOCK: All those in favor will signify by saying "aye"; those opposed "no." The motion is carried.

I designate Mr. R. H. Altman, chairman of the original committee, as the man to whom you are to send any suggestions or criticisms. In the meantime, remember, gentlemen, we have a half dozen engineers representing the section. Mr. Costigane, Mr. Gleason, Mr. Rosebush, Mr. Hoyman, and other members of the Engineering Section are here and you can interview them if you have any suggestions to make. Is Mr. Dowd present?

We had an informal discussion yesterday afternoon regarding the Contest. We were very sweet about it, but we spent two hours in our sweetness. We asked Mr. Dowd to sit up all night and think things out for us.

A. SCOTT DOWD ("The Paper Industry," Chicago): I am reminded of the story of the old colored preacher who went to the Internal Revenue agent to get a permit for the use of "sacrilegious" wines. The agent asked, "what kind of wine do you want, Rastus?"

"Well, the members of the congregation at the meeting last Sunday night decided it would be gin!" was Rastus' reply.

I couldn't get a unanimous opinion from the members last night in regard to this unfortunate situation in the inability to give a cup to the "C" group. After sitting up all night and conferring with the publisher of "*The Paper Industry*" and talking with the members in the "C" Group last night and this morning, I cannot present anything contrary to the resolution that I am going to ask permission to present:

Whereas, Rule 3 of *The Paper Industry* Annual Safety Contest for 1927 reads as follows:

"Contest shall start January 1, 1927, and end June 30, 1927. However, should two or more mills in any one group be tied for first place, as of June 30, the contest for all contestants in said group shall be extended until the tie is broken," and,

Whereas, Rule 4 of the same Contest reads as follows:

"The winner of each group shall be the mill having the lowest accident severity

rate (days lost per 1,000 man-hours worked), in accordance with the rules and the 'Scale of Time Charges for Deaths and Permanent Injuries,' as listed on page 4"; and

Whereas, There were six mills in Group C (mills having 20 to 200 employees) which operated without an accident for six months, each attaining thereby a severity rate of zero, and the contest for all contestants in that group was extended according to Rule 3, and to date has not been broken; and

Whereas, An interpretation of Rule 4 has been expressed by certain contestants to mean that group winners shall be determined on the basis of man hours worked, which in the event of a tie would give prior rank to that mill working the greatest number of hours; and

Whereas, It is the desire of many to award all cups for the 1927 Contest at this annual meeting, and the desire that the aforesaid interpretation be accepted in order that all awards can be made; and

Whereas, Rule 4 specifically states that the "winner of each group shall be the mill having the lowest accident severity rate," and that this rate is defined therein in parenthesis as ("days lost per 1,000 man-hours worked") and that a zero number of accidents divided by any number of hours worked makes a quotient *rate* of zero, and that nothing can be less than zero, and that by this rule as specified, it is *impossible* to declare a winner until such tie is broken; be it

RESOLVED, That the rules governing *The Paper Industry Contest* for 1928 be formed to include the provision in the event of a tie that the mill in such tie working the greatest number of man-hours for the period of the Contest shall be declared the winner.

Respectfully submitted,

A. SCOTT DOWD.

Editor, *THE PAPER INDUSTRY*.

Resolution on Contests is Adopted

JOHN LUNDRIGAN (The International Paper Co., N. Y.): That is for the 1928 Contest?

MR. DOWD: Yes.

MR. LUNDRIGAN: I move its adoption.

CHAIRMAN PEACOCK: Are you ready for the vote?

All those in favor, kindly signify by saying "aye," those opposed "no." It is unanimous.

MR. DOWD: I haven't anything to say at this time regarding the 1927 Contest awards. I think the time set for that is the Luncheon. I imagine our anticipations are rated high for that which is to come.

CHAIRMAN PEACOCK: You all want to be there when this matter comes up. Mr. Hoyman is designated chairman for the program, and he will please take the chair.

M. G. HOYMAN (Kimberly-Clark Co., Neenah, Wis.): Having such an interesting event at twelve-thirty, and not knowing any more about the results than we know now, we do not want to do anything to prevent being here at that time. We have four speakers on the program this morning, which means we should get down to business at once.

We know that the greatest thing about safety is the business of selling it. In fact, everything we do is trying to sell something, whether it is service or goods. This idea of selling safety is the only way safety can be gotten across. These men will tell you in their own way just how it is done.

The first topic is "To Employees." We have some one who is well able to tell us about that—Mr. D. D. Thirkield, Sorg-Oglesby-Smith Paper Co. Middleton, Ohio.

Selling Safety to Employees

D. D. Thirkield, Sorg-Oglesby-Smith Paper Company, Middleton Ohio

My talk is short. I hope you will understand that I feel fairly humble in appearing before such a group of safety men. Some of you may remember that I was present last year, and I would like to say now that the information I received at Detroit has been the mainstay of my work during the past year as safety director of my company. When I started, I didn't have the slightest idea of what the job would be. The general attitude of the foremen seemed to be, "We have so many accidents anyway, we might as well have them and get them over with." I went back with the idea that we could reduce accidents.

The first of January we opened up a new department for this work, and I was placed at the head of it. When I started in at Middleton, I was very enthusiastic about what I had heard up here in the way of the safety contest, with cups for the winners, with dinners for the safety committees and all that.

I had a number of very definite plans, with two safety committees, one for the foremen and one for the workers. Then I was also going to buy three or four cups and have monthly dinners for the safety committee, and start off with a great big hullabaloo, and make 400 employees accident proof in thirty days.

Fortunately, I was so busy the first thirty days getting organized, that I didn't have time to put any of these plans into effect. I was very fortunate, for had I started off the way I had planned, it would have slid off into the river.

Many of the employees had been working 10 years or more, a couple of them 25 years, and they had never had safety talked to them. It appeared foolish to try to sell safety by the circus method. I decided that the thing to do was to go quietly about the safety work and sell them slowly but surely, and then when I got through they were all sold, because when such a point is reached it will stick. We didn't have any dinners, and have never secured a safety committee. I was fearful that with my ignorance coupled with theirs, any organized attempt for safety work would be disastrous.

I remembered that everyone who spoke about safety declared that anywhere from 75 to 85 per cent of all accidents were caused by carelessness. With that in mind, I went over the mill very carefully, and in spite of the age of various departments and the age of the machinery, found that we have lived up to that Code pretty well. The dangerous points were pretty well covered up, and I made up my mind that if this great percentage of accidents was caused by carelessness, I certainly ought to reduce accidents by making the men careful. That is the way I have been going along all this year. I have used the National Safety Council posters, and I couldn't have done very much without them. I had 25 bulletin boards made, and had them placed at strategic points all around the mill, after which these fine posters were put up. That was the starting point. Then I started mimeographing bulletins, of which I have a few samples here.

This is a green telephone book cover that we make, and I used that. (Indicating) I also used yellow posters like that. I make them fairly interesting, and they are always before the men. Also, there is always one of these either green or yellow bulletins indicating the safety progress in the work for that month.

After talking to several safety men down at my end of the valley, I was somewhat doubtful as to whether we would be able to reduce accidents the first year. Some of them thought it would take a year for the idea to sink in deep enough to make the men careful. They were right to a certain extent. The figures for the first nine months, January to October 1st, 1926, showed 73 lost time accidents. There

is no question about this being terrible. Anybody can improve on that 2,201 days of lost time among 400-odd employees.

Our method of selling safety isn't mine or our company's. It is really yours, gained through the National Safety Council. The results for the first nine months of 1927 have been: 29 lost time accidents, 391 days lost.

I have here the "*Sosco News*." Mr. Peacock suggested that I print up some extra copies to have at the meeting, and I believe he meant that, so I did print up a couple of hundred more of them. That is, in my estimation, the most important method of selling safety to our employees. As you glance over it, you will find it is practically all devoted to safety.

If you will take notice, you will find that January, February and March did not show any decrease in our accident prevention. March was the worst month. It took three months for the idea to seep through that accident prevention was possible. The second three months show a decided improvement.

When a man gets hurt, that is the best time to sell safety. When some one is injured, he reports to my office. I send him to any doctor he wants to go to, as we haven't a company doctor. Then he comes back to my office and makes out a report. Before he leaves, he is absolutely sold on the idea of safety. I don't give him a rough talking to. When he gets out of there, he is a mighty good disciple of safety work. He spreads it to his fellow workers, spreading the gospel of safety all the time, and that is very important.

Accident Prevention Has Been Justified

Our men are enthusiastic now about safety. They have had proven to them that you can reduce accidents. I have pumped the fact into them that they derive the greater benefit from fewer accidents in the mill, because they not only work the additional time but get the extra money. I feel confident that by pursuing the same methods without any safety committee and without any hurrah every day, and every hour of the day, keeping the idea of safety before them, I feel confident as I say, that next year we will reduce accidents in about the same proportion as we have this year, and in two, three or four years our four hundred men will feel about the same as you do.

So far, the response has been wonderful. Some men, some foremen and executives have told me, "Those fellows don't give a damn about safety—they don't care." But they do. They are just like the rest of us. I feel sure that as we go on in that quiet method, we will have at least a running chance at the Safety Cup to be presented next year.

CHAIRMAN HOYMAN: That just shows you what can be done. It may not be new to some of us, but it may be to others, and is at least an inspiration. As we are going to make the discussion very brief, if you have any question to ask, you have four or five minutes to do it in. Who is the first one?

STUART H. BROWN (Union Bag & Paper Corp., N. Y.): I would like to ask something more about these yellow and green sheets.

MR. THIRKIELD: The first one is dated May 1st, and reads:

"Lost Time Accident Record for April.

- | | |
|--|--------|
| 1. Lowell DeBolt, Oglesby Beater Room..... | 9 Days |
| 2. John White, Sorg Yard Gang..... | 3 Days |
| 3. Lester Dennis, Sorg Beater Room..... | 1 Day |

Total Time Lost	13 Days
The loss in wages for these three men was.....	\$42.69
Less Compensation paid by State.....	8.04

Net Loss	\$34.65
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Lost Time Accidents, First 4 Months 1927

January	6	57 Days
February	3	41 Days
March	7	135 Days
April	3	13 Days
	19	246 Days
Loss in Wages		\$868.39
Less Compensation		231.82
Net Loss		\$636.57

The Cost of Accidents is greater to the Insured than to the Company.
Make May a No Accident Month."

This green folder has the departmental standing which I get out every quarter. This shows the mill, department standing, average number employed, total hours worked, number of days lost, severity rate and frequency rate. We have a lot of discussion about the severity and frequency rates. By the way, never until last year was a record kept of the number of accidents.

GEORGE HEESAKER (Kimberly-Clark Co., Kimberly, Wis.): I would like to ask in selling safety whether it would not be a good idea to talk to them before they are hurt instead of waiting until after they have been injured. Why not call them together once a week instead of talking to them after they are hurt?

MR. THIRKELD: I don't believe the spirit is there yet where they can all come together in a big group and get very much out of a safety talk. I do not think it would be wise to call them together and address them through the executives of the company or by outsiders. I am not claiming that I am right, I may be wrong, but that is my opinion.

CHAIRMAN HOYMAN: I think we will have to go on with the next topic, because if we have time at the end, we can discuss and argue any of these points that we won't have time to talk about now. I think Mr. Thirkield made a great showing for the first year. I want to congratulate him. The next subject will be handled by Mr. W. E. Walker, Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich.

Selling Safety to Foremen

W. E. Walker, Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich.

When I was coming down on the train this morning, I wondered if I could do as well as a preacher I heard a week ago Sunday night. I think it was the best sermon I ever heard, and he did not exceed six minutes in delivering it.

Yesterday there came to my desk a paper gotten out by the American Management Association, on accidents usually classed as unavoidable. It says that Mr. Heinrichs brought out the fact that noncompensable accidents cost our plants four times as much as our compensable accidents.

I wonder if any of the foremen here are not sold on safety. If there are, I would like to have them stand up. I would like to meet the executive or the employer who is not interested in the folks that work under the foreman. I would like to know how they selected such a man for such an important job and just what they think the duties of a foreman are. My contention is, that a foreman who cannot see or pays no attention to the possible hazards of occupations under his supervision does not know whether his employees are doing a good day's work or not.

We'll grant, for argument's sake, that he does know that his men are producers and he is conscious of the fact that hazards or probabilities for accidents do exist, and yet he does nothing about it. Isn't he the man who sees many wastes, many

places where improvements could be made, many places where the company's interests could be better served, and yet does nothing about it?

The next gentleman on our program I believe, has the job of selling safety to superintendents or higher executives. He is the boy with the big job. And on the other hand, why does any live, wide-awake foreman, if he knows that something should be done, wait for the superintendent or executive to tell him to do it? He was evidently picked because he showed an interest in getting the proper things done without having to be told, as far as production is concerned and the best interests of the employer. Why does he remain ignorant of the possibility of loss of life or limb to an associate? Would he tolerate a machine that wouldn't produce goods accurately? I believe he would holler his head off?

What I mean by that is: A foreman is more apt to show an interest in the producing machinery than in the employee, who is really the higher cost of producing. I wonder if a foreman always thinks of what it costs his department and his prestige as a foreman when an accident occurs to one of the men under his supervision. I wonder if he knows this costs his employer many dollars in many ways.

The Accident Cost in Terms of Dollars and Cents

I know of a plant where in 1925, with 750 employees, the combined medical, hospital and compensation bills paid were \$5,730. This covered a total for 204 accidents in one year, besides which there were 1,501 days lost. Figuring labor at a very conservative estimate, say \$4 a day, that makes \$6,000 lost in wages to employees to say nothing of mental anguish, physical suffering and the privations endured by the families affected. That means quite a lot that might be avoided.

To get back to the costs of accidents in terms of production, in our plant we figure twice the amount in loss of production that a man loses in wages every day he is off. That means that when the employees' loss is \$6,000, the plant loss is \$12,000. This amount added to the compensation, medical and hospital costs, makes a total of \$17,730 for one year.

Would you say that was a lack of supervision on the part of the foreman? I would ask you that question and let you answer it to suit yourselves. But, anyway, the people who are most in touch with the people to whom these accidents occur are the foremen.

These figures may seem extreme, but they are compiled in a plant that has a safety organization, a poster or bulletin plan of placing warnings, and a safety engineer. What does it mean? I will tell you what I think it means. We all know what we ought to do all the time, but we need some one to constantly remind us of our duty every day to the fellow who works under us.

I think what we need more is the spirit of fair play in all of us, and above all things, all the time, the sense or responsibility that we as foremen ought to have to the wives and children, fathers and mothers of the men who are working for us.

CHAIRMAN HOYMAN: Does anyone care to ask a question?

MR. SELLHOFFER (Milwaukee, Wis.): I was very much interested in the speaker's remarks relative to the fact that a present day management didn't want to hire a foreman who is not interested in the welfare of those under him. What are you going to do with the fellow who has been with the company before safety became a real part of his responsibilities?

MR. WALKER: There is only way for a foreman to be today, and that is to keep pretty well posted on everything. He is not a good foreman today unless he is interested in the safety movement. It should be definitely realized that an increase in accidents causes a loss of production, and a decrease in accidents causes an increase in production. I would say that fellow was not keeping up to date with his job as a foreman.

W. A. GLEASON (Hammermill Paper Co., Erie, Pa.): I can answer that in another way. In this case, it took an accident to put these things into effect. After a very severe accident had occurred, in investigation the safety man said that he had experienced difficulty in getting safety devices installed in this particular department. The chief executive put the responsibility for that accident directly up to the superintendent who had been in the plant some 27 years. He in turn put the responsibility up to one of the foremen under him, and since that time there has been an entire reversal of policy. They are now leaders in the safety movement.

L. W. RHODES (Kimberly Clark Co., Niagara Falls, N. Y.): Is it possible for the foreman to be partly sold on safety?

MR. WALKER: I don't know where you would draw the line.

MR. RHODES: It seems to me that in selling safety to the foreman, you never can sell him 100 per cent on safety as you can on production.

MR. WALKER: The foreman may not figure it out that one way to increase production would be to decrease accidents. He may not be smart enough to know that a decrease in accidents would help production, but when a foreman gets that into his head, production is going to increase.

MR. RHODES: I have worked with a number of good men, yet they do not become half as excited about an unsafe practice as they do about bad machinery.

JOHN H. CRIST (West Virginia Pulp & Paper Co., Piedmont, W. Va.): I think most foremen are really sold on safety. Foremen are all human, and safety engineers and safety people aren't always as diplomatic as they might be. I believe when a man has the calibre and enough executive ability to get their respect, he can get results.

JOS. H. SLATER (Escanaba Paper Co., Escanaba, Mich.): I think it is wholly the attitude of mind of the old foreman who perhaps had his early training prior to the time the safety movement came into prominence. His mind is very much a one track mind. His mind doesn't include safety. He feels that it is one of the frills put on business and gives it as little attention as he can.

You must get after the foreman and change his attitude of mind. I had an experience of that kind in the past, where I called one of the old foremen in and told him that he didn't seem to pay much attention to safety in his department. I said that we would have to get someone else in there unless he adapted himself to the realization that accident prevention was as much a part of the business as the business itself.

Usually the man changes. It may not be as much of a change as you wish, but he changes. Then by treating him with some kind of friendly interest thereafter, he will presently become a pretty good safety man. The old type of foreman was a rather belligerent sort of fellow, having very little sympathy for the other fellow who got hurt. It is a matter of education for the superintendent and the foremen in seeing that the safety idea be observed and carried out.

CHAIRMAN HOYMAN: I am afraid we will have to go on to the next subject, which is the report of the Nominating Committee. Mr. Nat. Bartlett!

Report of the Nominating Committee

NAT. F. BARTLETT (Hollingsworth & Vose Co., Boston, Mass.): I want to thank you for this privilege of serving as Chairman of the Nominating Committee, and also for the absolute cooperation of the other members.

The Nominating Committee respectfully submit the following names to serve the Paper and Pulp Section of the National Safety Council for the coming year:

Chairman: W. J. Peacock, Northern Paper Mills, Green Bay, Wis.

Secretary: N. H. Bergstrom, Bergstrom Paper Co., Neenah, Wis.

Sixteenth Safety Congress

Vice Chairman for Canada: A. P. Costigane, Ontario Pulp and Paper Makers Safety Association, Toronto, Ont.

Vice Chairman for South: G. W. Phillips, Champion Fibre Co., Canton, N. C.

Vice Chairman for Middle West: M. G. Hoyman, Kimberly-Clark Co., Neenah, Wis.

Vice Chairman for East: W. A. Gleason, Hammermill Paper Co., Erie, Pa.

Vice Chairman for Paper Box Manufacturers: H. C. Sackett, Alton Box Board & Paper Co., Alton, Ill.

Engineering Representative: R. M. Altman, Marathon Paper Co., Rothschild, Wis.

Regional Directors

For Maine: Alvin F. Record, International Paper Co., Chisholm, Me.

For Massachusetts: Nat. F. Bartlett, Hollingsworth & Vose Co., Boston, Mass.

For Michigan: C. E. Torrance, Bryant Paper Co., Kalamazoo, Mich.

For Ohio: Kenneth L. Faist, Champion Coated Paper Co., Hamilton, Ohio.

For Pennsylvania: E. J. Gayner, Scott Paper Co., Chester, Pa.

For Wisconsin Valley: F. H. Rosebush, Nekoosa-Edwards Paper Co., Port Edwards, Wis.

For Fox River Valley: W. F. Ashe, Thilmany Paper Co., Kaukauna, Wis.

For New York: C. H. O'Connell, International Paper Co., New York City.

Committees

Chairman Statistical Comm.: E. E. Grant, The Crystal Tissue Company, Middletown, Ohio.

Chairman Poster Comm.: Ameil Umlerham, Ft. Howard Paper Co., Green Bay, Wis.

Chairman Membership Comm.: J. H. Slater, Escanaba Paper Co., Escanaba, Mich.

Chairman Publicity Comm.: D. D. Thirkield, Sorg-Oglesby-Smith Paper Company, Middleton, Ohio.

Chairman Contest Comm.: A. Scott Dowd, Editor, "The Paper Industry," Chicago, Ill.

Chairman Health Research Comm.: J. J. Plzak, Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis.

Respectfully submitted,

R. S. TURNER

W. A. GLEASON

E. A. KENNEDY

N. F. BARTLETT.

A Token of Appreciation to the Chairmen

CHAIRMAN HOYMAN: You have heard the report of the Nominating Committee, gentlemen, what is your pleasure?

JOHN LUNDGREN (International Paper Co., N. Y.): I move that the Secretary be instructed to cast one vote for the officers named by the chairman of the Nominating Committee.

CHAIRMAN HOYMAN: It is moved and seconded that the Secretary be instructed to cast one ballot. Are you ready for the question? All those in favor please stand up. It is unanimous.

I believe this will be a very appropriate time for Mr. Bartlett to say something to the past chairman and secretary, before he gets entirely surrounded.

MR. BARTLETT: There is nothing in this world like appreciation. I believe that one of the most unpardonable sins we have is forgetfulness or ingratitude. For the past three years, a gentleman by the name of Peacock from Wisconsin has given his services unstintingly to this Section.

On behalf of the Paper and Pulp Section of the National Safety Council, in

appreciation of the value of his services I wish to present a little token to Mr. Peacock, and I know he will accept it with equal pleasure to himself and to the Paper and Pulp Section.

Mr. Umberham, it also gives me great pleasure on behalf of the Paper and Pulp Section and those present to hand to you a token of appreciation and our esteem for your services as Secretary of this Section. Mr. Umberham, please come up and get it!

W. J. PEACOCK: Before you pass on to the next subject, I want to express my appreciation for these good words of Nat's and this beautiful wallet. I also want to express my appreciation of the unanimity of the vote on the report of the Nominating Committee. I am not certain that Mr. Slater was consulted, but the rest of you were, and I believe we are going to show the entire National Safety Council some speed next year.

CHAIRMAN HOYMAN: The next speaker is Mr. J. H. Slater of the Escanaba Paper Company, Escanaba, Mich.

Selling Safety to Superintendents

J. H. Slater, Manager, Escanaba Paper Company, Escanaba, Mich.

The fact that we should want to discuss the selling of safety to paper and pulp mill superintendents, indicates that there has probably been some disappointment or failure in having superintendents become interested to the extent they should in maintaining safety in the plants over which they have control. I think there is little doubt that this is so. I am tempted to believe that we have all had experience with superintendents which has been disappointing in connection with safety work, and we probably all have some idea as to the reason for not getting better results, better cooperation and more satisfactory safety conditions, because of laxness on the part of mill superintendents.

Personally, I am a believer in the old proverb that "the eye of the master makes the house thrive," and in this case the meaning of the proverb is that in the final analysis the management, including all executives who occupy a position over the superintendents, are perhaps as much to blame, or more to blame, for lack of energy or enthusiasm than the superintendents, themselves. Even the best of superintendents are much influenced to take their cue from the attitude of the management above them, and if there is an atmosphere of indifference, or perhaps more correctly an attitude of weak interest, on the part of the management, then the superintendents very easily and quickly senses this condition and falls into the same attitude. Particularly is this true since the superintendent has usually been trained and early taught to give his first attention to quantity of production, in quality and then to the economy of production; and it is not easy for him to realize that a vital part safety plays in these matters of quality, quantity and economy.

While it is true that practically all men subscribe to the doctrine of a safe mill and even a few have been made specialists, a great many treat the matter of safety as a small detail to be passed over with as little consideration and trouble for themselves as possible, deferring the matter of following up nearly everything that has to do with safety and better working conditions to a superintendent of maintenance.

Perhaps a safety organization has been formed, but all too frequently it exists as a weak, ineffective force. The recommendations for safer conditions and the recommendations of factory inspectors from the insurance companies are ignored or delayed for weeks and months and then too frequently carried

out reluctantly with much complaint about the cost, or the stupidity of the working force that makes them necessary. In other cases safety measures and safety work are attacked spasmodically, the result being that the whole subject finally comes to be regarded as a necessary evil hardly worth the effort.

The state of mind arising from a condition of this kind permeates the whole force and is a cause of much failure to obtain the large percentage of success in safety work which should be the aim of all effort in this direction. There is a species of insincerity, or at least a weak belief in safety work, and this quickly affects the superintendent unless he has been completely convinced on safety work previously; and, even if he has, when he finds a lack of vital interest and energy in this matter emanating from the head executive, he is almost sure to let down in his interest and effort. To attain success there must be a constant, aggressive demand for a betterment of safety conditions on the part of the executive management. There must be earnest encouragement and proper financial support given to all problems of safety, so that the superintendent and all his men may realize that safety in the operation of the plant is in a measure just as vital as production and quality—in fact we strongly believe it is one of the principal factors and production is lowered and quality impaired by an undue number of accidents, and quality is sustained and improved by a small number of accidents.

Safety a Part of the Executive's Plan of Management

The up-to-date executive will not fully delegate safety and improved working conditions to his superintendent but will make it an important part of his whole scheme of operation. He will want to fight the battle of meeting the needs of his fellow men in his particular line of manufacture with as few wounded and killed as possible. Why? Because it is the humane thing to do and particularly is it the economical way to operate. It pays in dollars and cents. It pays in the reaction of the employees—in the feeling that their comfort and safety is a matter of real concern—and the management recognizes its obligation.

Every superintendent is continually and profoundly influenced by the executive management above him. His thoughts are colored, his actions are influenced, his decisions are made almost invariably with the thought of what the executive wishes. Of course, this means that when strong influence is exerted in favor of certain action (as, for instance, safety) this will receive the support of the superintendent to a much greater extent than if certain desires are weakly expressed or indifferently sustained.

Therefore, if you have difficulty or think you have difficulty in selling safety to your superintendent, look to yourself and frankly analyze your own attitude. Judge if you have given him the proper moral and financial backing. Judge if you have by your actions created an atmosphere of sincerity regarding your interest in safety, your determination to demand safe operation as you will demand production, quality, economy and all the other features you believe necessary in successful manufacture. Then if you are really satisfied that you have done your part, I think there will be little difficulty in having your desires carried out, in selling more completely the safety idea to your superintendent. If perchance you do not have success, then your superintendent is evidently not the man for the place he occupies.

The extraordinary interest and vigorous effort accorded safety measures is of comparatively recent origin and yet it has been given recognition to a still greater degree each year, so that every superintendent today is more or

less interested in it, but just needs to have his interest stimulated constantly by insistence on measures and methods for the reduction of accidents.

Life is constantly being modified and adapted to meet the demands which are being made upon it, so we merely have to insist sternly that safe manufacturing operation be given adequate consideration and the superintendent is pretty certain to deliver what is required from him. However, there are many different minds and superintendents vary greatly in their opinions as to the value of safety. Thus it is strictly up to the management to impress on the superintendent the need for his leadership in safety work and in all the other functions of his position. The management can easily show the superintendent the outstanding value of safe working conditions in their actual reduction of cost per ton of production. Ordinarily this cost changes from month to month and is at its lowest when there are no accidents. This is convincing evidence and should spur the superintendent to redouble his efforts in educating his foremen and other employees to greater care. Once the superintendent is made to feel through the management the full responsibility of his position in this regard, he is almost certain to awaken and presently the whole organization will be permeated with a consciousness of danger and the need and power to prevent it by putting up a line of defence.

The progressive superintendent—and they all want to be numbered in this class—can be shown that to take more and more interest in safety work will enormously raise him in value to his employer for he will then more vividly comprehend the need for quiet but firm discipline because confusion and lack of order breed accidents. He will note more keenly the dangers about his plant from lack of cleanliness, from the disorderly arrangement of everything that has to do with the work, from the absence of proper lighting, unsafe tools, dirty corners, obstructed avenues, slippery floors, accumulated debris, dangerous, risky methods of working and the thousand and one features open to criticism which he perhaps never fully realized before.

Bad Housekeeping An Indication of Inefficiency

He is almost certain to see deficiencies and dangerous conditions in his mill with a new outlook—sloppy, wet floors in the grinder room, rickety trucks, grinders obscured in vapor and covered with stock and useless appendages, and all the other features that go with such conditions. These loom up as a danger. In a sulphite or sulphate mill, leaky pipes, a mill smelly with escaping gas and wood room and repair shop room confused and dirty and totally lacking in order, a mill yard without system—all these will present themselves as menaces to safety. A boiler house and power plant dirty and disorderly, creating a sense of insecurity and impermanence; a machine room perchance greatly overheated, improperly ventilated; employees exhausted from working in such conditions—all will emphasize in the superintendent's mind the need for better organization and better direction so that he may reduce accidents; and of course in doing this he will improve running conditions in his whole mill.

If he is the right sort of superintendent, he will be rather appalled at the imminence of the dangers arising from just a few of the conditions I have touched upon and he will probably want to begin at once to put his house in order. As a matter of fact, there is a vast amount of poor housekeeping in mills and it is a source of numerous accidents; but the superintendent who insists upon a clean, orderly mill with a place for everything and everything in its place will automatically reduce the accident record, also reduce waste,

cut costs, increase production and make all manufacturing conditions more definitely reliable.

Safety is an essential factor of operation, and failure to secure it is failure to fill the job satisfactorily. Every superintendent should realize this. He is called upon to play a difficult part. He is, to a large extent, "his brother's keeper."

Although we emphatically believe that safety should be observed and carried out on a strictly business-like basis, a friendly, sympathetic attitude on the part of the superintendent in his intercourse with his men will do a great deal toward avoiding accidents. The formation of safety committees should by all means be made and continued, and as time goes on it has been our experience that it is surprising how many men on committees show special aptitude for the work in suggesting dangerous places and dangerous practices. This is an excellent means of giving to a considerable number of your men possibility for self-expression. Many men will show real leadership in heading groups of workers. The wise superintendent will be quick to recognize such men and use their talent in various ways to cut down accidents and it will be a means of getting a more accurate knowledge of their fitness for promotion.

Great Losses Arise from a Small Injury

Our experience has shown that our greatest losses, our most severe cases, have usually come from a small injury—a small cut, a scratch, an abrasion that was not given attention and protection, so that presently it was a bad case of blood poisoning. An educated accident committee group will do much to reduce such cases by warning the injured man of his danger and by assisting the foreman to note such injuries.

Then a modern, intelligent superintendent hardly needs to have it impressed upon him that continued reiteration of warnings and cautionings and still more repetition is of infinite value in educating his men. It is the way we gain most of our knowledge and have it stick in the mind. Safety education advances through cycles. First one method is employed to impress the need of caution; then other means are taken to keep the mind fresh and active in the matter of accidents, the most recent one being the posting of highly colored posters—display pictures with pertinent and humorous quotations. We think this way of driving home the truth of wonderful value. It keeps interest alive and in a pungent manner shows the absurdity of many practices that make for accidents. Men talk about what is shown, getting a laugh out of it, but the truth gets over and remains in their minds.

The superintendent's duty is to direct the making of pulp and paper. With almost equal care he must direct the organization of safety or eventually his company and himself will be beaten; and, while committees, cautioning signs, placards, mechanical protections and the whole array of safety measures are needed, the superintendent must be the building force, he must take the initiative, he must reach out and keep himself thoroughly acquainted with what others have done and are doing and adopt as much of it as will fit into his particular mill. We may say with the poet, "If it were as easy to do as it is to tell what to do, then poor men's cottages would be princes' palaces." The superintendent's task in warding off accidents is everlasting and it is not as easy to do as it is to tell him what to do, and while he can not make poor men's cottages princes' palaces, he can do, if properly supported by his company, a world of good in keeping sickness, pain, disaster and death from many a poor man's cottage and while doing so make his mill more highly profitable.

CHAIRMAN HOYMAN: We are now ready for the discussion.

MR. HEILIG: Mr. Slater has hit the question right on the head. I have always asked the "how" and he has asked the "why." In my contact with mills, this fits the whole problem of safety. When you have safety as a part of your program of production, when you realize the synchronization of safety and production in its relation to cost and the increase of efficiency and quality because of this, you have found the answer to the problem. When you tie safety into production—tie it on the men's pay envelope making definite responsibilities, then you have a safety program in your mill. Mr. Slater is to be commended for the splendid paper in which he has put the problem as part of production.

CHAIRMAN HOYMAN: I agree with you that Mr. Slater has covered the subject so clearly and emphatically that there isn't much left to be said. I want to remind the newly elected officers that tomorrow morning in the room adjoining us, there is to be a meeting of all officers. Please be there at nine-thirty if you can for the discussion of the coming year's plans.

MR. PEACOCK: That includes the committeemen. I would like to make the suggestion that Mr. Slater is in good position to make a point of contact with the Superintendents' Association.

A. S. WILSON (American Writing Paper Co., Inc., Holyoke, Mass.): I am very much impressed with our meetings. It seems to me that this is the best one I have ever attended. We are getting higher up in the safety work all the time. Is it possible in any way to have Mr. Slater's paper come directly to the superintendents and other divisional supervisors through our Section? Is it not possible to get these words in a letter or some other manner to the various companies?

MR. PEACOCK: That will be part of the work of the Publicity Committee. Mr. Dowd will be glad to get this address in full into the paper.

CHAIRMAN HOYMAN: Is there anyone else?

J. N. FREEMAN (River Raisin Paper Company, Monroe, Mich.): I have a little record here that I think is pretty good, for our corrugated department. We had a superintendent who was not very much sold on safety last year. The record was very poor. With 250 men in his employ there were 52 accidents for 1926, 600 lost days and a medical expense of \$600. The net compensation paid was \$500. Medical supplies furnished by the company amounted to \$275. This year, so far, he has had five accidents with one and a half lost days.

CHAIRMAN HOYMAN: That makes a remarkable record, a very remarkable record indeed.

Our next speaker is one of the pioneers in this movement, and he will talk to us out of his experience. He is not tied down to any subject and can talk on anything he pleases.

Practical Experience in Accident Prevention

**John Lundrigan, Industrial Superintendent, International Paper Company,
New York City**

The prevention and care of accidental injuries in industry may be summarized as a policy and an education in what constitutes safe conditions and safe conduct, and seeing to it that the policy is maintained and the education actually carried on as an integral part of the operation of industry applied to every individual occupation. A good part of this program is the direct duty and responsibility of owners and executive managers of industrial enterprises. So far as policy is concerned, the sole responsibility rests here.

Where owners and management are in favor of such policy, a tremendous responsibility and continuous duty devolve on supervision and administration,

that is, on the men and women paid to supervise, direct and control individual employees. Because, particularly in large enterprises, individual owners and high executives cannot be expected to have more than a general knowledge of how to go about the job, and even if equipped with special training they have not the time required, as the business of maintaining safe conditions and practices runs current with every moment that industry contains a human tenant.

So, when we speak of administration and supervision, we mean the man in charge "where the wheels go round." He may or may not be an owner or executive. To this group falls the responsibility of creating and maintaining a system for securing the safety and promoting the health of every human over whom they exercise supervisory control. Such a system must be very much more than a perfunctory set of rules or even arbitrary rules. Its application must go infinitely further than posting of the printed word on bulletin boards or even the distribution of individual booklets to each employee. As a matter of fact, many high grade practical rules amount to nothing more than an alibi for putting the blame on the injured person after the accident has occurred, because such a rule was not obeyed.

Good Intentions Defeated by Ignorance

We all know that the Golden Rule, Ten Commandments, eight Beatitudes and many similar exhortations provide for an exemplary line of conduct. The unfortunate thing about them is, most people have only a vague or imperfect knowledge of their text or meaning and little or no feeling of personal responsibility for their observance, as well as a lack of human authority behind their enforcement.

We are becoming almost submerged in an ocean of laws and codes intended presumably to correct the ills of industry by government fiat. Nearly all of them create positive added costs in construction, alteration, equipment, compensation and medical care of injuries, and not by any means the least is added taxation to support government enforcement. We do not question the need of many such laws; because the attitude of some groups of employers is like the manager whose alibi is, "the injured person did not obey the rule, therefore he was to blame"; and they take the position, "I live up to the law, therefore the accident was no fault of mine." This leaves the legislator with no other remedy than to make the law more drastic; thus another bill is passed and while costs are increased the business of killing and maiming human beings not only goes on but increases in both numbers and proportion.

While a lot more could be said, we will call this enough in the way of glittering generalities, because you have a right to ask what we have done about all this and what, if anything, do we propose the rest should do. The best way I know of to meet that situation is to give you a rough outline of what our company has accomplished and how it was brought about, omitting of necessity details because time does not permit.

Up to the year 1917, in common with most other industrial concerns, while we did not intend to kill or injure employees and did what we could with the help of insurance carriers to prevent accidents, no intensive effort was made in that direction. Our experience had become so bad we decided it must be remedied if it was humanly possible to do so. What we have accomplished in the ten year period, 1917 to 1926 inclusive, is best illustrated in the following table dealing with the more important items.

	1917	1926	Decrease
Lost Time Accidents.....	1,399	451	948
Fatal Accidents	12	4	8
Total Days Lost.....	18,194	7,046	11,148

We might add that the first half of the current year 1927 shows an improvement of approximately 25 per cent over 1926 experience.

While we are none too proud of our current experience, it must be admitted we did "go some" compared with 1917, particularly when the best available information indicates that there has been a general increase, instead of a decrease, in industrial accidents as a whole.

Now, I know you want to know how we did it, which is the easiest and simplest part of the story. In the first place, there not only was no difficulty in securing the wholehearted support of our owners and executives, but we have known from the start they were solidly behind any effort made to improve existing conditions. Next, we were fully aware that the only place where accidents can be prevented is on the job. We made up our minds the men on the job were going to be the ones who "did the trick"; they were not only to have all the credit for any improvement shown, but were in fact to be the authors of the plan or conditions under which it was to be accomplished. Therefore, instead of taking them into our confidence, we asked to be taken into theirs.

All of us realized that with twenty-odd plants scattered over 1,500 miles of territory, system and regulations would be vitally important, so we collaborated on working out what amounts to a Magna Charta, or Constitution, intended to be not our maximum but our minimum of requirements, with each unit free to go as much further as local conditions and their resources permitted. This document when put into effect could honestly be said to have been created by the employees and local management of all of our plants, because they had either proposed or approved of every feature in it. Its foundation, (or perhaps keystone is better), lies in the fact it became officially and positively a part of the manufacturing policy of our company. I am leaving a copy of it with your chairman, so will only refer to its main features.

The Plant Manager Personally Responsible for Safety

We make the plant manager, who is our company so far as his locality is concerned, personally responsible for its everyday application as a part of his manufacturing operation. He is even personally the active chairman of his plant committee and does actually preside at all committee meetings unless he is absent from the plant. The committee includes all department heads, resident engineer, plant nurse and physician, where one is employed, together with one or more workmen selected by their fellows from each department. Should there be failure to make such selection, substitutes are appointed by the manager or department superintendent. Then comes the local supervisor of safety and sanitation who devotes all his time to the study of accident causes and their prevention, which includes supervision of the local plant employment service. At large plants he has such assistants as are needed. He is personally responsible to the local manager and in the matter of interchanging information, making required reports, etc., to the general management as well. The general office end serves as a clearing house and distributor of information, not only on accidents within the company, but from all available sources such as the National Safety Council, The National Industrial Conference Board, Government Departments, etc.

One of the things we give special attention to is seeing that all plants get full information relating to serious or unusual types of accidents that occur at any of our plants, so that each is at all times getting the benefit of the experience of the others, enabling all of them to guard against the conditions causing an accident at one. This type of information is sent out without delay, supple-

mented every three months by a detailed report of experience at all plants rated according to efficiency. In order that large and small plants may be on an equal footing, this rating is on the basis of "lost time per 100 employees" which includes all time lost during the report period without reference to when the disability began. Our system and reports provide positive information and a complete check on all lost time accidents including current cost. In the case of fatal accidents a penalty of 1,000 days is added and for total disability after one calendar year of lost time has been charged, a penalty of 500 days is added. So you see our separate plants are practically engaged in a continuous accident prevention contest each with the other.

Some time ago, we added to our manufacturing cost sheet a separate item showing the cost of industrial accidents. We know this has a direct influence on accident prevention because it is a positive and frequent reminder of cost variation for this item, the same as is the case of stock, power, etc.

I want to add that every report or form that is made up at a mill (and there are a great many that accompany these instructions) is forbidden to leave the mill without being sure of a journey back in the next mail unless signed by some one acting in the capacity of mill manager.

Now we don't wait for these quarterly reports in the case of any unusual accidents. As soon as we can get enough information that will be of some benefit to the other mills, the history and the remedy of the particular accident is dispatched in the next mail. In this way, they don't have to hurt a man at each mill to find out what can be done.

Physical Examinations of the Employee

Five years ago we established what we term an "employment service," to which we later added a system of physical examination of all future employees, which has been and is of practical value in accident prevention. This service is in charge of our safety supervisor, thereby coupling it with our safety organization. It provides a positive contact with every new employee providing opportunity to start them right by posting them as to our safety and health program, as well as seeing to it they are properly instructed in the work they are to do. This part of our system is a long story by itself; therefore, it cannot be gone into here any further than to point out what is already known, that accidents and health are closely identified, for which reason we take a real interest in the health features of this service. No one is rejected for employment on account of any physical disability that will yield to treatment, provided the person concerned is willing to cooperate in being restored to health. The system provides for financing this procedure so as not to be a burden on the employee concerned. We also undertake to transfer men who are not fitted for the particular job in which they have been placed, but may be properly placed at other work.

The foregoing provides a somewhat rough and very condensed outline of what we are doing and how it is brought about. But, after all, while we feel sure we have good practical rules and regulations, we find the big thing is personal contact plus instruction, advice and encouragement to the men on the job by the department superintendent, foreman, gang boss or whatever you may call him. To his crew this "Boss" on the job is the company and that is as it should be, because in actual practice management looks to him for quality, quantity and cost of production. As a matter of fact, he is the "Top Sergeant" of industry and the real point of contact between employer and employed; which, as we see it, means that if safety is to be "put across" he is the largest single factor in doing it.

Thus it naturally follows we must see to it that this important man has the needed equipment. It is more than likely he became a boss because of long and efficient service in one plant. In most instances he has had very little outside time or opportunity to learn of many things needed to combat successfully the hazards of industry. Often he may not even realize the existence of a real hazard or know a practical way to avoid it or how to instruct others to do so. This is one of the situations we try to meet by securing this information for him and then giving him all of the assistance and encouragement we can in its practical everyday application. This is perhaps the most important part of our safety supervisor's job, and in turn our job at the general office, to see that the information reaches the plant organization.

We have studied and tried many and various forms and methods of providing information and securing interest. We have no quarrel with any of them. In fact, we have and will probably continue to use many devices and services that may or may not help in this work.

The Safe Practices Pamphlets of the Council

We do, however, want to testify to what I consider not only a real help, but a practical necessity in this work of preventing accidents. That is, the Safe Practices Pamphlets issued by the National Safety Council. Not only on account of the technical and practical knowledge and experience utilized in their preparation, but on account of the form in which they are provided, treating each subdivision or separate hazard by itself in a comparatively small and well illustrated pamphlet, using such language as the men in the street may understand. We believe they are not only the best sources of information, but the best reference data for the everyday use of the man on the job.

Engineering associations and individual engineers have done and are doing a great deal to improve safety of structures and equipment by the elimination of hazards in plans and specifications for construction, equipment and machinery. It is not only safer and more sightly to build safety requirements as an original part of structures equipment and machinery, but less costly than to be compelled to install them later. We should encourage this character of service.

Beyond machinery and power transmission hazards, there is still a larger field not often fully realized. Our experiences show 85 per cent of lost time and costs result from accidents in the most ordinary occupations and operations, largely owing to lack of knowledge on the part of the injured how to do his job safely (which nearly always means efficiently). Just because it is an ordinary or common job, management and supervision seem to take it for granted persons so engaged need little or no instruction other than to keep moving. We are convinced it is just as important to teach employees safe methods of loading and unloading, piling or taking down piled material, digging ditches, taking care of tools, etc., and in any of the hazards of industry, and having done this we must exercise constant vigilance to see that safe practice continues.

One of the most expensive accidents we ever had occurred one cold night in February, when a night watchman went out to call somebody. In doing so, he froze his big toe. He fussed around with it, and did not use the first aid treatment, as he didn't know much about those things. He went home and soaked it in cold water. When the doctor started in, he first cut off the big toe, then the ankle, finally cutting the leg off above the knee. The old man then died. According to some of the methods of recording accidents, we would have had no lost time at all.

If a man is discharged for the accident in which he was injured, he is losing time. That should be charged as a penalty, because the company is losing time until he can be replaced. His family is suffering and he surely is. The lost time must go on and on until there is a final conclusion. We think we have done the fair thing, but we are still looking for light.

We have no quarrel with insurance companies; in fact, know they render considerable service in developing and carrying on safety education and practice. At the same time, we are convinced our policy of carrying our own compensation insurance risk is one of our most valuable helps and incentives in centering constant attention on not only the prevention of accidents, but seeing to it that every available assistance is given to hasten speedy and complete recovery of those who are injured.

Time and space permit only a brief reference to what can, and we believe must, be done along the lines of safety education for the future. It must begin in the school and be made an integral part of our educational system in order that the children may secure fundamental training in safety and health that must have a large influence in their adult life. Our company is doing something along this line usually by cooperation with local school authorities in the way of providing material for study and to some extent personal attendance of members of our safety and nursing system.

Lastly, we believe there is a positive need for better information in the form of what is commonly termed statistical data, in order that all of us may have a better and larger knowledge of what is actually going on. In our opinion, the existing basis on which such data are computed is neither practical nor fair and does not lend encouragement to employers to voluntarily provide necessary information.

The First Move is Consultation of the N. S. C.

I want to say that nearly every time we have anything that appears to be an unusual accident and sometimes what appears to be an ordinary accident, before I do anything about it, I usually reach for my file of National Safety Council pamphlets on that subject and I get something that is of real, positive help to me in seeing that situation and it also helps the man at the mill.

Believe me, we should do more than simply listen to a paper giving us encouragement in that character of service. I don't think a good many of us who are inclined to pat ourselves on the back realize what the engineering talent of this country has done to cut down the volume of accidents, even though they did have the question of economy and production before them.

For instance, in the International Paper Company, they have done away with the old hand-fired boilers, substituting stokers in their place. In the modern paper mill, it is practically impossible to find the beater room. Up on the mezzanine floor they have a little box of steam where they have a system for mixing the stock. They have almost entirely gotten over the idea of putting sulphite and groundwood together, pressing it, looping it and then beating it up again. The engineering talent of this country has moved this man out of the way.

Another thing, if the Paper and Pulp Section would have representatives from the various manufacturers of pulp and paper machinery present to discuss these matters, they could help you in solving your problems.

I also believe if we could have that sort of contact at these meetings in order to learn more about the electrical devices and other machinery it would be a lot cheaper in the end, because we would know how to do away with lost production caused by interruptions in service when something goes wrong, and at the same time a lot could be accomplished in the prevention of many serious accidents.

We are hopeful this Council or some equally reputable body will promote a proper basis of statistical data and develop a scheme or system for its compilation and distribution. We believe it would be a misfortune to continue the present system which does not furnish any real information and has a distorted basis. Unless something is done we may find the whole subject taken out of the hands of the direct representatives of industry and added to the hoard of governmental duties and supervision already existing.

Summed up, we must provide individual responsibility for capable study of our own accident and health hazards and experience as well as similar information from all available sources. We must make such information available and provide for the facilities for its application in the case of all employees, particularly the "Gang Boss." We must assist him in educating the individual workman as well as providing him with the authority and resources to establish safe operating conditions and safe practice. We must see that injured persons have competent medical care which often means help beyond what the physician may give. All of which, we believe, we have proven can be done in large industrial organizations with little or no added costs per unit of production and a large saving in accident costs. We believe the same thing may be accomplished on a community basis where groups or numbers of small plants or industries are willing to cooperate. Our principal slogan is good housekeeping which means cleanliness and order. This automatically compels safe places in which to work and requires teaching employees safe and orderly practices, which combined spell efficiency, safety and health.

ADJOURNMENT

Wednesday Luncheon, September 28, 1927

The luncheon session was called to order at twelve forty-five o'clock by the chairman, W. J. Peacock.

CHAIRMAN PEACOCK: Don't disturb the looks of tables just yet, gentlemen, we are going to have our picture taken.

(Luncheon was served immediately following the photographing of the group.)

CHAIRMAN PEACOCK: Our program is long enough to give attention to conserving time, but for the purpose of good-will and efficiency, I want you to know the new officers and committeemen whom you have elected. Certainly you will want to know them if they happen to be in your region.

(Chairman Peacock read the list of nominations voted upon at the Wednesday Morning Session and introduced each officer, the Section applauding meanwhile.)

CHAIRMAN PEACOCK: We are not unmindful of the past history of this Section. We have with us the gentleman who served as the first chairman of the Section. He modestly denied this, but I have the goods on him in print. His name is S. F. Shattuck, of the Kimberly-Clark Company. Do you want to hear from him?

S. F. SHATTUCK (Treasurer, Kimberly-Clark Company): Mr. Chairman, Gentlemen: That had grown very faint in my mind. I haven't forgotten though, the burning desire to get on top of that terrific accident record we were having a few years ago. It has been my bad fortune all my life to find people who do things so much better than myself that I lose my place to them. Mr. Peacock, Mr. Hoyman and others have proven this. But, comparing the impression one gets from this gathering with the impression one received 10 or 12 years ago, I confess that those first gatherings were very discouraging. There was a small sprinkling of paper and pulp men, and the room was filled up with insurance men and machinery salesmen. Our seed was sown outside of our territory a great deal. I rather think that it is pretty solidly a paper and pulp gathering this afternoon, and a very substantial one. Through Mr. Peacock and other members of the Section, it has become quite the envy of the National Safety Council. We are to be congratulated upon the officers you have selected to carry on the work of this Section.

CHAIRMAN PEACOCK: My reply to Mr. Shattuck is somewhat like the story of the little Negro on the wrong end of the street fight. After the other fellow had called him all kinds of names, he said, "Is you 'fru?"

The other fellow said "no," and added a few remarks.

Pretty soon the meek one said, "Now is you through?"

The reply was "yes," so he said, "All right, all dem things you done said about me, you is!"

Frankly, Mr. Shattuck has been an inspiration, and a tutor for a lot of us. In experience and vision he has had much to do with the making of the present Section.

Proceeding with our program, George Burns is the darndest little czar I have had anything to do with in years. After I build the program up, he unbuilds it. But, thanks to numbers, we have built it again, and George is first speaker in spite of his intentions.

GEORGE E. BURNS (National Safety Council): I am merely going to tell you at this time who won the contest in the "A" and "B" groups, and leave the details until other speakers have finished. What I have to say so interlocks with some of the other speakers, I don't want to take any advantage of them.

The winner of the group "A" cup is the Nekoosa Edwards Paper Company, of Port Edwards, Wisconsin, with the following: Number of employees, 948; hours

worked, 1,345,455; number of accidents, 7; days lost, 56; frequency rate, 5.21; severity rate, .041.

The winner of the group "B" cup (and this is a good one, because we had to fight like the very devil to get them to come in), is the International Paper Company, Niagara Falls, N. Y. Their record is as follows: Number of employees, 497; hours worked, 674,956; number of accidents, 2; days lost, 66; frequency rate, 2.96; severity rate, .10.

Unfortunately, or fortunately, I should say, because we are primarily interested in accident prevention, group "C" is still tied, with six companies tied for first place.

We have the pleasure of having Mr. C. E. Pettibone, Vice-President for Industrial Safety, National Safety Council, with us today, and I will turn the cups over to him.

C. E. PETTIBONE: It is a pleasure for me to be here. It is more than that. For a good many years I have watched the accident game, and have always been very much interested in the National Safety Council. The Paper and Pulp Section, as I have watched through the years, has passed beyond anything we ever dreamed of years ago in the Council. It seems to me today we have a National Council in the Paper and Pulp Section. There are more people in one meeting now than we had in a dozen sections during whole meetings years ago.

As one of the past chairmen said, in those days a few insurance men would sit around, and they made poor ground for this work. The thing I see here today, and it is most gratifying, is that you have actual owners and operators of organizations at these meetings. Safety work has grown beyond the point where a man was given the job just because he had nothing else to do. People are recognizing the fact that it is absolutely a part of production.

The Reaction of the Section to the N. S. C.

I think that I should say a word as to what the relation of your Section is to the National Safety Council. In talking with men, I not infrequently find the assertion that the Executive Committee runs everything. What are your respective relations? Your Section can run itself just as it pleases, with one exception: that it does nothing to interfere with the general policy of the National Council, or other Sections. It is your Executive Committee, made up by people you elect. They are not the holy of holies, and they probably don't know half as much about your problems as you do. The Council is absolutely dependent upon the Sections.

The Paper and Pulp Section, I can say without fear of contradiction from my friends in other Sections, is one of the most, if not the most interesting, active, earnest Section in the whole Council.

I don't want to make a speech, but, there is one fundamental thing about the American people—one fundamental trait—and that is the love of contest. Here in Chicago after the Tunney-Dempsey contest, I think it is a poor time to talk about it, but we do love contests, and this is one we can all enter in, can play fair and all win. Another fundamental trait of the American people, although it is kept hidden under cover and very seldom allowed to get out, is a love of humanity.

It seems to me in this contest that has taken place, you have both of these characteristics—you have the love of contest and the great good you have done for humanity, for the people in your employ. Those of you who haven't won have still accomplished a great deal, not for this year perhaps, but for years to come. So, it is a great pleasure for me to award these cups.

Is there a representative of the Nekoosa Edwards Paper Company here? Will he come forward, please?

(F. H. Rosebush came forward.)

MR. PETTIBONE: The inscription on this cup reads:

very much desire to have some representative from that mill here to express their appreciation which I too feel, not only for that mill but for the whole company.

I want to say at the same time, as was said here last year, while our Niagara Falls Mill was one of the most efficient or lucky or combination of both, I believe in encouragement to all of them. I believe that the Niagara Mill will have closer contestants among our own mills in the next contest. I thank you.

MR. PETTIBONE: Gentlemen, there are a great many contestants who will not receive cups. Without detracting in any way from what has just passed, this is one place where you can lose and win. One contestant reduced accidents two-thirds. Certainly, there is a wonderful record when you think of what that means, not only to that mill but to the paper industry as a whole in the National Safety Council and everybody in the United States.

I hope that those who have not won cups will not be discouraged and will not feel that the race has been in vain. The work is worth while; the contest purely a stimulation, and I hope you will work harder next year and we will always continue these contests for the good that they do through the industry.

CHAIRMAN PEACOCK: I am just as new to this information as all the rest of you. I didn't know until just a few minutes ago who were the winners of the cups. I am appreciative of the last words Mr. Pettibone gave you. We are all winning in a contest of this kind.

From my mill it looks like a hopeless contest, out in a city where labor turnover is something terrific, promoted by agencies which we can't control, and with manufacturing problems which we think are extraordinary, when we compare ourselves with my good friend, Franz' town, where the babies are all named after John Alexander, and where the preacher and school teachers are practically all in the official family; we seem to be out of the running.

But, I am still thankful to you, Franz, and to you, John Lundrigan, for the pace you are setting. As chairman of this Section, it is my anxiety to appreciate this fact: That we are all winning by the efforts we make in these contests. We are winning for the comfort of our men; we are winning for our mills cutting insurance rates, cutting costs, promoting efficiency, doing our part in promoting new spirit of achievement in the entire paper industry.

The next speaker on the program was to have presented the Grand Cup awarded by *The Paper Industry*, of which Mr. Edward B. Fritz is the publisher. Mr. A. Scott Dowd, of Chicago, is editor of the paper.

(At this time Mr. E. B. Fritz, publisher of *The Paper Industry*, was introduced.)

Presentation of Certificates of Merit

A Scott Dowd, Editor "The Paper Industry," Chicago, Ill.

I appreciate the honor you have shown me and the kindness of the publisher of *The Paper Industry* who has offered the Grand Cup for the 1927 Contest, in allowing me to make this presentation. That you may know him better, I want to introduce my dad—or "our dad," as he is affectionately called by us boys and girls in his employ—Mr. Edward B. Fritz.

I wish now to congratulate the two winners of group cups. It is gratifying indeed to observe their records. That of the Nekoosa-Edwards Paper Company is a long jump better than they made last year, and the International Paper Company's splendid achievement accompanies their first participation in The Paper Industry Contests.

Fifteen states of this country and three Canadian provinces have been represented in the contest this year; and the numbers entered have increased

from 41 mills that took part in 1925 and 72 that were registered in 1926, to the pleasing total of 119 that started off on January 1, 1927. The 107 mills that stayed through to the finish on June 30 made a safety record so far below the marks made in previous years that convincing proof is thus shown that safety contests are wonderful and excellent mediums through which to reduce industrial accidents.

The average severity rate for the Pulp and Paper section for the past seven years was 2.36, and frequency 42.03. The average severity rate for the six months of this year's contest was .63 and frequency 33.01, this severity rate being far below the splendid contest record last year of 1.746.

We are inclined to take as a sort of bogey the mark made in 1925, namely that in the 30 day contest in August of that year there were 16 out of the 41 mills that operated without a lost time accident. Perfect scores (no accidents) in the first month of the 1927 contest were 16; and the average for the eight months thus far recorded was 37 perfect scores per month, or 37 mills each month without an accident.

The 1927 Contest Was Among Four Groups

The contest this year, as you know, has been divided into three groups as follows: Those mills having 500 or more employees are classed as Group A; those having 201 to 500 employees are in Group B; and mills employing between 20 and 200 people are in Group C. This classification has made it more fair for the small mill to compete with the big one, and cups having been donated by the National Safety Council for the winners of each group, the opportunity to win a trophy has thus been tripled. Then the customary Grand Prize Loving Cup donated by *The Paper Industry* is to be awarded to the mill which, in the opinion of the group of judges, has made the most outstanding record in the contest.

The rules provide that on the basis of the lowest severity rate if two or more mills in any group are tied for first place, the contest for all contestants in said group shall be extended until the tie is broken.

There are six mills in Group C that have thus far had no accidents and their severity rate is therefore zero. Under the rules of the contest, this group as a whole must continue until there is one mill that has a lower severity rate than all the others.

The awarding of the major cup must therefore be held up pending the result of this C Group contest.

It is unfortunate in many ways that this large handsome silver cup which you see before you cannot be awarded at this time. However, I ask why you should fail to rejoice in the possibility that one of the mills in this open group which does not have a perfect score at present might even yet be declared a winner, and the spread of opportunities to win the major cup becomes wider as the contest lengthens.

I feel rather keenly the disappointment to be on the program to award this grand prize cup, and arrive at this time to find that I am unable to do so. Undaunted, however, in the desire to be of some service in this respect, *The Paper Industry* has given me certificates of merit to award to a few of those mills in Groups A and B, whose good records deserve some form of recognition.

Constructive activity in the Pulp and Paper Section is causing the gospel of safety to be spread over larger areas and into the minds of workers everywhere, and the results are becoming more and more gratifying.

I am therefore going to award a few of these certificates of merit to those mills who have won them.

The Champion Coated Paper Co., Number Two Mill, of Hamilton, Ohio, is the first to receive the Certificate of Merit, ranking Number 2 in the Group A contest. This is the first time they have been registered in the contest, and they have made an exceptionally low frequency rate.

I will ask Mr. Faist to approach the front of the room and receive the Certificate of Merit.

The Champion Coated Paper Company, Number Two Mill, has an average number of employees of 547; days lost, 28; hours worked, 663,050; number of accidents, 5; frequency rate, 7.54 and a severity rate of .042.

This company had more than one mill entered in the contest, there being 3 mills at Hamilton, Ohio, with 2,200 people entered in the contest. They made a combination severity rate of .609 and a frequency rate of 16.07.

K. L. FAIST (Champion Coated Paper Co., Hamilton, O.): As Mr. Dowd has just said, this is our first experience in a contest. However, from this time on, we are going to show the Nekoosa Edwards and some of the other mills what we can do.

At the start of the contest we almost lost out altogether. We were hardly on the second week when we had a fatality, but the rest of the mills pulled through and carried us on. Our Palmer Mill No. 2 had a wonderful record, and another of our mills came along mighty fine. All three mills will be in rank next time.

MR. DOWD: The Chillicothe Mill of the Mead Pulp & Paper Company of Chillicothe, Ohio, ranks third in the Group A contest. Will Mr. Ernest Augustus please approach the front to receive this Certificate of Merit.

This mill had an average number of employees, 674; severity rate, .044; days lost, 42 in 937,070 hours work; number of accidents, 7; frequency rate, 7.47.

During the eight months they were in the previous contest, the 1926 contest, their rank was 16, with a severity rate of .194. In the August, 1925, contest their severity rate was .064. Their lowest severity and frequency rates have been in 1927.

Confidence in Eventual Winning of a Cup

ERNEST AUGUSTUS (Mead Pulp & Paper Co., Chillicothe, O.): I just want to say to Mr. Fritz and the rest of you that we are going to be in it next year, and one of these days we are going to win the cup.

MR. DOWD: Rank Number 4 of this group is a repeater—the sun shines brightly on some of the contestants in this year's contest. The Hudson River Mill of the International Paper Company, at Palmer, New York, is the winner.

Mr. Lundrigan, is there a representative of that mill here? Mr. George J. Adams is the man we have been corresponding with.

MR. LUNDRIGAN: No, there is no representative here.

MR. DOWD: This mill had an average number of employees of 738; severity rate, .10; days lost, 91; hours worked, 951,626; number of accidents, 11; frequency rate, 11.56.

This is the largest paper mill in New York, and the fourth largest in the United States. The International Paper Company entered 15 of their 32 mills in the contest. The figures for these are as follows:

4,132 employees in 13 of the above 14 mills (155 accidents in 6 months); severity rate for 12 mills (6 months), .48; frequency rate for 12 mills (6 months), 20.99.

MR. LUNDRIGAN: I would just like to make one remark. There *must be something* in this safety contest business. This mill during 1926 and for several years past has not done as good work in this direction as might be expected. I did not expect to hear that they had won a certificate, and I surely will see that they get it.

MR. DOWD: The next rank is 5, and there are two mills tied for this position. We do not give one any priority over the other. The first one is Dill & Collins

Company, of Philadelphia. Is Miss Raub or any representative present? That is too bad. We will have to see that the certificate is mailed there.

This mill has had an average number of employees of 619; severity rate of .16; days lost, 146 during 885,755 hours worked. Number of accidents, 15; frequency rate, 16.94.

Their record for the previous contest during the eight months in 1926 in which they were entered was: rank, 13; severity, .193. The severity rate was lower in 1927 than in the 1926 contest. This company was one of the organizers of the Paper and Pulp Section.

The Laurentide Company, Ltd., of Grand Mere, Quebec, was also tied for Rank 5. This is a groundwood, sulphite, newsprint and board mill. Their average number of employees was 1,047; severity rate, .16; days lost, 205 in 1,255,295 hours worked; number of accidents, 17; frequency rate, 13.55.

In the previous contest during 1926 (8 months) their standing was: rank, 10; severity, .173, and in 1925 (1 month), a severity rate of .06.

The last mill receiving certificates ranking Number 6 in this A group are our old friends, the Marathon Paper Mills Company, of Rothschild, Wisconsin.

This groundwood, sulphite, paper and board mill with an average number of employees totaling 587, had a severity rate of .19. The days lost were 155 out of 814,270 hours worked; number of accidents, 20; frequency rate, 21.56. In the previous contest (1926—8 months), their rank was 44; severity rate of .706.

Mr. Altman was a former chairman of the Section, and an early participant in Safety Contests, winning a safety flag in 1916 in 3 months contest among Wisconsin mills.

An Old Contestant Victorious in Group B

As an official of that company, I will ask Mr. Everest if he will accept this Certificate of Award from *The Paper Industry* with their congratulations. We know that the message of inspiration will be brought back to the employees of that mill.

D. C. EVEREST (Marathon Paper Mills Co., Rothschild, Wis.): I regret that Bob Altman, the pioneer in this work, is not here to receive it.

MR. DOWN: Mr. Everest gives the credit for this safety record to the safety director, but without the inspiration and without the support of the mill management, where could the safety director get? Surely, without the complete endorsement and support of the Marathon Paper Mills, they could not have made this record.

In Group B the first Certificate is awarded to a mill that has been in former contests, but never has received any awards in them. We are very greatly pleased that this mill has been recognized this year—the East Walpole Mill of Bird & Son, Inc., of East Walpole, Mass.

This is a paper and board mill, with an average number of employees, 394; severity rate, .12; days lost, 67 in 557,916 hours worked; number of accidents, 12; frequency rate, 21.50.

In the previous contest during 8 months in 1926, their rank was 21, with a severity rate of .228. Will Mr. Rogers come forward, please?

B. D. ROGERS (Bird & Son, Inc., East Walpole, Mass.): It is certainly very gratifying to receive this Certificate. It is as much a pleasure as it is a surprise, as I had no idea we were in it with our 12 accidents. It is going to be a great pleasure to present this to the men at the mill, and it will be an incentive to do even more.

I want to pay tribute to the winners of the cups presented, but serve notice on them right now that seeing we have won a certificate, perhaps we can get a cup next year.

MR. DOWD: The next ranking mill is a repeater. This is a regular pump gun contest. I see John Lundrigan getting out his handkerchief to wipe his eyes, and it is true—The Glen Mill Number 5, at Berlin, New Hampshire, of the International Paper Company ranks Number 3 in Group B. As you know, this is a groundwood and sulphite mill. This mill had an average number of employees at 454; with a severity rate of .15. Days lost were 83 in 557,203 hours worked. Number of accidents, 10; frequency rate, 17.95.

MR. DOWD: The next ranking order is a mill which made a much lower record in 1927 than previously. The Mittineague No. 1 Mill of the Strathmore Paper Company, Mittineague, Mass., ranks Number 3 in this group. Is Mr. Wyman or any other representative of that company present? This mill had an average number of employees of 256; severity rate, .15; days lost, 46 in 306,716 hours worked; number of accidents, 7; frequency rate, 22.83.

The next mill is one which has never yet participated in any of these contests. Gentlemen, just notice that all down the line every mill has been improving its record. This mill is the Rhinelander Paper Company, of Rhinelander, Wisconsin. Is Mr. Bertels present? Mr. Roller? Will you kindly step forward, please?

MR. ROLLER's mill, the Rhinelander Paper Company, a sulphite mill, with an average number of employees of 382, had a severity rate of .19; days lost were 91 in 485,526 hours worked; number of accidents, 12; frequency rate, 24.72. It gives me great pleasure to present this certificate to you.

Speaking for the Boys Back Home

GEORGE ROLLER (Rhinelander Paper Co., Rhinelander, Wis.): This is indeed gratifying, and I know the boys back home will feel just as proud as I do. I would also like to express my appreciation of the assistance given by the inspectors of the Employers' Mutual Liability Insurance Company of Wausau, who were always interested in the promotion of safety in this mill.

MR. DOWD: The mill ranking fourth is the Mead Fibre Co., Kingsport, Tenn., with an average number of employees of 310; severity rate, .19; days lost, 79; hours worked, 423,494; number of accidents, 3; frequency rate, 7.05.

H. R. LADY (Mead Fibre Co., Kingsport, Tenn.): Gentlemen, you will hear from us again next year, I am sure.

MR. DOWD: The next mill is the Falls Manufacturing Company, Oconto Falls, Wis., a groundwood sulphite and sulphate mill. Average number of employees, 324; severity rate, .19; days lost, 88 in 464,274 hours worked; number of accidents, 10; frequency rate, 21.54. Their record in 1926 (8 months) was: rank, 12; severity, .188.

Mr. Bolt, will you just step to the front and receive this certificate?

MR. DOWD: The next mill, ranking Number 5, is the Beebe & Holbrook Mill of the American Writing Paper Company, Holyoke, Mass.

Mr. Wilson, will you represent the mill and accept this certificate?

A. S. WILSON (American Writing Paper Co., Holyoke, Mass.): I am proud to do so.

MR. DOWD: Their record is as follows: Average number of employees, 222; severity rate, .20; days lost, 56 in 278,752 hours worked; number of accidents, 4; frequency rate, 14.35. Mr. Wilson, kindly accept our Certificate of Merit for this splendid achievement.

A. S. WILSON: I feel elated inasmuch as we haven't been in this contest before. At that, we didn't do as well as we hoped to. Perhaps this is because we are situated a little differently from some of you, with twelve mills scattered all over the city. This makes it very hard to get results, although we have been working hard to prevent accidents. However, we have an incentive to do better another year. Thank you.

MR. DOWD: The last certificate in this group is to be awarded to the Port Huron Sulphite & Paper Company, Port Huron, Mich. Is there a representative of that mill present? If not, we will see that the certificate is mailed out with a letter of congratulation. This mill had an average number of employees totalling 238; severity rate, .27; days lost, 85 in 318,706 hours worked; number of accidents, 10; frequency, 31.38.

It is a personal sense of gratification to see a Regional Director of this Section in the State of Michigan and we feel that Michigan has an opportunity to do valuable regional work. We hope to give you publicity in order to build up some real enthusiasm in the State of Michigan.

The certificate that I have awarded to a Canadian mill, I am unable to give to anyone, as no one from the Laurentide Co. seems to be present. It seems necessary this year to resort to the pleasure of requesting our good friend, Mr. A. P. Costigane to serve as bearer.

A Final Group of the Severity Rates

A. P. COSTIGANE (Ontario Pulp & Paper Makers' Safety Association, Toronto, Ont.): It would be the greatest pleasure for me to do so, but I think they might value this Certificate more if it were accompanied by a letter of congratulation from you.

MR. DOWD: That shall be done.

Just in closing, I would like to quote these severity rates:

Average Severity Rate for 41 mills during 1 month, August, 1925.....	.276
Average Severity Rate for 63 mills during 7 months, January 1 to August 31, 1926	1.746
Group A—23 mills during 6 months, 1927—Frequency.....	28.22 Sev. .56
Group B—23 mills during 6 months, 1927—Frequency.....	44.00 Sev. .81
Group C—36 mills during 6 months, 1927—Frequency.....	34.82 Sev. .70
Average severity rate for Section for 7 years.....	2.36
Average frequency rate for Section for 7 years.....	42.03
Perfect scores (no accidents) in the first month of 1927 Contest were 16, and the average for 8 months of this year was 37 perfect scores per month (37 mills each month without accident).	
Average severity rate for leading 10 mills in 1926 contest.....	.125
Average severity rate for leading 14 mills in Groups "A" and "B" in 1927 contest	.126
"A" Group (7 leading mills), Severity.....	.105
"B" Group (9 leading mills), Severity.....	.162

In Group "C" the following six mills have had no accidents, and were therefore tied. There has been no winner to date:

Provincial Paper Mills, Ltd., Montrose Div.
 Kimberly-Clark Co., Neenah.
 International Paper Co., Riley.
 U. S. Gypsum Co., Gypsum, Ohio.
 Lincoln Pulp & Paper Co., Ltd., Lincoln.
 U. S. Gypsum Co., Lancaster, Ohio.

The next contest can perhaps simply be touched upon by me at this moment. The services of *The Paper Industry* are offered to carry on a contest in 1928 with your acceptance. We are enthused in this work as well as you are. Our work as publishers of an educational magazine is to enlighten our industry and bring those engaged in it up to higher levels of achievements. Safety is one of the greatest departments that there is in the industry.

We had been taking an active interest in the value of safety in the paper industry as early as 1910. It is gratifying to this magazine that the work has progressed as well as it has. You boys have responded to the inspiration of the thought of the contest that has linked Canada and the United States together in this safety work. This year has been greater than the preceding years. We are now looking forward to next year, to January, 1928, to terminate this contest at a definite time.

Learning as we do, getting nearer and nearer to perfection, and getting more enlightenment, I can say that we will not again have a repetition of the cup going over a meeting. Let me state the fact that this cup is to be awarded at a subsequent meeting, and the inspiration is there for the "C" group to go on and win their Group Cup, thereby building up regional contests. Perhaps one of the little mills will get the cup. In this way, the gospel of the Paper and Pulp Section will be spread over large areas as the results become more and more gratifying.

CHAIRMAN PEACOCK: The next speaker is Mr. D. C. Everest, President, American Paper and Pulp Association. We are indeed honored to have him present.;

Why Safety Is Worth While

D. C. Everest, President, American Paper and Pulp Association, New York City

It is a pleasure for me to meet with you today and discuss the subject "Why Safety Is Worth While." You are all familiar with the whole safety movement and many of you, from the earliest time of organized effort along that line. You know why safety is worth while, and you have helped to increase its value to your fellow men and the concerns which you represent. You know the game and you do not need figures to prove it. I have been asked to discuss it from the viewpoint of management; and as one who has watched the work of the National Safety Council, and particularly of the Paper and Pulp Section, and individuals in this section who were lending their efforts to this work before the formation of this section, I desire to extend my sincere congratulations on the good you have accomplished for the paper industry.

To my mind you represent the Technical Association of Safe Practice for the Paper Industry. You represent one of the pioneer sections of the Council and that seems but natural, since the paper industry itself is one of the pioneer industries of this country. With the rapid development of the business, it was recognized over fifty years ago that there was need for association work in the industry and consequently there was formed at Saratoga Springs, N. Y., the present American Paper and Pulp Association, which I have the honor to represent. I believe there is only one other trade association which has been in continuous existence for a longer time. Fifty years, or perhaps we may say seventy-five years, at the most, represents the development of the so-called industrial age in this country. People engaged in the industry were among the first to take up cooperative work as an association and this section of the National Safety Council was one of the first to vigorously enter into safety work and apply it to its business. It has paid the industry to do it, and the best evidence of that fact is that those who first started in the work have been the most enthusiastic for its continuance.

In considering whether it is worth while, I have always separated the subject into the two groups of tangible and intangible benefits and I am sure that if it were possible to satisfactorily measure the intangible benefits, they would far outweigh those which we are able to compute in figures. For instance, we know that we are making definite savings in the matter of premiums on compensation insurance. But I think too many were slow in taking up intensive safety work because they were not able to see in this one feature sufficient saving to warrant

any great expenditure along safety lines. It is the same class who attempt to operate plants with out-of-date machinery, limited personnel in both operating and accounting departments and boast of the fact that they do all their office work with one or two men and a stenographer. They only come to realize the necessity of safety work, of adequate machinery and ample personnel when the economic urge of business competition forces them to either get in line or get out of business. In our industry I think there has been greatest advancement in the art of manufacturing since the formation of the Technical Association ten or twelve years ago than there had been in any previous forty or fifty year period.

It may be interesting to note that expansion in output per person in all industry has been particularly large during recent years, amounting to 11 per cent in the two years from 1923 to 1925, and to 41 per cent in the six years from 1919 to 1925. Practically the same increases were recorded for the paper industry. The increasing of speed, the addition of new and complicated machinery has revolutionized the productive capacity of mills and yet with this continual "speeding up" one would naturally expect increased hazards and increased accidents, but such has not been the case. There have been fewer accidents in relation to productive output and to the number of men employed than ever before. It is the work of the men engaged in safety work, both in our own industry and in the machine building industry, who have made such a condition possible. You have in your line kept pace with the development of speed. If we had not received the benefit of your efforts, I can easily conceive of a highly hazardous manufacturing business instead of the comparatively safe and increasingly safe operation which we have today. It has been the cooperative work of the so-called practical men, the technical staff and the safety organizations which have made these things possible.

Continuity of Employment a Result of Safety

It must be evident to every one that with less accidents there has been greater continuity of employment for skilled men and labor familiar with the operating conditions in every plant. Labor turnover, which is one of the most expensive things in plant operation has been reduced. Safety organizations in plants have awakened everyone to the necessity of seeing what is going on about them, and in consequence many of the leaks and wasteful practices which have been going on for years have been stopped. From my own experience I know that there has been added interest on the part of every employee to stop waste, improve plant conditions and contribute to the general welfare of both employee and employer.

One of the outstanding things which I think has done more to benefit the management and therefore the business itself, is the fact that safety work has brought the management, the operating staff and the employees together in conference. This has built up a better understanding, a better situation generally than could have been done in any other way. It has provided a meeting place for the discussion of all plant and personnel problems. I think every manager knows his men better and the men have a better understanding of the management and its policies.

Safety work in a plant must be seriously considered. The management and all concerned with it must show real personal interest. The safety and health of men are at stake and despite the criticism made several years ago, that industry was not concerned with the sacrifice of life or limb and were only interested in what a man might produce, I am convinced that present day

operators are deeply interested in their employees and that they recognize that their highest duty is to expend every effort for their protection from accident or disease. If there are today selfish men in charge of plants, even they, as well as those who have a deep human interest in their men, must realize that from an economic standpoint they cannot afford to sacrifice men either through accident or illness. Take the situation from any angle you may view it, you cannot afford to provide anything except the best in the way of protection.

Safety work and the discussion of its various phases has opened up a new era in plant management and every factor which it has developed has been worth while. It has made for closer relationship, allayed suspicion, provided a healthy and wholesome atmosphere in which to work, eliminated the suffering of the employee and the consequent worry and mental distress on the part of himself and family. It has educated those who have come in contact with the work in health and sanitation, encouraged the provision of nursing service, brought about the adoption of group insurance, both life and health and accident. It has brought home to each man the necessity of further protection in the way of life insurance other than that provided under group policies. It has been the means of contact, and, through discussion, the point of origin of some of the finest things which we have in our industrial life today. It has, in fact, accentuated every good thing for the benefit of those who, through their daily work, contribute to welfare and upbuilding of the industrial and social life of this country.

The Council Has Made People Think

I am pleased with the fact that as the industry which we represent, has been a pioneer in the development of business relations in so many ways, that it has also taken such an active part in the work of the National Safety Council and has shown other industries the way in many of the things which go to make up a safe and efficient manufacturing business in this great industrial age of hustle and bustle, which, if left to its old policies might have resulted in much suffering and misery.

You have made people think. You have made them think about themselves, their families and their fellow men. No one can think and think seriously of the program as outlined by such an organization as this, without having a kindlier feeling for those about him. Any program which includes the idea of protection to others and watchfulness and care in your own doings, cannot help but make for better relationship with one's associates and a happier and better world in which to live.

In conclusion, I wish to again congratulate you, who have made this condition possible. You have made management and operating force both understand that the safety program is worth while and that the greatest thing in industry today is the elimination of suffering and waste of human life.

CHAIRMAN PEACOCK: Thank you, Mr. Everest, both for your presence and for your very interesting address. I can see a very useful continuation of these addresses in print.

F. H. ROSEBUSH (Nekoosa Edwards Paper Co., Port Edwards, Wis.): May I interrupt for just a moment.

I think one motion should come before us. *The Paper Industry*, as you all know, has been very active in forwarding the interests of the Section. In fact, we feel as though *The Paper Industry* belongs to us. I would like to make a motion that this Section accept the offer that Mr. A. Scott Dowd made as to the 1928 Contest, and also that we express our thanks to the Editor and Publisher of *The Paper Industry* for the efforts extended in our behalf in this Paper and Pulp Section.

(The motion was seconded by Mr. B. D. Rogers of Bird & Son, East Walpole, Mass., and unanimously carried.)

EDWARD B. FRITZ (*The Paper Industry*, Chicago): I don't think we need to have any further words. I think it is more blessed to give than it is to receive. At least, the Good Book says so. There is more pleasure in giving this cup and in saving the little finger of some employe than in receiving something.

CHAIRMAN PEACOCK: From now on a name has been coined for you—"Dad."

MR. FRITZ: It is a familiar one.

CHAIRMAN PEACOCK: We shall hear next from Mr. George E. Burns.

Paper and Pulp Contest Achievements

George E. Burns, National Safety Council, Chicago, Ill.

When Mr. Peacock asked me to speak on "Contest Achievements" I was panic stricken and even now I am somewhat in the same frame of mind. To answer this or rather to point out all the good that is accomplished, cannot, I believe, be done by merely studying the reports as they are received. As you know, this is the only resource at my command and I therefore have resorted to this graph (indicating) in order that you may follow the thought I have in mind.

The greatest good, to my mind, is to the individual, whether he be president, superintendent, trucker, or what not. Unfortunately, however, the reports that I receive for tabulation do not reveal the salient points. I can only hope to interpret for your approval, facts as I personally have noted them when handling the monthly and yearly accident statistical records.

Let us, if you please, consider for the moment the experience of the Paper and Pulp Section since 1920, the first year that an attempt was made to compile this data.

In 1920, 45 plants reported for an average severity rate of 2.60 and a frequency rate of 46.34

1921—	55 mills averaged	2.83 severity and	41.67 frequency
1922—	55 mills averaged	2.36 severity and	47.77 frequency
1923—	66 mills averaged	2.73 severity and	43.50 frequency
1924—	62 mills averaged	2.07 severity and	41.58 frequency
1925—	99 mills averaged	2.15 severity and	38.43 frequency
1926—	133 mills averaged	1.95 severity and	36.77 frequency

This brings us up to the start of the present contest. During this seven-year period the average severity was 2.36 and the frequency rate 42.03.

As can be noted on this curve (indicating) the averages are higher than those established during the 1926 contest, at which time the severity was 1.75 and the frequency 34.00. I am at a loss to understand why, during the first two months of the present contest, both the frequency and severity were subject to sudden rises and falls. It may be that many, never having entered previous contests or kept their accident records on this basis, failed to note all lost time cases until after the first month or two of the contest. Some believe that unless an accident is compensable, it should not be considered as a lost time accident, and this also may have had a tendency to overload the first few periods. Then again, it may be that some contestants reported cases which really should have been charged to December of the preceding year. Of course, upon learning of this condition, I immediately made every effort to correct our records as well as to give the misinformed member more detailed information.

Perhaps you can see that the severity rates outlined on this curve do not correspond with those quoted by Messrs. Pettibone and Dowd in awarding the

cups and certificates. Please do not misunderstand for I do not wish to distract in any way, shape or manner from the excellent showing made by these mills, but I think it is only fair that your attention should be called to the fact that these rates were not figured on the so called "standard 6000 day penalty" basis. You will recall that when the contest rules were discussed last year, we adopted for 1927 a 1000 day penalty for death and permanent total disability instead of the 6000 day penalty. Therefore, all severity rates will naturally be lower. All other charges were in proportion (6 to 1) to the old plan. Where 300 days were charged for the loss of the little finger, under the new plan 50 days are charged. Consequently, in preparing this chart, it was necessary that I revamp all records and put them on the standard 6000 day charge so that they might be compared with previous years' records. Of course, this change has no effect on the frequency rate. You can get some idea of what effect it had on the severity rate when I tell you that under the present plan the accumulative rate for the first six months is .63, which when revised becomes 1.97.

You may be interested to know that up to June 30 there were 11 fatal accidents reported. This is slightly above the average for the section which is 21 per year. During the same period 18 permanent and 1,603 temporary disability cases were also reported. The total days lost for all cases amounted to 31,488 days. This is the record compiled by 111 mills working 50,211,176 man hours, and employing over 38,000 workers.

The accumulative severity rate of 1.97 for the present contest is somewhat higher than that of 1.76 for the 1926 contest. However, the 1927 average is not really as bad as it first appears. It is quite a bit under the rate of 2.36, the average severity for the past seven years of the section.

Records of Short Duration Not Dependable

One should not be too hasty in forming opinions based on records of such short duration. Even five or ten years are hardly sufficient to visualize clearly the results of safety efforts in industry. Accident fluctuation during short periods bears too heavily upon the average. Year to year, or five year to five year, trend downwards will go far to furnish evidence why safety efforts should be expanded and made more directly responsible for management efficiency.

It is not difficult to reduce a high accident rate to one of modest proportions. But to reduce the rate below this would involve ten times the effort necessary to reduce it in the first place.

For example, take the drilling operation for oil or water. The first 50 or 100 feet is easy or it may not require much more effort to reach 1,000 feet. But after that every additional foot may cost as much as the 100 feet preceding. While finally, an irreducible resistance is reached, making further progress hopeless, at least with the tools in use.

So it is when accident records reach the average of many, many years' experience.

In all industrial accidents, we are, of course, always concerned with two elements. The first and easily controllable is the mechanical equipment, which may be defective.

The second is the human element influenced by age, customs and usage, while lacking in training or disposition. These can be brought under control by years of patient influence in educational directions. I believe this second factor is brought out quite forcibly by the fact that in all contests conducted by the Paper and Pulp section, the winners have been mills actively engaged in accident prevention for several years past. It is this patient influence in educating employees in safe practices which really brings about a healthy reduction from year to year.

The mills that have just been awarded the cups in Groups A and B will, like the example just mentioned, be called upon to exert extra effort. For them the race is by no means over. You will recall that in the contest rules, the grand prize cup is awarded to the mill, which in the opinion of the judges, makes the best record. This means that the Nekoosa Edwards Mill and the International Paper Company Mill at Niagara Falls, N. Y., must keep going every day or the winner of Group C might run away with that big cup. All the judges will have to go by is what we put on paper, or what can be explained to them should a conference be called prior to awarding the cup. We are planning to give the judges the history, as near as we can get it, of the accident prevention activities, both past and present, of the three group winners. Also, some idea of the manufacturing processes involved so that they can compare the so called "inherent hazards."

There has been some question why certain mills have withdrawn from the Contest. This is just a little family gathering, and I don't want anyone to feel that we haven't explained everything. I have had mimeographed the standing of all mills to date. I have a number of copies of this, and will be glad to give each and every one of you a copy.

A Regrettable Misunderstanding in the Contest

On the last page, you will find listed the mills withdrawn from the Contest, due to shut downs or one thing or another that prevented them from continuing. There are one or two mills in this group that I think might be referred to without mentioning any names. I think there was a little misunderstanding in the rules for this year's Contest. I hope the Contest Committee, for next year, will keep this in mind and not leave any "Stumbling Blocks."

When Bill Peacock said "George, you do it," I knew nothing about paper mills and nothing about the difference between mills. So, I said, "The Contest is open to all members of the Paper and Pulp Section of the National Safety Council, employing more than 20 employees and manufacturing pulp, paper, container board, strawboard, plasterboard," and after I got as far as strawboard and plasterboard, I just said, "and so forth."

I think that got us into a lot of trouble. Later we drafted a little pink slip and sent it out to each and every mill. We did not believe that anybody was prevaricating, but thought that it would be nice to have them state whether or not they were actually engaged in the manufacture of paper and pulp. Some of the replies we received weren't any too polite. Some of them called our attention to the fact that we did not have "actually engaged in the manufacture of paper and pulp" in the instructions that were originally sent out. Nevertheless, those mills were withdrawn from the Contest. With this one mill in particular, it was really unfortunate, because we had one of the national officers visit this mill and they were doing a real bang-up job. They were right on the jump every minute. They had posters throughout the place, and every man was keyed right up, having a wonderful time until we had to tell them they were out of the Contest.

I expected, after that, to meet someone at this meeting with a shot gun, waiting for me. I think that was true with one or two other mills. Mr. Hoyman had a mill or two that wrote in and said it was the same way with them—they hadn't taken time to read the original instructions, and just said "We are in the Contest." Mr. Hoyman very graciously withdrew those mills.

I want to clear up that question for those who thought it might not be fair.

CHAIRMAN PEACOCK: George, name the six mills for us that are still tied in the "C" Class.

MR. BURNS: The Provincial Paper Mills, Ltd., Montrose Division, Kimberly-Clark Co., Neenah; International Paper Co.; Riley, U. S. Gypsum Co., Gypsum, Ohio; Lincoln Pulp & Paper Co., Ltd., Lincoln; U. S. Gypsum Co., Lancaster, Ohio.

These are all in first place at the present time, and I wish you would please note in this report that I have listed all as Number 1. Never again will I list according to man-hours worked. I made that mistake in April and unthinkingly left the plant with the greatest number of man-hours first and let it go at that. This time they are all down as Number 1, and may the best one win.

C. E. TORRANCE (Bryant Paper Co., Kalamazoo, Mich.): You mention the fact that a contestant has to be a bona fide manufacturer of paper. What about our case? We have five mills, and three of them are paper mills. Wouldn't the three paper mills be eligible?

MR. BURNS: I think that promotes a little bit the argument we had last night. When *The Paper Industry* originally started this Contest in 1925, I believe it was the idea to award the Cup only to those actually engaged in the manufacture of paper. I feel this way: If you have separate divisions (this is my personal feeling in it, because Mr. Dowd is now chairman of the Contest Committee) if you wish to penalize yourself by putting in the power and repair division with one of your other mills, you can.

MR. TORRANCE: In a great many paper mills where they have several mills, each one has a power and maintenance division. About five or six years ago they were separated. The three paper mills have a total of 11 machines. The coating mill buys the paper from our own paper mills. It would seem to me, in view of that, only the three paper mills would be eligible to enter the Contest.

MR. BURNS: Somebody got up in the discussion last night and asked the same question. I don't know, but I believe everyone felt as you do, that the coating mill should not be included. I don't know how you keep the pay roll record. How do you charge maintenance?

Adjusting the Circumstances to the Contest

MR. TORRANCE: It is pro-rated over the mills. We have a system where that is charged to the mills issuing them.

MR. BURNS: If you have men working a day or two in mill No. 2, why not charge those hours to the mill if the men suffer injury?

MR. TORRANCE: No man working in another division except on a definite order is charged to that division when he has an accident.

MR. BURNS: We had that come up from one of the Eastern companies. They had an electric railway, and owned the entire town. They claimed that all their employees were engaged in the manufacture of paper, but at that time I just arbitrarily said that these men doing other work should not be counted. That is the way I had to do in my office, not knowing anything about it.

STUART H. BROWN (Union Bag & Paper Corp., N. Y. C.): I imagine there must be a similar condition in all the paper companies where they run more than one plant. We had a great deal of difficulty in determining for ourselves how to take care of this situation. We have electric railway, power and maintenance plants and the other departments that have nothing to do with the actual paper making. Still, they are more or less coincident to paper making, and I think that is a question that ought to be very closely defined for the future, because I have no doubt that there are many cases where an unfair advantage might be taken. There is lots of leeway there for things that do not exist. I would recommend or urge rather, that for next year's contest that very question be very closely defined.

JOHN LUNDRIGAN (International Paper Co., N. Y.): It seems to me the simplest and easiest question to decide since I have been in Chicago. If one of those main-

tenance or repair men was injured in the coating mill, it wouldn't count of course, any more than the hours he worked would count. But, if that same man was injured in part of the maintenance of the pulp and paper mill, it would count. If your truck driver went to the freight station for a gear to be used on a pulp and paper machine and was injured on the truck, it would positively be a part of the business of manufacturing pulp and paper. But, if this happened to be a gear for some other department in that company having nothing to do with the business of manufacturing paper and pulp, this accident could not be counted. I can't see how it would be understood otherwise.

As I said this morning, one of the most expensive accidents we had, occurred one cold winter's night in February when the night watchman of one of our mills was calling out a man. He froze his feet and later died. However, he was engaged in the business of manufacturing pulp and paper, but if he had been out on one of the several auxiliary or subsidiary interests of the International Paper Company which we operate and control, we couldn't consider charging this to anything but the department to which the accident would be chargeable.

How to Charge the Accidents

We have a door mill construction company, covering large jobs in our mills. While we inject the spirit of our safety organization into this door mill construction company, we absolutely separate them from the accident costs and charge them with whatever is directly up to them.

If in any way it has to do with the manufacturing of paper and pulp, that division is charged with it. After it is manufactured, it goes into a thousand and one interests. Our own company happens to operate several such interests. We have our own woodland operations. We have a great many accidents there, but it is kept as completely separated as a separate corporation, because we do not consider that it enters into the process of manufacturing paper and pulp until we begin to unload it out of a boat or a car at a plant. The moment we start to do that, it becomes an essential part of the business of manufacturing paper and pulp.

B. D. ROGERS (Bird & Son, Inc., E. Walpole, Mass.): I dislike to disagree with Mr. Lundrigan, but I want to say this: We have a paper mill and two box factories, and the only way we could decide this thing was, that we felt certain maintenance and engineering should be entered into the paper mill contest. We couldn't enter the box factories, although they were by far the largest and the maintenance crew work under the same work order system. We arbitrarily said the maintenance crew is part of the paper mill, and if the maintenance crew happens to be working in the box factory, and an accident occurs, the accident goes into the manufacture of paper and pulp.

The truck driver goes to the freight station for machine parts, a motor for the box factory and a gear for the paper mill. They were both on the same load. Then suppose an accident occurred. Who will you charge that to? One department will try to put it over on the other.

I say you should decide what departments and what mills will be in the contest and let it go at that. We have a definite number of men then in the contest, and those departments are in it. Otherwise if you try to separate these things after the accidents happen, you will find that you don't know where lots of them occurred.

MR. BROWN: The way we disposed of such accidents was to have the maintenance and engineering departments entirely separate, making them separate units from paper making or bag making or whatever it may be. We tried to get it down to the personnel as finely as possible—to what part of that department the repair crew belonged, for instance in paper making, and we decided after much research that 25 per cent belonged to the paper mill. Then, every month we took 15 or 25 per cent of the maintenance and engineering payroll and added it into the paper mill.

Whether that is satisfactory is a question, because conditions may occur which will make the results entirely wrong. We can't get very much closer, though.

A. SCOTT DOWD: Mr. Rogers covered the point I wanted to bring out. This company having paper and converting plants, with a maintenance crew working in both plants, the question would come in where to distribute the time when the men are engaged at the same time in service for both plants. I can't help feeling as we felt last night, that a maintenance crew would perhaps be included in the paper mill man-hours if the paper mill would be charged up with them. The paper mill would get the credit and not the power and repair mill.

MR. LUNDRIGAN: Let's get this clear. The maintenance and repair crew of a paper mill covers about 10 per cent of the payroll. They are not there waiting for something to happen. They are all over the mill, keeping the mill running. They are a part of the business of manufacturing pulp and paper. It is a mere matter of bookkeeping from time to time when you call one of those men into another industry, possibly joined to the same building. To my mind, that doesn't leave any doubt when the man gets hurt where the accident should be charged.

Now, if it could be determined as closely as our friend from the Union Bag & Paper Corporation says, where the average percentage of time of the repair crew is distributed to some certain mill, that is a good way to do it. For instance, in the town of Pittsfield, Massachusetts, our company owns every mill in the town but two. We have to maintain them. Oftentimes we may have to build a house. We could find many cases if one of the repair crew fell off the roof of a house, to charge that to the business of manufacturing paper and pulp, because the technical fellow will say, "You have to have the town there." Another brother put up a technical question also that would kill a thousand per cent batting average when he asks where to charge an accident when the truck driver goes to the freight house to get machinery for both plants.

Points in the Contest Referred to Committee

If we will be fair with ourselves, we can honestly determine every time an accident occurs whether it has to do directly and is a part of the necessary operation and process of manufacturing pulp and paper. If it can't be directly connected with that business, it surely has to do with some other industry. That is the way I see it.

MR. ROSEBUSH: Who are the other members of this Prize Committee besides Mr. Dowd?

CHAIRMAN PEACOCK: It hasn't been completed yet. All we know is that we have a chairman.

MR. ROSEBUSH: I move the question we are discussing and the questions relative to the next contest be turned over to Mr. Dowd to consider.

MR. LUNDRIGAN: I second the motion.

MR. ROSEBUSH: I move that the committee shall consist of Mr. Dowd and the vice-presidents of the different regions of the United States.

CHAIRMAN PEACOCK: That sounds pretty good. Is there a second.

(The motion was seconded.)

CHAIRMAN PEACOCK: All those agreeable say "aye." contrary "no." The motion is carried.

MR. ROSEBUSH: There is one other motion I would like to make if I may have just a moment: That the Nominating Committee put on the name of Mr. Robert Altman with the Engineering Committee. Mr. Altman is entirely competent to act on that committee, but I happen to know that Mr. Altman has been engaged in other work. If it meets with the approval of the Section and the Nominating Committee, I would suggest that we add another name, Mr. F. W. Braun, of the Employers Mutual Insurance Company of Wisconsin.

(The motion was carried.)

NAT. BARTLETT (Hollingsworth & Vose Co., Boston, Mass.): Before I go home, I want to say this: To these men here present, my heartfelt appreciation for the loyalty and kindness extended to me, and also for the correspondence and various posters and so forth to assist me in the safety work in Massachusetts. I also want to thank Ben Rogers who is adjacent to me, in fact just across the street, in opening up the archives of their safety records to me for my benefit.

ED. H. VALLIERE (Michigan Mutual Liability Co., Detroit, Mich.): I happen to be one of the insurance representatives at the meeting today, and I heard the reference made in regard to the great expectations from Michigan in the next contest. I want to assure this body that I will do all in my power to cooperate with Mr. Torrance to put Michigan on the map in a safety way.

CHAIRMAN PEACOCK: I have a suggestion which appeals to my sense of fitness: that "Dad" stand on his feet and say something.

EDWARD B. FRITZ (*The Paper Industry*, Chicago): I haven't anything on my mind. I came down to get something to eat, and am rather like the colored man, "At peace with the world—Ah just done et."

I am mighty glad to be here. We will be particularly happy to present this bigger cup to the winner sometime in the future. I believe the fight for the cup has, in a sense, helped to prevent many accidents in paper mills. And if it has done that, we are very happy. As I said before, the giving of this cup gives us a great deal more pleasure than anything we possibly could receive, because we are trying to help every section of the paper industry, and we consider this one of the very important ones. We are mighty glad to be a part of this organization.

CHAIRMAN PEACOCK: I wish Mr. H. G. Noyes would stand on his feet. He is engaged in educational work with the Vocational System in Wisconsin. He knows a lot about this safety game; in fact he teaches it to foremen.

B. D. ROGERS (Bird & Son, Inc., E. Walpole, Mass.): Do you want anything in the record in regard to the roofing situation?

CHAIRMAN PEACOCK: Go ahead, let's have whatever is on your mind.

Discussion of the Roofing Situation

MR. ROGERS: The first day I was here, I talked with Mr. Peacock about this matter. The National Container Association has recently joined the Council. The roofing manufacturers in many cases throughout the country, are not represented in the Council except in an auxiliary way. I thought a great deal of interest could be aroused in the roofing industry if we could get the safety idea to them. I also thought that the Paper and Pulp Section was the closest connection that could be made.

There is a National Roofing Association the same as the Container Association, and it would seem to me that through that way, the Executive Committee might interest them further in this Section. It would make it a larger Section if we could get them in. The machinery used in that work is about the same as the paper machinery, and the hazards are about the same.

Mr. Bickford is the representative of the Flintkote Company. They have paper mills, and incidentally I want to mention that they are probably the largest roofing, having one or two paper mills. They are not in the Association. Mr. Bickford is very keen on it, and he expects to become a member shortly, and I assure you that our people will also get back of it.

CHAIRMAN PEACOCK: We will ask you gentlemen to nominate someone who would get up interest in your Section.

MR. ROGERS: I think we can do that.

CHAIRMAN PEACOCK: Before we leave tomorrow we will try to appoint whoever you name as a chairman.

GEORGE BURNS: I want to take this opportunity to say something if I may. This

being the only opportunity I have of seeing you all together, I want to thank each and every man for the real and truly wonderful cooperation I have received during the handling of the contest for this year. You have most graciously sent in the reports, and I want to thank you for the the various little courtesies extended, and for the very kind way you have taken what we have attempted to give.

CHAIRMAN PEACOCK: I have just made the suggestion to Mr. Scott that he see that George's picture in connection with a write-up be placed in *The Paper Industry*, so that all of our friends may be acquainted with him face-to-face.

MR. DOWD: I was just hoping that that would be a little surprise. That is a very unusual thing for *The Paper Industry* to do; they are not in the habit of publishing the pictures of individuals. I was looking forward to this opportunity, and I think his picture really has a place in the magazine.

MR. FRITZ: The first time we published the picture of an individual was last March, and that was our good friend Mr. D. C. Everest.

ADJOURNMENT

Thursday, September 29, 1927

One of the most important meetings of the Paper and Pulp Section from the viewpoint of constructive planning and accomplishment for the coming year was the special business session held Thursday morning at nine-thirty o'clock, with Chairman Peacock presiding.

Chairman Peacock opened this meeting with the following welcoming statement:

"We are to understand that this year's business is over, and that we are entering upon the first meeting for the year 1927-28. The purpose of this meeting is designated in your program as, 'a meeting for intensive study and discussion of the major problems of the section, held especially for new officers, regional directors and committeemen to acquaint them with their tasks and to adopt a unified program for the coming year.'

"Our objective in the Paper and Pulp Section is to have a section that functions all year round. Those of you who have followed the history of this section know that the problem has been to get an activity and a group feeling that will carry through the entire year.

National Safety Council Service. We must not forget the service that the National Safety Council can and does give us. Get our individual mills in touch with the National Safety Council, and their facilities. Posters, educational service, statistical compilation is all part of the service that the Council is anxious to give to the members of the Section.

Carrying Home the Spirit of the Congress. Carry the Congress kick back to each region, urged the Chairman in his message. We have learned how to do that in this Section. Get the inspiration to the last man in the mill in the farthest isolated region. Chairman Peacock then diagramed the coming year's activities into the following divisions: Commissions, Newsletters, Contest, Regional Conferences, Safe Practice Pamphlets and Reports and Membership Drive."

Commissions. Chairman Peacock told the group present that this year the Paper and Pulp Section will elect research men to fill commissions and study certain problems throughout the year. He also made the announcement that J. J. Plzak of Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis., had been elected as one of these research men.

A suggestion made by one of the prominent members of the section to the chairman that consideration be given to the idea of employing a paid secretary to carry on the work and activities of the section was announced and the request made that the matter be given the benefit of careful thought.

Newsletters. George Burns, of the National Safety Council, urged all members who desired to receive newsletters for the coming year to cooperate with the council by sending one centrally named address, one designated person to receive these, and a group number of newsletters to be sent in one package.

He explained that in this way, 20 or more letters can be sent at once to a central place and to one particular person to be held responsible for their distribution, saving postage, and at the same time eliminating the possibility of loss of the newsletters and later complaints to the management of the mill or the council that the letters are not reaching the right persons.

In connection with the material available for newsletters, Mr. Burns urged all those present to promote the regional conference idea, renew membership activities, and promote committee activities throughout the year. Developing safe practice pamphlets will give something to the section through the medium of the newsletter by announcing it to other members. Food for the newsletters can be provided and developed through the above channels throughout the year.

1928 Contest. A. Scott Dowd, chairman of the Contest Committee, spoke on the coming contest, and asked for suggestions as to any way that several manufacturers now members of the section could be included in the coming year's contest. These included such manufacturers as converters, coating mills, and others.

George Burns suggested having a group designated as N. O. C., "Not Otherwise Classified," but J. H. Slater of Escanaba, Michigan, immediately took the floor and said as follows:

"This is a rather deep question. When you start differentiating, you open up a real problem. Hazards are less in book and fine paper mills than in newsprint mills. Roofing mills while handling large amounts of material have a comparatively simple handling operation. Converters buy by far the greater portion of their material and make the paper from this material. We might take and divide the industry in half and put into one group the book, tissue and wrapping mills and put into the other group the news mills. However, let us have the question open for debate, gentlemen."

A Contest Equalizing Factor is Discussed

Mr. Rosebush then took the floor, and his expression on the contest situation was as follows: "When we are in a contest, we want to be measured according to the hazards we have. I suggest that hazards be made a factor in the coming contest. However, we are in favor of the one cup idea, and would like to see all the mills entered in the contest for one cup as last year."

M. J. Steinman of the Indemnity Insurance Co., of North America, then suggested that some adjusting rate, such as that used by steel companies and General Motors Co., in bringing all plants down to one basis, be used in the Paper and Pulp Section.

Mr. Burns promptly took the floor and stated that the only difficulty is determining this so-called equalization factor, and getting some sort of a measurement to bring all the mills down to one level.

Mr. Slater then spoke again and said that one of the determining factors should be whether the concern actually makes paper or not. Just how far we want to allow the concerns to do other things is a question open for decision.

The question then came up as to the desire of mills handicapped with serious hazards having the same incentive to enter a so-called "losing race," but Gleason, of Hammermill, brought out the fact that his mill, having serious hazards, even though it had never yet won the cup, had been stimulated to greater activity by far since entering safety work, and had reduced accidents immeasurably.

Chairman Peacock then suggested that in the near future we should have some other basis of judging, such as an achievement of first year's results. This met with the approval of the group present.

A. P. Costigane, Ontario Pulp and Paper Makers' Safety Association, Toronto, Ont., Can., then asked if the rules for the 1928 Contest would be submitted to all members. Mr. Dowd, chairman of the Contest Committee said that all members would ultimately have a chance to see the rules for the coming contest and comment upon them.

Developing Safe Practice Pamphlets. W. Dean Keefer, Chief Engineer for the Industrial Division of the National Safety Council, told of a prepared folder that the council is working on, entitled "Organization of Activities in Industrial Sections." The exact duties and obligations of each committee and executive committees is told in this folder. He suggested that sub-committees be appointed geographically so that they can get together and have reports circulated among the executive committee, and eventually have these reports printed by the National Safety Council as a safe practice Pamphlet. He emphasized the fact that reports and work done in different regions must be made available to those who do not come to the meetings or the Congress.

Regional Conferences. The Paper and Pulp Section is planning to have the regional conference idea uppermost. Chairman Peacock inquired of Alvin Record as to the possibilities for the regional conference in Maine this year, and Mr. Record assured him that this year they would attempt their very best to have a conference. They plan to make a canvass of all the mills in Maine and find a central location, and hold the meeting there. Invitations will be extended to non-members as well as members in an effort to make the meeting thoroughly worthwhile.

Chairman Peacock then asked M. G. Hoyman of Kimberly-Clark Co., to report on the results of their regional conferences in the past. Everyone knows that Wisconsin has had signal success in their regional conferences. Mr. Hoyman suggested that more mills and geographical groups make use of the National Safety Council, and get speakers from them to help put the meeting across.

Mr. Gleason of Hammermill Paper Co., then told of Erie conferences which had been held in conjunction with other organizations, getting local organizations for sponsors.

Mr. Hoyman in telling the value of regional conferences stressed the fact that men going to regional conferences get so many practical ideas and meet men that they know and exchange ideas of value. He then spoke about the unusual success of the Sheboygan conference this past spring, and urged more meetings to stimulate safety growth in the mills.

Chairman Peacock concluded the discussion on regional conferences by stating and emphasizing the fact that we must tie up our paper and pulp meetings if possible with some other safety meeting. Then, too, he stated that as soon as a region is large enough we will have a regional director.

He then announced that C. H. O'Connell, International Paper Co., as regional director of New York, who stated that he would work out his plans for the coming year with Mr. Lundrigan, industrial superintendent for all of International's mills.

Membership Activities. Mr. Burns spoke on the plan of getting new members and bringing those who had cancelled membership back into the fold. He stated that the best plan so far was the one of making so many definite appointments with different mill officials, and a field man from the National Safety Council would come up and keep these appointments. With the introduction provided by the members in bringing this field man to the new official, the National Safety Council man had a very good entree, and a splendid opportunity to talk safety to the official.

Mr. Burns also reminded those present that the National Safety News is publishing several pages each month devoted to exchange ideas, or practical mill helps. He urged the members present to be generous in sending in little kinks and practical suggestions. Many times a little device that has been helping in many ways is operating in your mill, and forgotten because it is no longer new to you, but the other fellow would like to have the idea, so pass it along whenever you get a chance.

Conclusion. Mr. Dowd concluded the meeting by stating that contest ideas that had been expressed in this meeting would be put into some form of a questionnaire and first of all submitted to the vice-presidents, who constitute the Contest Committee. The results would then be submitted to the regional directors for their comments. Finally, the adopted rules would be submitted to all members of the section.

Chairman Peacock adjourned the meeting by stating that he felt this session had been one of the most important of the Congress, and hoped that each member would carry back the stimulus of the coming year's activities to each individual of his respective mill.

ADJOURNMENT

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Petroleum Section

New Section Officers

Chairman, GEORGE F. PRUSSING, Union Oil Company of California, Los Angeles, Calif.

Vice-Chairman, DR. R. P. ANDERSON, American Petroleum Institute, New York City.

Chairman Atlantic Coast Division, S. W. CANDEE, Tide Water Oil Company, New York City.

Chairman Mid-Continent Division, T. N. SHAW, The Midwest Refining Company, Midwest, Wyo.

Chairman Pacific Coast Division, F. A. SCOFIELD, Associated Oil Company, San Francisco, Calif.

Secretary and News-Letter Editor, A. A. NICHOLSON, The Texas Company, New York City.

Poster and Slide Committee Chairman, O. W. HUMPHREY, Standard Oil Company (N. J.), Elizabeth, N. J.

Publicity Committee Chairman, RALPH E. MOTLEY, The Atlantic Refining Company, Philadelphia, Pa.

Program Committee Chairman, RAY E. MILLER, Marland Companies, Ponca City, Okla.

Statistics Committee Chairman, J. W. MYERS, Standard Oil Company (N. J.), New York City.

Field Representative, H. N. BLAKESLEE, National Safety Council, Chicago, Ill.

Engineering Committee:

Chairman, C. W. SMITH, Standard Oil Company (Ind.), Chicago, Ill.

F. L. NEWCOMB, Standard Oil Company (N. J.), Elizabeth, N. J.

C. L. HIGHTOWER, Texas Pacific Coal & Oil Company, Thurber, Texas.

R. E. DONOVAN, Standard Oil Company of California, San Francisco, Calif.

Executive Committee: THE OFFICERS AND

E. J. SENNE, Vacuum Oil Company, New York City.

R. S. BONSB, Standard Oil Company (N. J.), New York City.

C. C. BENEDICT, Standard Oil Company of New York, New York City.

A. L. BARTH, The Atlantic Refining Company, Philadelphia, Pa.

V. R. CURRIE, The Texas Company, Houston, Texas.

D. J. WALLACE, Mid-Continent Oil and Gas Association, Tulsa, Okla.

E. D. MURPHEY, Mid-Continent Petroleum Corporation, Tulsa, Okla.

R. B. ROAPER, Humble Oil and Refining Company, Houston, Texas.

H. L. EGGLESTON, Pan American Petroleum Company, Los Angeles, Calif.

C. P. ANDERSON, Richfield Oil Company, Los Angeles, Calif.

H. M. WOLFLIN, California Petroleum Company, Los Angeles, Calif.

W. C. LYNCH, General Petroleum Corporation of California, Los Angeles, Calif.

Retiring Officers

Chairman, V. R. CURRIE, The Texas Co., Houston, Texas; *General Vice-Chairman*, DR. R. P. ANDERSON, American Petroleum Institute, New York City; *Chairman, Pacific Division*, CHARLES M. BUTLER, General Petroleum Corporation, Los Angeles, Calif.; *Chairman, Mid-Continent*, RAY E. MILLER, Marland Refining Co., Ponca City, Okla.; *Chairman, Atlantic Division*, THOS. W. WADDINGTON, Standard Oil Co. (N. J.), Elizabeth, N. J.; *Secretary*, A. A. NICHOLSON, The Texas Company, New York City. *Committee Chairman: Program*, F. C. SINGLETON, Standard Oil Co. (Ind.), Chicago, Ill.; *News-Letter*, A. A. NICHOLSON, The Texas Co., New York City; *By-Laws*, DR. R. P. ANDERSON, American Petroleum Institute, New York City; *Poster*, D. J. WALLACE, Humble Oil & Refining Co., Houston, Texas; *Membership*, GEO. F. PRUSSING, Union Oil Co., Los Angeles, Calif.; *Statistical*, J. W. MYERS, Standard Oil Company (N. J.), New York City; *Engineering Representative*, E. J. SENNE, Vacuum Oil Co., New York City; *Executive Committee*, THE OFFICERS and ROY S. BONSBIB, Standard Oil Co. (N. J.), New York City; F. A. SCOTFIELD, Association Oil Co., San Francisco, Calif.; J. D. BRIGHT, Texahoma Oil & Refining Co., Wichita Falls, Texas; W. F. BURT, Standard Oil Co. (N. Y.), New York City.

Tuesday, September 27, 1927

V. R. CURRIE, Chairman

Manager, Employment and Service, The Texas Company, Houston, Texas

The first session of the Petroleum Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, V. R. Currie, manager, Employment and Service, The Texas Company, Houston, Texas.

CHAIRMAN CURRIE: We want first to extend a most hearty welcome to any representatives present of new members enrolled during the last year, also to any representatives or members who may be attending for the first time a Congress of the National Safety Council. We hope that you will enter into our discussions in a wholehearted manner in order that you may derive the greatest amount of benefit from your contact with these safety men during the next few days.

It might not be a bad idea at this time to have these new members and representatives rise for a brief moment and give their names, as well as the names of their firms, in order that we may all get acquainted.

(About twenty-five men rose to their feet and gave their names and the names of the firms employing them.)

CHAIRMAN CURRIE: It is customary at the start of meetings of this kind to make a few announcements, and then hear the reports of the various officers and committeemen.

Several months ago I appointed a Nominating Committee composed of Messrs. E. J. Senne, chairman, D. J. Wallace and R. S. Bonsib, in order that they might deliberate and decide on nominations for office for the next year. I believe that they have worked out a line-up, and we sincerely hope that you will be present tomorrow morning at the election of officers to help select our officers for the coming year.

I believe that I can safely report that some progress has been made in the acci-

dent prevention activities of the Petroleum Section during the past year. Much of the work of your chairman has been handled by correspondence, but I feel that the outstanding feature of the year's work has been the employment of a full time field representative for the section. This was brought about by a continuation of the efforts of my predecessor, Mr. E. J. Senne, and also through the interest, aid and cooperation of the American Petroleum Institute. This plan became effective during May of this year, and our section has the distinction of being the first section of the National Safety Council to have a full time representative in the field. Through a special committee authorized at our last meeting, a young man was selected for the post and this selection confirmed by a mail vote of the Executive Committee, and I feel that I can best cover this particular phase of my report by presenting an exhibit. It is my pleasure to present to you, as Exhibit A, the only sectional full time field representative in captivity, Mr. H. N. Blakeslee, field representative of the Petroleum Section of the National Safety Council. As he is on the program you will hear from him later, so I will not ask him to say anything to you just now.

An Appeal to the Membership and Founders

I want to make at this time a special appeal to the general membership, but more particularly to the founders of this section. I want to ask all of them to continue to give their full support for the maintenance and promotion of the present scheme for a field representative which the American Petroleum Institute has so kindly sponsored. We all owe it to them to see that the office and the duties of the representative are kept at the maximum of efficiency and that the time is divided equally so the industry in general receives the help and support that was promised and intended.

I think I will continue my scheme of presenting the different officers as exhibits, and so as Exhibit B, I will introduce General Vice-Chairman Dr. R. P. Anderson. Dr. Anderson, have you any report to make?

GENERAL VICE-CHAIRMAN ANDERSON: (American Petroleum Institute, New York City.) As a perfectly proper General Vice-Chairman, I have no report.

CHAIRMAN CURRIE: Mr. Butler, have you any report?

C. M. BUTLER: (General Petroleum Corporation, Los Angeles, Calif.) I have nothing to report.

CHAIRMAN CURRIE: Mr. Miller, have you anything to say?

RAY E. MILLER: (Manager Safety Department, Marland Refining Company, Ponca City, Okla.) I think I included all that I have done in my letter to Secretary Nicholson, and he probably has it in his report, and I do not think it necessary for me to say anything here. If you read the secretary's report you will find out what I have done.

CHAIRMAN CURRIE: Then I will call on Mr. Thomas Waddington, chairman of the Atlantic Division.

(Mr. Waddington, chairman of the General Safety Committee, Bayonne Refinery, Standard Oil Company, Elizabeth, N. J., presented a detailed report of activities of the Atlantic Division.)

CHAIRMAN CURRIE: Secretary Nicholson is not present, and we are not going to have his report read. His report is here and as we have about a hundred copies available, the members who would like to have a copy may get one. There may be some salient features that you would like to know about.

I would like to say that Secretary Nicholson has done wonderful work indeed in getting out our News Letters and other work in connection with his duties, and this becomes more wonderful when we remember that he has been flat on his back since February. His contributions have come practically from a hospital cot, and

I think that we owe him a vote of thanks for what he has done. He has kept up both his work as secretary and that in connection with the News Letters.

R. S. MURCH (The Texas Company, New York City): I should like to call attention to some points in that report.

On Page 29 our secretary has outlined some suggestions which you might want to consider. They are as follows:

1. That the field secretary arrange to hold at least one General Divisional Conference each year.
2. That copies of all proceedings be sent to the secretary of the section for file and record.
3. That definite assurance be secured from the NATIONAL SAFETY NEWS, that at least one page be granted in each issue to the Petroleum Section, and that the field secretary be held responsible for securing suitable material for such page.
4. That at each Congress, the field secretary will render his annual report separate and apart from the report rendered by the secretary of the section.

The News Letter to Be Continued Quarterly

5. That the publication of the News Letter be continued on a quarterly basis, and that there be secured from the representatives the name or names of the executives of each concern member, and that a copy of News Letter be sent them direct. This would seem in order, inasmuch as these concerns make our section possible and it is only reasonable to assume that they are interested in keeping in touch with the section throughout the year.

6. That the chairman of the section will interest each Regional Chairman to appoint, without delay, a News Letter representative of the division who shall be responsible for submitting News Letter data to the editor, per his submitted schedule.

CHAIRMAN CURRIE: I think that Secretary Nicholson has done a wonderful piece of work on this report, especially when we remember that it has practically come from a sick bed.

R. S. BONSB (Standard Oil Co., New Jersey): I think that we ought to express our appreciation of his work to him by a letter or telegram from the chairman. Many men would have used that as an excuse not to do anything at all, and he has gone on just the same and kept up not only his secretarial work, but the News Letters beside, and I think that we owe it to him to send him some word of appreciation.

CHAIRMAN CURRIE: I shall be very glad to send him a telegram.

R. S. BONSB: Is he still in the hospital?

CHAIRMAN CURRIE: I believe that he is now confined in his home.

(The following telegram was sent):

A. A. Nicholson,
c/o Overlook Hotel, Saranac, N. Y.

Members Petroleum Section in session today unanimously express hearty appreciation for splendid work performed by you during the past twelve months, and join in wishing you full, complete and speedy recovery.

(Signed) Members of the Petroleum Section.

CHAIRMAN CURRIE: Mr. Wallace is not present, and I have received no report from him.

We have no report from the Membership Committee, but in spite of the inactivity I feel that we have made considerable progress during the year in the prevention of accidents, and I want to express my appreciation at this time to the officers who

have served and cooperated with me during the last twelve months, as I may not have an opportunity later.

I am not going to introduce the next speaker with any flowery language. I am going to give Mr. H. N. Blakeslee, our field representative, the opportunity to say something, of which I deprived him a while ago.

H. N. BLAKESLEE (National Safety Council, Chicago, Ill.): I want to thank the safety men and the engineers with whom I have been dealing for their co-operation, and I take this occasion to thank the superintendents and officers who are not present, for their splendid cooperation.

The Accident Situation in the Petroleum Industry and the Progress Made Thus Far

H. N. Blakeslee, Field Representative, Petroleum Section,
National Safety Council, Chicago, Ill.

This is the sixth annual session of the Petroleum Section of the National Safety Council. The first session was held in Detroit in 1922. The proceedings of that meeting indicate that a group of petroleum men interested in accident prevention got together in a round table discussion of the accident problems of the petroleum industry. The next program in 1923 brought forth some well prepared talks on the hazards of acetylene welding and static electricity. Each year since then other hazards have been covered in a similar manner. Speakers have told those in attendance how they were reaching the accident situations within their organizations and how accidents were being prevented. The committee, in bringing to you the present program, has endeavored to produce a program that will show actual accomplishments in accident prevention. It is the hope of the committee that upon the completion of this program every person present will feel as never before that his work is not only humanitarian but that it also is essentially a part of the production program of his company.

Management in the old industry is interested in accident prevention as never before. The American Petroleum Institute has proved its interest by making it possible to employ a full time representative on the staff of the National Safety Council. Company managers have made accident prevention a part of the duties of certain departments and have in many cases employed full time safety engineers, established foremen and workmen's committee and are making working conditions as safe as possible.

First-aid training is being given to workmen wherever possible. Instead of depending upon the United States Bureau of Mines for an instructor, employers are having one or more of their employees specially trained by the Bureau for the purpose of giving instructions to all company employees. First aid has proved its value in developing the accident prevention thought which causes employees to avoid injury. Artificial respiration alone is saving the petroleum industry thousands of dollars in death compensation claims by reviving workmen who have been overcome by petroleum vapors or gas. First-aid kits are being provided so the small injuries will not be neglected and cause unnecessary lost time.

Physical examination of new employees is almost a general practice. Old employees have been examined and are occasionally placed on work for which they are physically better suited. This works for general efficiency and is a help in preventing accidents. Employees were skeptical of the physical examination at first but they now realize it is for their own protection and are for it. In some localities where living conditions are not the best, typhoid inoculations have been given to employees free.

Free and group life insurance have been provided to create an estate for the

employee's family and also pay benefit in case of total disability. This insurance serves as an inducement for permanency and eliminates to a certain extent the worries upon the mind of the workman regarding the future of his family.

By these acts progressive management is manifesting its interest in employees' welfare and protection.

In contrast with this situation there are companies which have not yet realized the value of accident prevention. Occasionally I find a company which has a beautiful organization on paper for the purpose of securing insurance credits and is actually doing very little accident prevention work. I have talked with company officials who know their accident costs are high and would like to reduce these costs, but to use their own words "we would like to do something but we don't want to spend any money." Boards bristling with protruding nails are every place on some properties. There are no rules prohibiting smoking and no-smoking signs are not used. Boilers are set up with no thought of safety in operation. Keys protrude from engine shafts. Rotary draw works are unguarded. Cat heads are badly grooved and the cat head keys protrude. This may sound exaggerated to some but others know it is true. Insurance rates are very high and some insurance companies are simply refusing to carry these risks. The refusal of insurance companies to renew contracts has caused some of the companies to undertake accident prevention. These small companies usually have been able to make money under flush production but as production falls off become a losing proposition until one of the larger companies takes them over and by good management with improved and safe operating methods makes them pay.

State Legislation Sometimes Works a Hardship

These situations where management fails entirely to protect the workmen cause state legislation which sometimes works a hardship upon the conscientious operator and the entire industry. It would be far better to prevent the accidents and obviate the necessity for legislation.

Many of the safety engineers are new in the producing end of the petroleum industry and are learning the hazards of production. The Executive Committee of the Petroleum Section feels that accident prevention in refineries has been much better cared for than in the producing fields. For that reason I have devoted practically all my time to a study of producing department problems and I will try to express to you my thoughts in preventing accidents in the producing department.

The National Safety Council now has a Petroleum Section membership of 100 companies and in 1926 only 20 firms reported their accident experience. This report is not at all complex and if you have kept your records so that you are in a position to make a report of your progress to your Executive Board it is an easy matter to make your report to the National Safety Council. Only eight companies reported their experience for producing operations. Make a definite study of your experience for 1927 for your own information and then send it to the National Safety Council and in return you will receive our statistical report which will list your own record as compared with the records of other oil companies. No doubt your President will be interested in knowing where you stand in relation to others. The safety engineers who do report are always anxious to get the National Safety Council statistical summary. It will be indeed gratifying to the National Safety Council to receive the 1927 experience of the entire Petroleum Section membership. In sending in your experience you are helping build up interesting and useful information.

A close study and investigation of every accident makes possible the effective use of a cause classification which discloses the real hazards. Many accident reports are incomplete and even incorrect and give no clue to the real cause of the injury. No doubt you are all familiar with reports which read like this: "Stepped on

like to have Mr. Blakeslee give us some of his own experiences, that is, places where he has been and what he has found, something about his own work.

MR. BLAKESLEE: During the summer I made a trip through the Seminole, along the border line of Texas, to Fort Worth, Houston and Beaumont, and everywhere I went I was welcomed, and I came in close touch with a number of engineers and managers.

I am going to tell you of one situation. One Sunday morning I was scouting around, and I went into a drilling station. Everything was in good order. The drilling rig was well set up and everything looked good.

From that location I stepped to another location. The set-up was very bad. I said, "Whose rig is this?" and the operator replied, "I have only been on this job a few days, and I don't just know who I am working for."

The cathead was badly broken, the cat line was hanging down over the cat-head, and things were about as bad as you could find. Quite a story could be told right there. A good competent workman would not stay on that job any longer than it would take him to find another. Which one of those wells would get production first? What does efficiency in the set-up of the drilling rig mean to the owner of the well?

I am satisfied that it was a losing proposition for the owner of that poorly set-up rig.

C. L. CANFIELD (The Sinclair Oil Co., Kansas City, Mo.): I should like to ask Mr. Blakeslee if he has ever inspected water wells, I mean the portable type of derrick?

MR. BLAKESLEE: I do not remember that I ever did.

MR. CANFIELD: I was just going to call your attention to the fact that the derricks sometimes blow down.

CHAIRMAN CURRIE: If there are no further questions we will listen to our next speaker. I have made a change in the program here, and instead of calling on Dr. R. E. Humphreys at this time, I am going to call on Mr. Boyd V. Osborn, safety director, Standard Oil Company of Indiana, Casper, Wyo.

Our Reasons For and Methods of Departmental and Plant Inspection Committees

**Boyd V. Osborn, Safety Director, Standard Oil Company of Indiana,
Casper, Wyo.**

Success in any phase of safety work depends entirely upon the ability to secure cooperation from every department, and the wholehearted support of every employee, whether he be superintendent, foreman or laborer. I named them in that order for the reason that in my opinion the man at the top is the key to the ultimate success of the plan. Likewise the importance of their position in safety work and accident prevention depends greatly upon the importance of their regular position on the job.

Granted that one has the backing of the plant managers, superintendents and assistant superintendents, the next problem is that of educating the foremen and other employees to the idea that safety work is not something apart from their regular line of work, but is a phase which holds a very important position in their daily plans and should always be considered.

There are numerous methods of accomplishing this vast educational program and one of the best and most successful is that of establishing and organizing active safety committees. Some large organizations have these committees composed largely, if not entirely of foremen, sub-foremen and pushers, while other

companies select them from the entire staff of employees, making it a point to have at least as many men who are not foremen on them as they do of foremen. Some industries have one large committee composed of representatives from most of the various departments, this large committee to meet periodically and as frequently as experience teaches is wise. Others divide the plant into divisions either according to the number of men employed or according to the nature of the work or both and a committee is appointed from each of these divisions.

At any rate, these committees should have regular meeting dates, and the time should be set aside religiously so the meeting will be held without fail. Someone who is qualified should be selected as chairman and the meeting conducted according to a well organized plan. In spite of this plan, formalities should be almost entirely dispensed with. Many employees become embarrassed with formalities and red tape. They must feel perfectly at ease and free from restraint so that suggestions may be made without fear of adverse criticism or prejudice. It has been our experience that monthly meetings give better satisfaction than having them either quarterly or semi-annually, for the reason that they are kept more alert with frequent meetings.

Two Fallacious But Very Old Theories

I expect that the large majority of men present today have been brought up under the old teaching that it pays to take a chance and accidents are bound to happen. Isn't it strange that these two fallacious theories have lived so long and go so well together? Yet when you stop to think of it they are always found hand in hand. So when you think back over your years of experience and realize the change which has come over your own thoughts, you can easily realize that many of our best employees who have not had the advantage of close contact with accident prevention work, will need a lot of good, sound preaching of the doctrine which we champion today: "Safety—at work—on the street—and in the home."

In addition to the need of education, I believe the other main factor to justify the existence of the committees is the correction of dangerous conditions. I name this as secondary in importance to education because I believe that proper teaching will bring about the correction of these bad conditions, while the mere fact of making safe these things which are unsafe will not alone build a solid foundation upon which the Safety structure can be built. Our problem today is to have such a thorough knowledge of human nature and such a keen insight into physical and mental dangers that the work we do will be of lasting benefit to posterity.

So far you will see that we have touched upon two reasons for the use of safety committees: (1) For the advancement of safety education; (2) for correcting dangerous physical or mechanical conditions.

The next phase of my topic deals with methods, which means a more detailed explanation of the organization of the committees, where and how often they meet, and what they accomplish.

In our case, the safety committees are selected semi-annually, having one meeting a month for each committee. Thus you will see that each committee member should attend six meetings in a term and will learn the aims of the safety division and have a broader and better vision of our ambitions and goal.

For the purposes of our industrial relations department, of which the safety division is a part, our plant is divided into nine main divisions. For each of these nine divisions a safety committee is selected composed of two employees who are not rated as foremen, and one man who is a foreman or department head. The safety director is also a member of each committee. These employee

representatives on the safety committees are selected through the channels provided by the industrial relations department and the foreman is appointed by the plant management.

At the first meeting of each committee the safety director goes into considerable detail to explain the duties of a safety committeeman. He emphasizes the fact that regardless of how a man was appointed on this committee his duties are exactly the same. He also explains the plan much as outlined in the introduction of this paper. At each succeeding meeting some subject is prepared and discussed which will keep up the interest of the work and articles are cited from the NATIONAL SAFETY NEWS and other safety magazines to show that safety is not merely a local fad, but is a nation-wide program among nearly all industries.

It is pointed out to these committees that accidents are an economic loss. There is no gain, nor are dividends declared on money lost through accidents. The employee is drilled over and over that he is the big loser when it comes to accidents. Loss of life, impairment of health and earning capacity, suffering to loved ones at home through interruption of earning ability, discouragement due to worry when recuperating from injury, and, in fact, many of the ills to which humanity falls heir are either directly or indirectly due to accidental injury.

The foremen who are members of the safety committees as well as the foremen on the plant generally are impressed with the idea that they will be held personally responsible for the safe working conditions of their men. Thus, if you have 100 foremen on the plant, you will have 100 safety inspectors who are responsible for seeing that the work is completed with as few hazards as possible. I never lose an opportunity to tell the foremen that one of the nicest ways they have of saving money for the company is by reducing accidents. In doing this they are not only reducing the expense to the company but are also increasing the pay checks of the men.

They Know the Foreman Is In Earnest

The outstanding result of this procedure is that the employees soon learn that the foreman seriously emphasizes safety work and instead of considering it a joke they, too, take it seriously. If, on the other hand, a foreman considers it a joke, his men reflect perfectly his attitude and very little can be done until the foreman is brought to see the light. Experience has proven conclusively that the general attitude of any gang of men is almost entirely governed by the attitude of the foreman.

I have digressed slightly from the subject of safety committees, but you can readily see the connection when you stop to think that after a period of four or five years you will have had a chance to come in contact with from 200 to 400 employees, and they will have gone out on the plant as active safety men although they are not active safety committeemen.

It is the hope of the safety division to keep at this program and almost every employee will have had an opportunity to serve on one of these committees. In doing this we find we are able to smooth off the rough corners that appear to exist between men of different thoughts and ideas. Every new safety committeeman is looked upon as an opportunity to enlarge our own knowledge and experience. It has been my experience that every man who has served on one of these committees has taught me some new angle from which it may be viewed. Through contact with these men I have learned how frequently they have been right and I have been wrong. A deep-seated sympathy has developed for their views, and a respect for their opinions.

Of course, over a period of years one comes in contact with many different

types of men and each man must be handled in just a little different manner. Some men wonder why they were appointed in this capacity and think ~~someone~~ who had served on one of these committees before should be appointed. They are told that we are attempting to give every man a chance to act on the committees and inasmuch as they had never been on before they were chosen.

The success of a safety committee depends largely upon the ability of the safety director to keep the interest of each man aroused. Some of our employees become discouraged if their suggestions are not accepted immediately and in the same form they are submitted. This, however, is not always possible nor practical. Some suggestions might have merit to a certain extent but it would not be possible to shut down operations until an entire unit could be remodeled to suit some of the ideas advanced. Other suggestions may also have merit, but conditions may have existed for years and it is occasionally difficult to bring out these merits to the point where they will be recognized and accepted.

The Qualities of a Good Committeeman

So, in order to overcome these tendencies toward discouragement, the safety committeeman must learn just what are the qualities which will improve his work in this line and enable the safety division to profit most. The qualities which make a good committeeman are: tact or diplomacy, perseverance, patience, and a respect for the opinions of others.

Tact or diplomacy is named first because it is essential to have the good will of the large majority of your associates if you expect to succeed as you should. Perseverance comes next because no man can hope to get results in safety work unless he is willing to stick to his propositions even though they do not always meet with success at the first attempt. Perseverance implies a desire to defend your opinions with proper arguments. Patience is third for the reason that the world cannot be made over in a day and the teachings of carelessness which have been imbedded deeply into our thoughts cannot be changed merely for the asking. Repetition and reiteration of our ideals and thoughts will eventually leave an impression in the mind, but we must be patient if we desire to succeed. Last, but not least, comes that wholesome quality, respect for the opinions of others. Without this, we are liable to make many errors and with it we will frequently find that the other fellow did have some good thoughts after all.

Both Methods Used With Success

Some safety committees are in the habit of making weekly or monthly plant inspections and others are taught to keep on the alert always to learn of dangerous conditions or unsafe practices. In our organization both methods are used with success. Safety committeemen see conditions that need attention and they are corrected frequently before the safety director learns of their existence. Most of the small jobs of safety work are nothing more nor less than regular repairs that should be made anyway regardless of the safety factor, and are treated as such. As I stated before, we are attempting to educate our men and foremen to the point where they will recognize safety work as a part of their regular daily duties.

Once in a while a great deal of good can be accomplished both for the plant in general and the safety committee in particular if they have a plant inspection of about a half hour. Taking them over the plant gives them a better idea of what is wanted and also develops dangerous conditions that have never before

been noticed. It also serves to keep the foreman a little more on his toes if he knows that a safety committee may make an occasional inspection trip through his department.

Safety committees, if properly trained and prepared, are always of inestimable benefit to the cause for the reason that they are able to reach almost every employee and pass on information which could not be successfully disseminated otherwise. They can be of great educational value when they are handled rightly. Employees out on the plant who have no direct touch with the safety division are given a means of advancing suggestions through their representatives. It is the nature of some men to hesitate in offering suggestions to their foremen and the fact that divisional safety committeemen are available makes them feel more free to advance their ideas.

In conclusion I wish to say that in order to maintain the success that any safety movement deserves, it is necessary to keep everlastingly at it. After a goal has been reached it is very easy to slip back into the old rut and lose the value of what has been accomplished. It is very essential to keep aroused the interest which was shown during the campaign. We must keep in the minds of the safety committeemen that they are to look at their work with the deliberate intention of finding unsafe conditions, should they exist, rather than viewing their work with the idea that everything is safe.

Keeping Everlastingly After Safety

CHAIRMAN CURRIE: This paper is now open for discussion. If there are any questions you would like to ask Mr. Osborn concerning this matter he will be glad to answer them.

L. C. HOWARD (Standard Oil Co., Ind., Sugar Creek, Mo.): I think we should give Mr. Osborn a vote of thanks for his modesty in his report. He has not said one word about how efficient his methods have proven. I work in the same company and I know something of what he has done, and I want to say that his company has a record of working an average of 1,420 employees for 108 days without one loss of time due to accident. That is the best record that has ever been made, so far as I know.

C. L. CANFIELD: I would like to ask Mr. Osborn how he gets his safety suggestions. Do you solicit them and pay for them, and if so, how much do you pay for them?

MR. OSBORN: We once tried having a suggestion box, and I think we got everything in it but suggestions. We were not able to get much out of it. We have rarely solicited our suggestions, but we encourage the men to come to us with them, and many of them are brought to us that way.

MR. CANFIELD: Do you pay for them?

MR. OSBORN: We do not try to find out who gives them. Sometimes, someone will say, "Who put in that suggestion?" and I say, "I did." We can tell by the tone how the suggestion is received, and we try to protect the men in every way, as sometimes the suggestions are not received in a good manner, and the men would not send them in if they thought we would find out who gave them. We never pay for them.

In 1921 we had 14 lost time accidents per thousand employees; in 1922 we had 10 accidents per thousand; in 1923, eight; 1924, six; 1925, five; 1926, four and one-half; and in 1927 we cut it down to about one and one-half.

From February to May was a clean slate, or a total of 108 days without a loss of time due to accident, 130,000 man hours worked.

CHAIRMAN CURRIE: Our secretary could not be here in person to read his paper, but he has sent it in, and I am going to ask Mr. R. S. Mutch of the Texas Company to read Capt. Nicholson's paper.

What We Consider Our Chief Means of Instilling Safety into the Hearts and Minds of Our Employees

A. A. Nicholson, The Texas Company, New York City

To the above title, I should like to take the liberty of adding "hands" as well as the heart and mind, for, after all, the hands are the servants of the mind, and out in the midst of industry the hands do the major part of human operations. To really cover the title question specifically is more or less of a problem, because we are, in a measure, passing through the experimental stage of plant safety. We are trying this and that; we are exchanging safety ideas and notions; some of us are working toward foolproof plants and operations, and some of us, with new employees coming into our services, are failing to pick up where the former employer left off. In a measure we are all trying to instill safety in our workers through a conglomeration of ideas—all of which are really in practical sequence so far as the worker is concerned, though they may be from the standpoint of the safety department. So, I am going to simply state that we are trying to instill safety in the hearts, minds and hands of our employees through a building up of safety individuality.

Personally, I do not believe that we can ever hope to reach or approach the Utopia of industrial safety until we not only are able to get all of the industries, large and small, interested in this problem of human economies, but until we secure and adopt a standard code and conduct of safety in all plants, irrespective of the nature of the business. This is a gigantic task, but a big start has been made and with some further concentrating and boosting, I am sure it could be put over. Safety is safety—you can't make anything else out of it. There are certain fundamental safety principles that are just as applicable to a small town garage as they are to a great railroad system. In each plant, of course, there would have to be certain modifications to cope with the particular situation at hand, but in general, the basic fundamentals of safety are just as applicable to a rolling mill as they are to an oil refinery.

In The Texas Company, as in other concerns of a like nature, there are great departments which correspond to other and separate industries. For instance, the refining department, the sales department, the producing department, the marine department and so on. For a long time we worked under the theory that a different kind of safety was required for each of these particular departments. We had the cart in front of the horse, and so we didn't get very far. Now, we are putting over a general program of safety for the company as a whole and then developing the modifications to meet peculiar situations as they arise. But we do not consider that safety is a mass proposition, and herein we have erred in the past.

You will recall that I said we were trying to get safety into the heads, the hearts and the hands of our employees through the development of individuality. I believe we all agree that very few accidents just happen—they are caused; and with all due respect to the sixteen principal causes or any other sort of classification, I am sure that you'll agree with me that the real cause of accidents rests with the workers. A thing is caused when two opposite forces form contact. To every man there are two forces at work—one is negative, the other is positive. When the man on the job attempts to combine positive and negative forces, an accident is the inevitable result. Our problem then is to eliminate, as far as possible, the negative complex in our workers. Assuming then that we are able to remove the negative forces, only the positive forces, or those which are for good, will be left, and these will cause our accidents to decrease and our production to increase. The ratio of production and destruction is always in proportion.

Man is the most peculiar species of the animal kingdom because he possesses the power of forming ideas, and this power united with other human characteristics and particular environments causes him to form negative ideas. If you want to see an example of this, just take any gang in any plant, give each worker a raise except one, and see the negative idea come to the surface. That's human nature and it's also an example of negative ideas, and though no two men are exactly alike, you will find that in the forming of negative ideas more than 99 per cent of them stand on common ground. What works with money works with safety, or with time, or with any of the other factors that cast an influence on human happiness.

Safety, in an organization where the plants are widely scattered and of, perhaps, a different nature, will take on the appearance of a local epidemic. In other words, there will be found existing safety in spots here and there, and these will be pronounced;—in other localities will come to the surface a sort of half-hearted safety: while in some places it will look as though the game of production had turned into a game of slaughter. In making an analysis of our situation, we found, in a measure, that such a condition existed. Like the folks who eat grapenuts—"There must be a reason." And so, we set about to discover that reason which would furnish the clue to the remedy.

Kalamazoo and Halifax Are Similar

It was felt that what would work in safety lines at Kalamazoo would work the same way in Halifax. If plant A could operate with 500 men for 200 days without an accident, there was no logical reason why plant B, with half that number of men, should not operate for at least the same length of time without an accident. For a long time we sugar-coated and swallowed the bunk that the plants in the North were having the greater number of accidents because of the great slipping hazards during the winter months. As a matter of fact, the larger number of slipping accidents were taking place in plants that were located below the frost line. Surely there was a nigger in the wood pile somewhere. We sought that colored gentleman and he was located in the plants that were turning out all products and no cripples. The secret of safety is the man, and therein lies the mainspring of industrial safety, from the time that the new worker knocks at the gates of industry as an apprentice boy, until the mutual benefit association takes him to the last stop this side of the Jordan after he has died of ripe old age.

It is rather difficult for me to adhere to the text of this paper. I should like to say something about bulletins, mechanical safeguards, community safety, and other important and influencing factors, but again I repeat that we consider our chief means of impressing safety through the development of individuality. Safety to be effective can't be luke warm. It's got to be hot stuff, kept at a high temperature, and it's got to start from the top of an organization and come down. You can never start safety at the bottom and go up with it and get any kind of results. I don't know whether our concern has an edge in this respect on other concerns or not, but I do know that we have always been extremely fortunate in having the thought of the physical welfare of our workers foremost in the minds of our executives and subordinate leaders. So the safety organization in our concern has not had to plod for greater support at the headwaters of the program. Rather it has been that our executives have made constant inquiry as to how they might be of greater assistance to the movement.

So, in attacking this problem we have used simple mathematics. We have taken man, our greatest asset, and have divided him three ways. We have divided him according to production and under the general assumption that "Wild Bill" in the bull gang was doing work proportionately as important as the most skilled mechanic. The class of work he was doing did not lessen his importance to the organization.

right up. Workers don't require bossing nearly as much as they require friendship and fellowship. A job should be a place of happiness and not a semblance of a chain gang, and this is made one or the other by the foreman. It doesn't require a prophet to gauge the accident standing of a gang when every man would go to hell for his foreman, but the gang that is trying to "get" their foreman generally gets hurt. And so, this high temperature safety which was fired with human interest at headquarters must be kept hot by the foreman. He does this in a number of ways; going over the job, tools and materials; pointing out special and hazardous conditions together with the remedial rules covering them; and by making safety gang meetings a regular part of his production program.

The foreman can't spend all of his time with each individual worker. He wins him, gets him on the right track, and then turns him over to the other workers in the gang, who carry besides the other tools in their kit the never-failing and accurate measure of safety—the Golden Rule. The workers in the gang must make him feel "at home," not only that he is one of the gang, but that he is one of the most important ones in the gang. The guardianship of the other workers supplements the efforts of the foreman, and their combined safety fellowship sinks the wedge a bit deeper into the heart, which reacts to the mind, and which reflects itself in the hands and makes and keeps the job safe.

Safety Individuality is the Keynote

I am sure that safety individuality is doing more to build up a healthy and permanent safety organization than anything we have done thus far. Of course, we hold safety schools, safety rallies, use safety posters and all other kinds of safety stimulation, but aside from administering these safety stimulants, we want something that will inoculate the entire organization against inherent carelessness. We are endeavoring to forge a great chain of safety that will hold together an organization which spans the world. The great safety hook has been forged by our executives, and each link attached thereto is the individual worker. There must be no weak links in the chain if it is to securely anchor human happiness and preserve it against the rust of "let down" and indifference which breed accidents; it must be kept constantly painted with a thick mixture of sincerity and human interest.

We are amassing here in America the greatest army that the world has ever known—the army of production—which is daily becoming more and more engaged in the war of busy industry. We possess the men—we possess the arms—both are essentials to victory. If our ranks are properly trained in the school of the worker, if they are led by real leaders who know what leadership consists of, and if they can be inspired by the spirit of safety, there need be no casualties. So, from the standpoint of safety in our concern, we have turned our thoughts to the individual worker, telling him, teaching him, and taking him through the busy avenues of industry—training his finders, developing his mind, and winning his heart—bringing him out as an individual, rather than leaving him a part of the great mass—and showing him, not the horrors of the careless, but the happiness of home and safety.

"Home" and "Safe"—

That is what we strive to teach,
Two little words of four letters each.
Just two simple words—no more, no less—
But which, entwined, spell happiness;
Which bring to workers joys untold,
And life grows sweet as yours unfold.
These words, it seems, were coined above;
They breathe of things we dearly love—
Home and Safe!

Home and Safe!
 In industry those words you'll meet;
 They sift the bitter from the sweet,
 And put real spirit into work
 That never tempts to slack and shirk.
 Half naked men who toil in sweat
 Live out their lives without regret;
 Their smile bespeaks an open heart
 As on they struggle with their part—
 Home and Safe!

Home and Safe!
 When din and noise and hissing steam
 Are left behind at night, it seems
 The sweetest path of life still waits—
 A dimpled baby at the gate,
 Who waits for daddy's loving arms—
 All grease and dirt—yet full of charms;
 For angels knot the tie that holds
 A baby's love and a worker's soul.
 Home and Safe!

CHAIRMAN CURRIE: That was a wonderful paper and it is now open for discussion. Has anyone any questions to ask concerning this?

Some questions have been presented to me on the question cards which were distributed among you, and we will take up these questions now.

C. L. HIGHTOWER (Texas Pacific Coal & Oil Co., Thurber, Texas): Gentlemen, I think we are forgetting something. I think that we owe Capt. Nicholson a rising vote of thanks for his wonderful paper, and I move that we do that.

(The motion was seconded, the question put and the motion carried by rising vote of thanks.)

Discussion of the Question List

CHAIRMAN CURRIE: Now I will read these questions, and I am quite sure somebody will answer them. Here is the first one:

What methods are used by workers (welders, lead burners) repairing tanks, agitators, and other vessels in regard to disconnecting lines or blind gasketing them?

A. TIMM (Standard Oil Co., Bayonne, N. J.): The lines are all disconnected, and the air of the tank is tested to see if there is any combustible gas in it, and the men are not permitted to go into the tank until we are sure that the lines are disconnected and a good test has been made of the air in the tank.

CHAIRMAN CURRIE: I have another question here:

What type of hose is most feasible for steaming of tank cars and other equipment for elimination of static electricity?

H. E. DISCHINGER (Roxanna Petroleum Corporation, St. Louis, Mo.): That was my question, but I find that it will be answered in the report of the Research Committee, so I will withdraw it now.

CHAIRMAN CURRIE: I might say that we will be glad to hear from Mr. H. C. Fowler, United States Bureau of Mines, Washington, D. C. I know that Mr. Fowler will have something interesting to say to us.

MR. FOWLER: Gentlemen: Even though I cannot be with you longer than today, I am glad to have had this one brief session with you.

I wish I could stay with you for the rest of the sessions, but, as all of you know,

the hand has written on the wall, and I am no longer a safety man. Mr. Miller and I leave this afternoon for Washington.

In common with all safety men, there is one line of safety which is my hobby, and that, as you know, is hydrogen sulphide. It was a long time before I could make the managers hear the rattle of the snake, and during that time the snake was taking its toll, but finally they took hold of the situation, and we found the snake. I do not mean to say that we have exterminated the snake, but I do feel that we have gone a long way toward doing so, and I am sure that the time will come when we will be able to avoid accidents caused by hydrogen sulphide gas, just as we have been able to avoid accidents from other causes.

OWEN HUMPHREY (Standard Oil Co., Bayonne, N. J.): This morning at breakfast I had a long talk with Mr. Fowler, and he told me that he had written a book dealing with hydrogen sulphide, and that it would soon be off the press, and I should like to have him tell us something about it.

MR. FOWLER: I have been studying this subject for a long time in an endeavor to find some way of preventing accidents due to hydrogen sulphide gas, and I feel as though I was just beginning to know something about it.

Just as we think we have it under control there is an accident and we have to go over the ground again, and this book is written from the experiments I have made and what I have learned from studying situations in an endeavor to find out whether or not a man can enter an atmosphere containing hydrogen sulphide gas with safety.

This book, "The Prevention of Accidents Due to Sulphide Hydrogen in Handling Sulphur Petroleum," gives the results of some of my experiences in that line, and as Mr. Humphrey said, will soon be off the press.

ADJOURNMENT

Wednesday, September 28, 1927

The second session was called to order at ten o'clock by the chairman, V. R. Currie.

CHAIRMAN CURRIE: We are going to make a little change in the program.

Mr. R. E. Donovan, Standard Oil Company of California, is the first speaker. He will illustrate his talk with moving pictures and the moving picture machine is not here now, so while we are waiting I am going to call on the next speaker on the program, Mr. Ralph E. Motley, director, plant personnel and employment, Atlantic Refining Company, Philadelphia, Pa.

How We Locate and Correct Unsafe Practices

Ralph E. Motley, Director Plant Personnel and Employment, The Atlantic Refining Company, Philadelphia, Pa.

It is written that "when the mountain wouldn't come to Mohammed, the sagacious prophet went to the mountain."

And so it is with all phases of safety. When results won't come to you (which is the rule, rather than the exception) you must "go out after them," and after you have exhausted all your bag of tricks, pray that you will harvest a good no-accident crop.

"How We Locate and Correct Unsafe Practices" is really a word picture of what we do when we "go out after them." It is not a new story. But it is a subject which bears repetition and one which usually offers a few choice morsels for those who are really interested in improving their methods of locating and correcting unsafe practices. A detailed account of the procedure we follow would be imposing on good nature, so I have subjected it to a "cracking" process and trust that the picture I will paint may be of some interest and value to you.

There are two chief bodies around which the safety activities of our plant are centered: the Safety Committees, and the Safety Department, each contributing in its own way to the locating and correcting of unsafe practices.

Ten sub-safety committees, composed of four or five persons each (usually foremen) and representing the various departments of the plant, make regular weekly inspections of all portions of the plant according to a predetermined schedule. These inspections are made on Monday or Tuesday of each week so that the reports will be in the hands of the general safety committee on Thursday morning. The reports, in addition to covering the entire results of the inspections along with the seemingly desirable recommendations, also include any other safety items of importance which come to the attention of the committee while on the particular inspection. Once a month each of the sub-committees meet with the safety engineer and discusses such things as: how to make more efficiently the assigned inspection; what to look for; ways of gaining the desired end without antagonizing foremen or men in the particular department being inspected, and other pertinent subjects of general interest to the committee. Each committeeman wears a company safety badge which identifies him as a bona fide safety committeeman.

The general safety committee, which is composed of the safety engineer as chairman, a representative from each of the main divisions of the plant, mechanical, operating, sales, package, miscellaneous, marine, engineering, and myself, meets each Thursday morning. At this meeting the reports sent in by the sub-committees are thoroughly discussed, digested and then forwarded

subsequent test shows the gas content to be below the required point. If the work is urgent, men are supplied with hose masks and are allowed to clean the tank if it does not pass the test. In all cases, a member of the safety department stands by to make sure that all necessary precautions are taken, and to lend intelligent assistance if necessary.

In high sulphur tanks such as storage tanks or distillate tanks of Crane Upton Crude, a preliminary test is made for hydrogen sulphide. To determine whether there is hydrogen sulphide present in the particular tank, a member of the safety department makes a test for this poisonous gas with a Tutweiler Burette. If the Burette does not indicate the presence of H_2S , the Burrell gas test is then made. The tank must be free of H_2S as well as below 25 per cent for gas before anyone is allowed to enter. In order to protect those persons who have occasion to work on the top of high sulphur tanks, a sign warning everyone to stay off the tank is placed in the middle of the stairway so persons attempting to reach the top of the tank will be warned of the danger involved. On any vent work on top of tanks or in taking samples or gauges from the thief hole, gas masks must be worn on all tanks containing hydrogen sulphide gas.

The Employee Must Be Thoroughly Trained

Before the inception of the tests for gas content of tanks and other containers ready to be repaired, the company had several unfortunate experiences, but since these precautions have been followed, there have been no fatalities due to these causes.

Before being allowed to operate a fuel oil burner independently, the employee must be trained by a competent instructor and then examined by a member of the safety department, in order that the safety of the individual operator as well as his companion employees may be assured. Gaseous repair work, still burning, elevator inspection, guard design, building inspection and special inspections are also functions of the safety department.

Anything can be done safely, even fighting. The story is told of a safe fight in which Henry Clay and John Calhoun were the chief combatants. The argument waxed hot. The contenders were nearly at blows.

"You are an old loafer, John," said Henry Clay.

"Say that again and I will knock your jaw off," replied Calhoun.

"Consider it said again," retorted Clay.

"Consider your jaw knocked off," diplomatically responded Calhoun.

Virtually all of the 350 foremen and many of the men at the Philadelphia plant have been instructed in, and are now capable of intelligently performing, first aid and artificial respiration. This instruction is given by the safety department under the supervision of the safety engineer. In addition to holding "refresher courses" for these foremen, it is planned to extend this course to all the employees at all the plants in order that everyone will be competent to lend such assistance should the occasion arise.

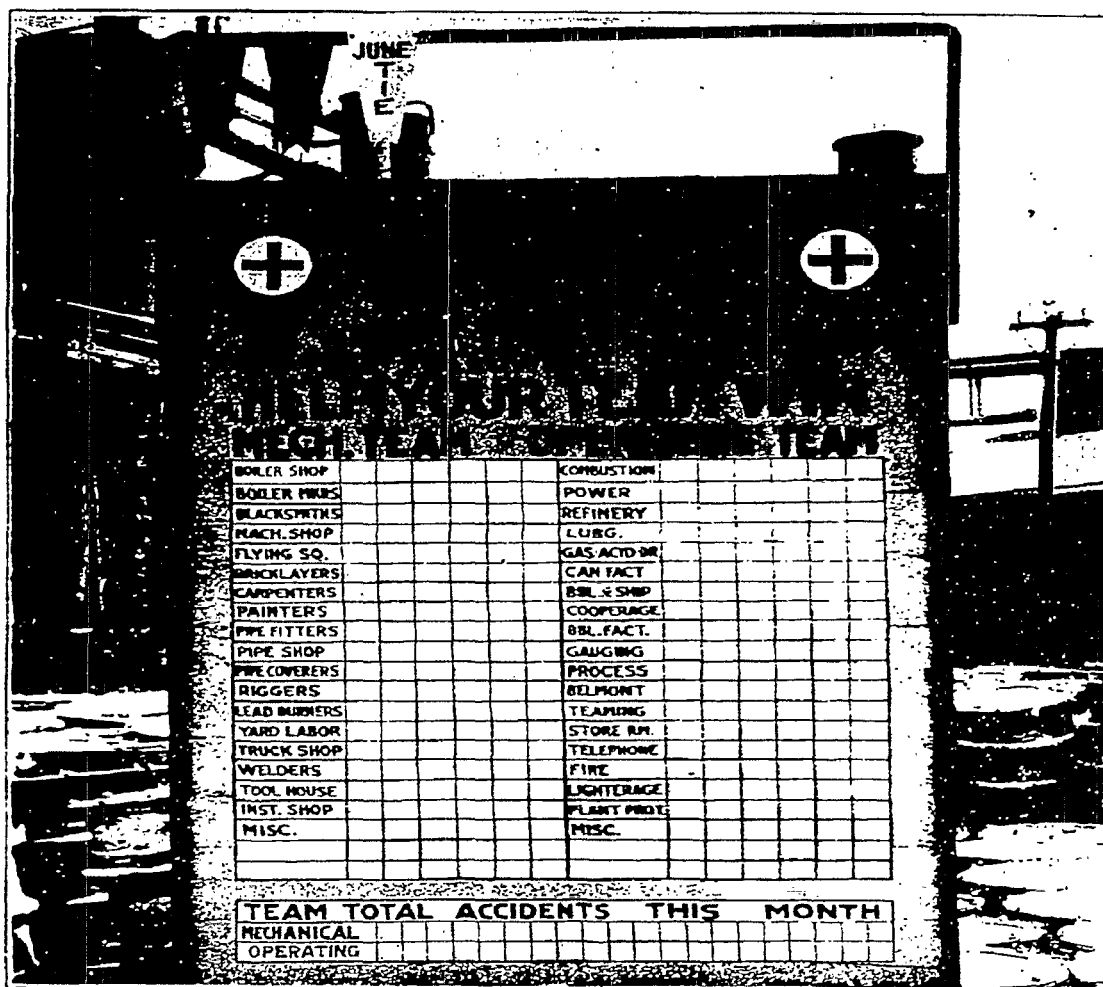
The safety department is held responsible for the strict observance, by the employees affected, of a set of rules known as "Plant Regulations." These regulations have been formulated by the superintendents, foremen and the safety department, are issued by the plant manager's office, and include such subjects as:

Precautions to be taken in ridding of vapors, stamping, welding and repairing of steel packages.

Method of work and attire of men working on acid lines and tanks.

The placing of planking where men must work on tank roofs.

The cleaning and loading of tanks and tank cars, and the use of masks. Precautions to be taken when repairing stills, agitator and ships, and many others where it seems advisable to issue such regulations.



The kind of bulletin board that demands attention.

As another step in our endeavors to make sure the regulations are being strictly adhered to, we are now drawing up rules and regulations for each individual craft. For example, the pipe fitters' rules would include such things as: when goggles should be worn, methods of working with various tools, precautions to be taken on different lines, kinds of pipe to use for different

installations, and many other essential safety precautions peculiar to that particular craft. These regulations are really nothing more than just what applies to the particular craft, as taken from all the existing rules and regulations and supplemented by other essential precautions which have not as yet been issued in regulation form. The advantage of individual regulations such as these is that the employee is not forced to digest several hundred rules which might not be at all applicable to his particular work.

Every accident report is thoroughly investigated by the safety department in an endeavor to determine whether the employee was personally responsible, and if so, to make sure that the relative chances for a similar accident to another employee is practically negligible.

The method we employ in keeping accident statistics enables us to analyze them individually and collectively by causes, character of injury, part involved, foreman, time of day, day of week, department, nationality, sex, color, education and marital state. All this information is contained on the accident report form which is made up by the dispensary, and which is subsequently punched on Hollerith statistical cards by the use of a proper set of codes. Then by the use of an electric sorting machine, any desired combination of contributing causes or factors can be determined for the entire plant or for the individual department. For example, we might wish to determine the number of married Italian laborers receiving contusions of the head by falling objects at 2:00 a. m. on Fridays. A monthly analysis is made for causes of accidents and the respective foremen involved. The former analysis points out the chief factors to be considered during the following month, and the latter analysis enables us to administer the necessary remedial ointment to the chief offenders. Each year a complete analysis is made of all the information contained on the card, for each department and for the entire plant. Analyses such as these afford some very illuminating facts, and are well worth looking into. A detailed account of the facts brought out in this yearly analysis is contained in the March issue of *Manufacturing Industries*.

Many Accidents Caused by the Tool Slipping

Many accidents attended by severe injuries have been caused by the simple slipping of a tool. The danger of injury is greater when men are working in elevated places, because if a tool slips at that time, the man may lose his balance and fall; and it is seldom brought out in the inquest that someone has been sufficiently instilled with the spirit of safety to go around placing feather mattresses in the several places scheduled for the receiving end of the man's anatomy. This hazard may be minimized by, (1) making sure the worker has in his possession good tools with which to work, and (2) by making sure that the worker uses his tools properly. A temporary lay-off for the first offense and dismissal for the second offense has practically eliminated the giving out of bad tools by the tool house employees. In addition to a monthly check up of tools by the safety department, one tool house man devotes his entire time to inspecting tools which are out in the plant on holdout orders, and instructing the workers in the proper use of them. The tool house contains adequate equipment for testing the capacity and strength of various equipment such as chain blocks, pneumatic hammers, gauges, hoisting machines and air compressors. Regular tests on these are made every two months. A monthly inspection is made of all acetylene equipment by submerging the torches under full pressure in water, in order that leaks which might cause a serious accident may be located and made safe.

Numerous manufacturers and retailers have justly complained that compe-

tion has forced them out of business, but in safety work, "competition is the life of the party." Posters, rallies and many other forms of creating interest all have their places, but if the spirit of competition has not been aroused, the

Filed: Co 764 petroleum



A safety trophy for which competition is keen.

fullest results will not, in most cases, be obtained. In an endeavor to create competition and arouse additional interest among our four plants, a special 1927 safety campaign was launched, the key-note of which was competition. All kinds of advertising media were prepared, including a distinct safety paper.

Immediate interest was aroused by allowing the employees to suggest names for this safety paper. Out of the numerous names submitted, *The Siren of Safety* was selected as the one most applicable to the proposed magazine. A silver safety plaque was then purchased to be awarded quarterly to the plant having the fewest lost time accidents per thousand hours worked during the respective three month periods, and to become the permanent property of the plant having the best record over the entire year. Space is provided for engraving the names of the winners by quarters and also for the entire year. The Pittsburgh plant was the winner for the first three months, and, incidentally, succeeded in going through the two months of February and March without a single lost time accident. In view of the fact that an extensive construction program was in progress during that time, this record was exceedingly encouraging. Because of its perfect no-accident record during the months of April, May, and June, the Brunswick, Ga., plant was awarded the trophy for the second three months. A keen spirit of rivalry exists among the four plants, and is entirely due to the fact that whole-hearted competition has been aroused. As an indication of this competitive spirit, the following telegram was received from the plant manager at Brunswick, Ga., when it was determined that his plant had won the coveted trophy for the second three months. "Please tell the Pittsburgh plant to send us that trophy P. D. Q. and kiss it good-bye, as it is coming to Dixie to remain forevermore."

An Interdepartment Competitive Race

At the Philadelphia plant, we are holding an inter-department competitive safety race in an endeavor to get our hooks on that trophy, which we have, so far, been unsuccessful in obtaining. To start the ball rolling, the superintendent of the mechanical department challenged all other departments to a contest for fewer lost time accidents for the remainder of the year. The large bulletin boards at the main gates of the plant were changed in such a manner that any employee could easily determine which team was leading for the month, and also which departments were responsible for any accidents which might have occurred. The accident experience over the past few years at the Philadelphia refinery has shown the mechanical department to be the chief offender. Since the challenge in March, the mechanical department has had several no-accident months, is leading in the inter-department contest, and accidents in all other departments have been greatly reduced.

Over the past five years, an average of 17 lost time accidents have occurred each month at the Philadelphia plant. While a great number of these involved the loss of only a day or two, nevertheless, they were considered as lost time accidents. In October, last year, by a special safety campaign, we succeeded in going through the entire month without a single lost time accident. Instead of having from 10 to 25 accidents per month this year, we are having only three or four, and all indications point to an even greater reduction.

The mechanical department has a special safety inspector who devotes his entire time to accident investigation and prevention. The fact that he insists that the company rule of reporting to the dispensary for even the slightest injury be strictly followed, has led to some very amusing incidents. One day he was down around the pipe stills, when, looking up into the air where riggers were placing beams, he noticed one man rubbing his finger, which to all appearances, he had recently bumped or scratched against the beam. Not a word was said. The mechanical inspector merely pointed his thumb toward the dispensary and the meaning was communicated to the rigger just as effectively as though the command had been spoken directly into his ear. The

rigger immediately slid down from his lofty perch and was last seen hot-footing it in the direction of the first aid emporium.

Before the medical sciences reached the stage where various kinds of vaccines and antitoxins could be successfully used in warding off many kinds of contagious diseases, literally thousands and thousands of persons in all parts of the world died because of the lack of these preventives. But now, through the wondrous advance of these sciences, there is in existence vaccine for warding off almost any kind of contagious disease. In view of this degree of perfection of the medical profession, perhaps some day someone will concoct a potion, which, if injected into the arms of all new employees, will render them totally immune from all kinds of accidents. But until that time, we will have to be satisfied to keep everlastingly plugging at accidents with the methods we have at hand, and those we borrow from our neighbor.

The chief thing to keep in mind in "locating and correcting unsafe practices," or in any one of the many phases of safety, is to locate and correct that unsafe practice before that unsafe practice takes its toll.

CHAIRMAN CURRIE: I want to thank Mr. Motley for his wonderful paper, which is now open for discussion.

It has been a recognized fact that very little can be accomplished without the support and cooperation of the men higher up, and I think that we are fortunate in having some of these men with us today.

I want to present to the members of the Petroleum Section one man who, perhaps, more than any other, has been responsible for the promotion of accident prevention work in the oil industry, and if Mr. C. J. Hicks of the Standard Oil Company, New Jersey, will please rise, I will be glad to introduce him to you.

(Mr. C. J. Hicks acknowledged the introduction by rising.)

CHAIRMAN CURRIE: The next speaker will be Mr. H. J. Tobin, Standard Oil Company, Indiana, Chicago, Ill.

What We Consider Our Most Successful Method of Promoting Safety In The Sales Division

H. J. Tobin, Standard Oil Co. (Indiana), Chicago, Ill.

So that you may understand our method of promoting safety in the Sales Division of the Standard Oil Company, it is necessary that you first comprehend our problem, the type of accidents we must cope with, their cause and the means at our disposal to eliminate that cause. To be sure, accidents are no respectors of persons and we sustain, as most of you do, accidents of all the various kinds and degrees that are known to the marketing end of the petroleum industry, from the tragedy of death to the showing of a profit in the business—which nowadays is indeed an accident.

But the particular accidents we suffer most frequently are automobile accidents. The Chicago division of the Standard Oil Company is located in a heavily populated metropolitan district, very congested, where the automobile accident rate is great, and the power to combat this problem not entirely in our own hands.

Now in dealing with accident prevention problems I believe you will find that in the main they may be dealt with in three different ways.

First: Where it is possible you may often remove the hazard of eliminating the cause of the accident. To illustrate, simply; around your plants where the danger of personal injury to an employee exists from use of a defective piece of equipment. You may eliminate the hazard of removing the defective equipment without injuring your operations.

Second: Where the hazard exists and it can not be removed, use measures to forestall the occurrence of an accident.

To illustrate: In the marketing of petroleum products there is always the fire hazard to combat. Protect yourself with modern fire fighting equipment and instruct your employees as to its use.

Third: Educate your men through all the devices at your disposal that safety is part of their job; that it pays them dividends and is a great power for doing good. And it is through this last method that we accomplish most, although it is the most difficult and intangible method of promoting safety that we have at our disposal. We believe we accomplish this end through the operation of our local safety committee. In our educational program we use the devices familiar to all of you. Lectures by the safety man at the meeting of salesmen, tank wagon drivers, and service station men, safety posters furnished by the National Safety Council displayed at all plants and service stations, competition in safety records between various plants and service station divisions. But in our safety committee we believe we have the most effective weapon to combat accidents.

The safety committee for the Chicago division is composed of the manager, the superintendent of equipment, the shop foreman, two tank drivers, a service station man and the safety man. The personnel changes from time to time so that as many as possible may have an opportunity to serve on the committee. The committee meets each Tuesday at 5:00 p. m. at the main office. Its purpose is to recommend methods of eliminating and preventing accidents. So far we operate about as all of you do; many, if not all, of you are familiar with the safety committee, its organization and operation. But here I believe we differ.

Men Involved in Accident Are Interrogated

Our safety committee brings before it each accident considered of importance, by calling in the man or men involved in that accident and having them explain in detail, with diagrams, charts and miniature equipment, the conditions under which the accident took place. With the man involved in the accident is his immediate superior, his foreman, or superintendent, whose duty it has been to investigate the accident immediately after its occurrence and who is before the committee to substantiate or contradict the man's explanation of the accident. After the man has explained his accident he leaves the room while the committee discusses the accident. They then vote on whether or not in their opinion the employee has been at fault. The man is then again called before the committee and is informed of their decision. If the committee believes the accident inexcusable the man is perhaps informed that the committee will recommend his discharge or demotion. If the accident was unavoidable and the man's conduct excellent, the committee does not hesitate to praise him. Now do not misunderstand me. The committee is not a court trying a man. It does not deal out punishment like a court of law. It is a committee of the man's fellow employees sitting to review the accident and to do all in their power to help that man avoid similar occurrences.

Now as to the effect on the man. Without doubt you can well see that a man would not care to come in before the committee and explain his accident. In the first place, he comes in on his own time, after working hours, and gets no pay for it. Secondly, no one cares to "go on the carpet" and explain the reason for an accident, whether he is right or wrong in the case. There is always the chance that the committee will not see the man's side of the story. In fact, most times they do not and no one cares to be "bawled out."

Now as to results. Five years ago, before the committee was created, operating about 350 cars and trucks and perhaps 100 service stations in the Chicago field we suffered about 90 accidents per month. Today, with 600 cars and trucks and about 400 service stations, we have on an average 30 accidents per month. This includes all types and kinds of accidents, from a spill of furnace oil on a lawn to a severe automobile collision. Now we are proud of our record and we attribute any improvement we have made to the fact that we have instilled into the minds of our men the fact that they will personally be held accountable for every accident in which they are involved. We have placed the burden of accident prevention on them and consider it as important a part of their job as making their sales quota.

The secret of our success, if you believe we are successful, lies in the fact that figuratively we take off our coats and go after each individual accident. We pick it apart to see what caused it and how we can prevent it in the future. We are earnest and sincere in our work and we try to instill in others that sincerity for accident prevention work.

Furnace Oil is the Cause of Much Worry

CHAIRMAN CURRIE: Are there any questions that you would like to ask Mr. Tobin? His paper is open for discussion.

C. L. CANFIELD (Sinclair Oil Co., Kansas City, Mo.): I should like to inquire the type of hose that you use for the delivery of furnace oil.

MR. TOBIN: Furnace oil is the bane of my existence. As you refinery men know, furnace oil is usually used by people who have nice lawns and are very particular about them, and in delivering oil it is almost impossible not to spill a few drops, and if you spill a few drops on these lawns it ruins them in the eyes of the owners; so when our men spill any oil it means that we have to send someone out there to dig up about 50 rods of ground and fix the lawn up, and this takes time, and we have never found any good way of delivering this oil.

We use the ordinary gasoline type of hose, but it is not very satisfactory for furnace oil. Sometimes we carry a tarpaulin to spread under the hose, and that helps. Perhaps you have a more effective way of handling this.

MR. CANFIELD: Our method is not very satisfactory, either.

R. J. LAUDER (Roxanna Oil Co., St. Louis, Mo.): What kind of fire equipment service do you think is best for service stations?

MR. TOBIN: We have not found fire extinguishers particularly effective. We have found the soda and acid combination not very useful, nor has Pyrene equipment been very satisfactory. We have had pretty good results by using the Pyrene with the one quart Foamite extinguisher. Of course, if there is much wind the fire is harder to control, but we like the Foamite very well, and used with the Pyrene we get pretty good results.

MR. BONSB: Do you ever use sand?

MR. TOBIN: We have not found fire extinguishers particularly effective. We nearly always the shovel is missing, because, as one of the men said, they make good coal shovels, and it is hard to keep them there. Then when you need it there is nothing to get it up with. The most effective way of using sand is to keep it in buckets, but it takes a great deal of it to put out a fire.

CHAIRMAN CURRIE: We will now listen to the report of the Nominating Committee.

R. S. BONSB (Standard Oil Co. of New Jersey, New York City): As Mr. E. J. Senne, the chairman of this committee is unable to be present, I was asked to read his report. He asked me to take his place, but I am unable to do that, so I will just pinch hit for him.

Report of the Nominating Committee

Chairman, George F. Prussing, Union Oil Company of California, Los Angeles, Calif.

Vice-Chairman, Dr. R. P. Anderson, American Petroleum Institute, New York City.

Chairman Atlantic Coast Division, S. W. Candee, Tide Water Oil Company, New York City.

Chairman Mid-Continent Division, T. N. Shaw, The Midwest Refining Company, Midwest, Wyo.

Chairman Pacific Coast Division, F. A. Scofield, Associated Oil Company, San Francisco, Calif.

Secretary and News-Letter Editor, A. A. Nicholson, The Texas Company, New York City.

Poster and Slide Committee Chairman, O. W. Humphrey, Standard Oil Company, (N. J.), Elizabeth, N. J.

Publicity Committee Chairman, Ralph E. Motley, The Atlantic Refining Company, Philadelphia, Pa.

Program Committee Chairman, Ray E. Miller, Marland Companies, Ponca City, Okla.

Statistics Committee Chairman, J. W. Myers, Standard Oil Company, (N. J.), New York City.

Field Representative, H. N. Blakeslee, National Safety Council, Chicago, Ill.

Engineering Committee Chairman, C. W. Smith, Standard Oil Company, (Ind.), Chicago, Ill.

Executive Committee, The Officers and—

E. J. Senne, Vacuum Oil Company, New York City.

R. S. Bonsib, Standard Oil Company, (N. J.), New York City.

C. C. Benedict, Standard Oil Company of New York, New York City.

A. L. Barth, The Atlantic Refining Company, Philadelphia, Pa.

V. R. Currie, The Texas Company, Houston, Texas.

D. J. Wallace, Mid-Continent Oil and Gas Association, Tulsa, Okla.

E. D. Murphey, Mid-Continent Petroleum Corporation, Tulsa, Okla.

R. B. Roaper, Humble Oil and Refining Company, Houston, Texas.

H. L. Eggleston, Pan American Petroleum Company, Los Angeles, Calif.

C. F. Anderson, Richfield Oil Company, Los Angeles, Calif.

H. M. Wolfkin, California Petroleum Company, Los Angeles, Calif.

W. C. Lynch, General Petroleum Corporation of California, Los Angeles, Calif.

CHAIRMAN CURRIE: Are there any other nominations?

THOMAS W. WADDINGTON (Standard Oil Company, Elizabeth, N. J.): I move that nominations be closed.

H. D. KETTELL (Standard Oil Company, Baltimore, Md.): I second that motion.

CHAIRMAN CURRIE: All those in favor of the list of officers submitted by your Nominating Committee please signify by saying "Aye."

The motion is carried unanimously.

I do not know of any better time for me to get out from under than just at this moment, and in turning the chair over to your new chairman, I want to express at this time my appreciation of the honor which has been accorded me, and the splendid cooperation, not only of the members of this section, but also by the officers and the various committees.

I want to compliment the officers upon their section, and compliment the section upon the officers it has selected. Mr. Prussing, come up and make your bow.

(Mr. George F. Prussing, Union Oil Company of Los Angeles, California, then came forward and received the badge from Mr. Currie.)

CHAIRMAN PRUSSING: As the newly elected chairman of your section, I wish to express my thanks to the members for the honor conferred.

I am not going to burden you with a speech. It is a pleasure to be able to act as your chairman, although I feel that the chairman of your Nominating Committee gave me more credit than I deserve.

The next speaker for this morning's session is well known on the Pacific Coast, especially to the Standard Oil men, for his wonderful work in the Safety Department. He has raised the standard of safety in California, and reports of his work have spread until everybody in the Southwest is looking to the Standard of California.

The work of R. E. Donovan is well known all over the country because of his work in preventing loss and accidents by fire.

In California they have been fighting fire by the use of a smoke screen or foam. This system was developed at tremendous expense, both as to the cost of the equipment and as the loss of oil due to its becoming mixed with the foam and being run out of the tank, sometimes on top of the foam.

Tank Fire Tests

R. E. Donovan, Standard Oil Company of California, San Francisco, Cal.

Just three days before the last meeting of the American Petroleum Institute, which was held in Los Angeles in January, 1926, a 115x35 foot storage tank containing 17 feet of engine distillate, burned at Standard Oil Company's refinery at El Segundo, a few miles out of the city. We did not have very much to say on the subject at the time, because we were somewhat disappointed by the fact that in spite of being equipped with what we considered a first class foam system, we were unable to extinguish the fire.

Perhaps I should say right at the start that this foam system was not put in by the Foamite company, though some Foamite equipment was used, and our Chief Fire Protection Engineer is an ex-employee of the Foamite company. I might add also that we had foam protection systems in operation before any company specializing in this form of fire protection was organized.

As a large number of pictures are available, both of this fire and of our experiments since, the whole story can probably best be told graphically.

The origin of the fire is not definitely known. The tank was modern in every respect, having a gas tight steel roof, vacuum and pressure valves, and an emergency liquid seal hatch. It was one of the few around the refinery which contained a distillate with vapor pressure likely to produce a combustible mixture within the tank. It was being gauged at the time with a steel tape, and the resulting explosion blew the roof from the tank and caused the death of the gauger. The fire started at 8:52 a. m., and by eight minutes later, the refinery operators had the foam system in operation.

The tank had been equipped with two type LA Foamite mixing boxes. These are the large size late design. They were supplemented by the addition of special deflectors designed to insure that the foam would be guided against the shell in its downward journey. Immediately after the foam was turned on, it was observed that the box upon which the roof had fallen was discharging most, if not all, of its foam outside of the tank. The foam was therefore turned off from this box and the entire capacity of the system was put through the

remaining box. A test immediately after the fire showed that the rate of delivery was about 510 gallons each solution per minute. A picture taken about seven minutes after foam had been turned on shows plainly that progress was being made; but that the progress was extremely slow and unsatisfactory is evidenced by the fact that pumping was continued into this box for 1 hour and 15 minutes, at the end of which time enough of the foam to cover the tank approximately 6 feet deep had been used (assuming a net expansion of 6), and the fire was still burning extremely fierce with no indication of further progress being made. Under the circumstances the management decided that either the mixing box had been damaged or that some other unknown cause was affecting the efficiency of the foam. They therefore decided to abandon foam application until such time as they could bring up some of our portable foam mixers and make an entirely new try at extinguishment.

Portables An Individual Type of Equipment

For various reasons this new attempt was delayed for several hours; but eventually portables were brought up. These portables are a type of equipment developed by our own forces, and it is perfectly feasible to erect and operate them after a fire has begun. With this new equipment in place foam was again applied at the rate of 730 gallons per minute, and pumping was kept up for 31 minutes. Again indications of progress were observed at times, but they were far from pronounced and did not continue. This time enough foam was pumped on to make a blanket three and one-half feet deep. As the foam stock was being seriously depleted and no further progress appeared to be made, it was decided to abandon further efforts to extinguish the tank and to allow it to burn itself out.

A review of the equipment and methods used in fighting the fire revealed no apparent fault. It was realized that the conditions prevailing at this fire might occur again at any time, and that unless some method of successfully coping with them could be developed, the value of our foam protective systems would be seriously lessened. Our directors accordingly decided to make some large-scale experiments to determine why the tank had not been extinguished. The old shell was moved to a more convenient location. The best sheets were straightened up until throughout most of the circumference of the tank it was 20 feet high and on two opposite sides it was raised to 25 feet high. In addition to that, a great deal of test equipment was out in place. Independent lines were run to each piece of apparatus, with an orifice meter on each line so that information on the rate of flow was always available. Eighty foot towers were erected to permit observation of the progress of extinguishment inside the tank, and thermocouples were located in about 15 places inside the tank.

It was attempted in the first test practically to duplicate the conditions of the actual fire. The Foamite mixing box therefore put in place cocked over just as it was in the original fire, and the distance from the box to oil surface was made approximately 20 feet—just as it had been.

Before putting any oil in the tank, foam was run through this box, and it was observed that the crooked position of the box did not affect the quality or the flow of the foam.

The test fire was allowed to burn for ten minutes, after which foam was applied at an average rate of 585 gallons per minute for 58 minutes—and much higher rates toward the last. At the end of this time the fire was out, but it had been a terrible struggle, and the method of extinguishment was not considered satisfactory from a practical standpoint. It should be borne in mind that at this test fire we had ever advantage of complete preparation and observa-



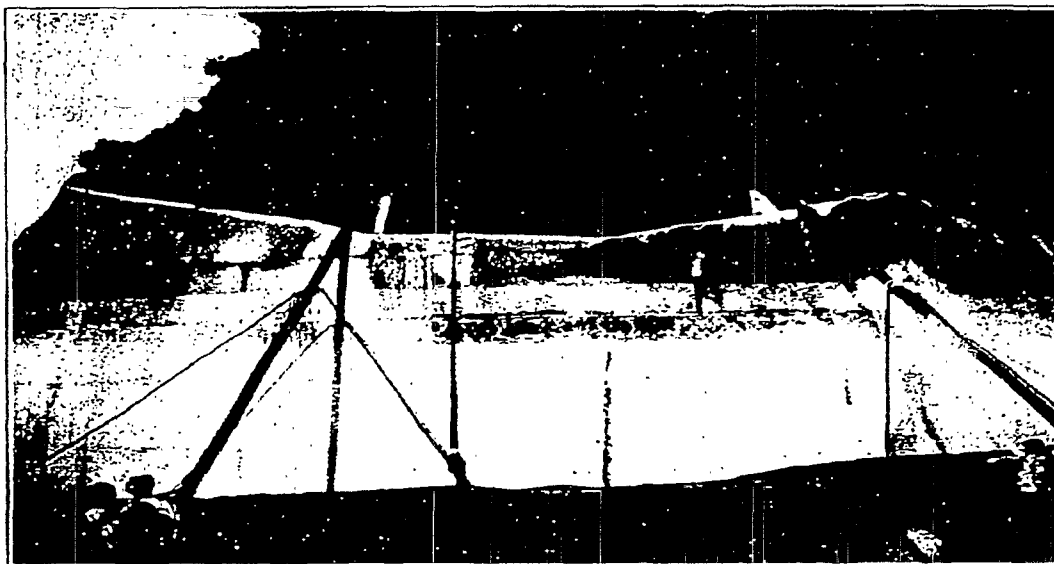
Aerial view of the tank fire in full career.

tion, as well as the benefit of the experience of most of the experts of various kinds available in the corporation. These are conditions which cannot be expected to exist at the time of the ordinary fire; and, even with these advantages, enough foam was used to put a blanket 5.2 feet deep over the tank before extinguishment was accomplished—some 33,000 gallons of each solution having been used.

Observation from both the towers and the ground indicated that foam which is allowed to drop any considerable distance into a fire undergoes the following losses.

A little is dried up as it falls through the heated atmosphere.

A considerably greater quantity is lost due to the up-draft of the fire swirling it out of the tank.



Placing the portable in position.

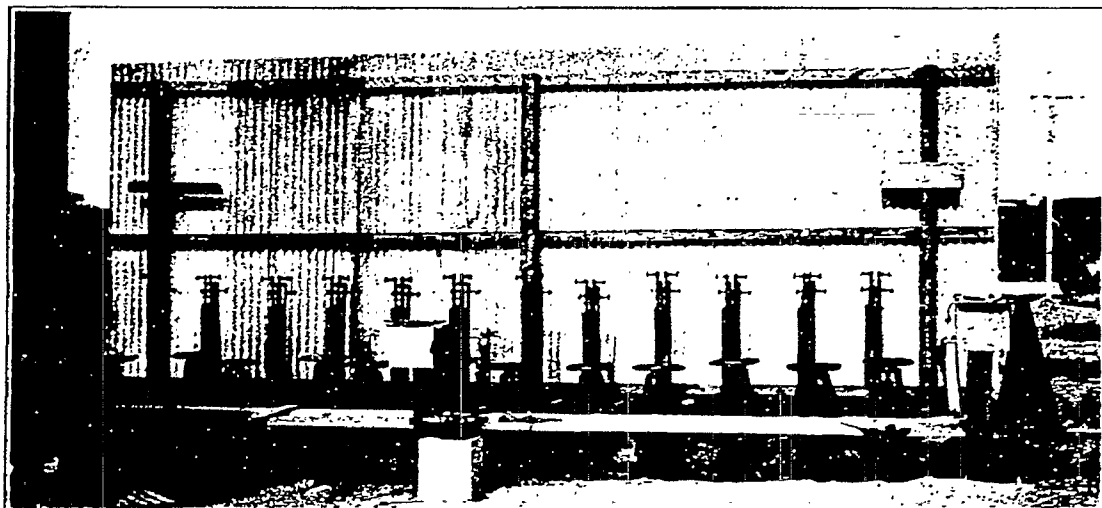
It should be borne in mind that this heat and swirling is the fiercest at the point where the foam is applied, because the falling foam splashes a great deal of oil into the air at that point. When the remaining foam with its high-falling velocity hits the oil surface, it is submerged. This submergence itself no doubt crushes some of the foam bubbles. Part of what remains then comes up into the turbulent and fierce-burning area immediately adjacent to where it went under. Most of this is probably consumed by the fire. Another part is forced some distance out under the oil before it comes to the surface. When it does come up, it is covered with an oil film, which has to burn off before an effective foam blanket is formed. It is easy to see that only a very small part of the original foam applied in this fashion ever does effective work.

In order to see whether this matter of the drop was the only serious difficulty, or whether there were other more important factors handicapping us, it

was decided to run a second test in which the foam would be applied close to the oil surface.

A hole was accordingly cut in the tank about three feet above the oil level and the mixing chamber was lowered so as to discharge through that hole. Additional holes were cut at about the same elevation so that our portables could be given the same opportunity to operate with only a few feet of drop. In a later test we demonstrated that these holes can be readily cut after the tank is on fire.

As in the previous test, the fire was allowed to burn ten minutes before any move was made to extinguish it. At the end of that time, two portables were put in place through the side of the tank and about 400 g.p.m. of each solution were applied through them, and an additional 400 g.p.m. through the permanent



The manifold and test equipment.

box. As was expected the foam applied in this way proved far more efficient—although even with this small drop the velocity was sufficient to splash the oil at the point of application and make it the hardest burning part of the tank and the last to go out. About 8,400 gallons were used, enough to make a 1.2 foot blanket.

These two tests had definitely indicated that a long drop from the mixing box to the oil surface severely damages the foam, and may be so serious that it will be impossible to control the fire. We were all convinced that to be in a position where we could confidently expect to extinguish all kinds of tank fires with our foam equipment, we must devise some means of applying the foam in a comparatively gentle fashion and from near the oil surface. We accordingly spent about a month studying various possible schemes for accomplishing such a change in the method of foam application. A great many plans were considered; but the one which appeared to be most feasible was to attach an asbestos tube to our portable mixers, on the bottom of which we proposed to hang something in the general shape of a dishpan either made of metal or asbestos. We figured that such an arrangement would protect the foam during

its drop, would kill the velocity at the bottom and then release it at slow velocity and around a big periphery very close to the oil surface.

We accordingly built several of these tubes, and some six weeks after our first tests, ran a new series. In this series our first fire was used to check the previous results. A permanent mixing box was set 10 feet above the oil and tried as a check on the two previous tests. It agreed remarkably well, requiring a total of some 11,000 gallons of each solution, or enough to make a blanket 1.7 feet deep over the tank.

A new fire was then started, and an attempt made to extinguish it with the new type of portables. After the fire had gotten a good start, the portables were brought up and put in place without serious difficulty by the fire crew. The asbestos tubes released just as anticipated, but the results were entirely unsatisfactory, as the tubes broke almost immediately when the full load was put on. Altogether, three portables were erected and every one gave way somewhere. Of course, they had been tried ahead of time for strength, but enough allowance had not been made for the weakening effect of the heat and the difficulty of getting both solutions started at once, etc.

After the new portables had failed, the fire was put out with the permanent mixing box set 10 feet above the surface which had been used in the first of this series of tests.

Another Test of the Asbestos Tubes

We still had two of the asbestos extension tubes which had not been attached to our portable mixers. As the indications were that, made up as they were, they were of no value anyway, we decided to try them at the beginning of the next test. They were accordingly brought up and erected; and while one of them broke at a seam part way down almost immediately, the other stayed intact and worked perfectly. For the first time in any of these tests the fire went out under the mixer almost immediately, and the foam spread from there, crowding the fire ahead of it. Some damage was done by allowing foam to flow through the broken mixer, which was located close to the effective one, this damage being caused by the splashing of the oil due to falling foam. The final result was extinguishment in a generally smooth and orderly fashion, using a total of 6,000 gallons of each solution—by far the least used in any of these experiments up to that time.

We were now entirely satisfied that the tube extensions would accomplish what we thought they would, that they were perfectly feasible to erect after a fire was started, and that the only defect in our plans was the mechanical strength of the tubes. The original tubes had been built of wire-inserted asbestos cloth with no additional reinforcing of any kind. We accordingly designed some new tubes well reinforced with wire and tried them.

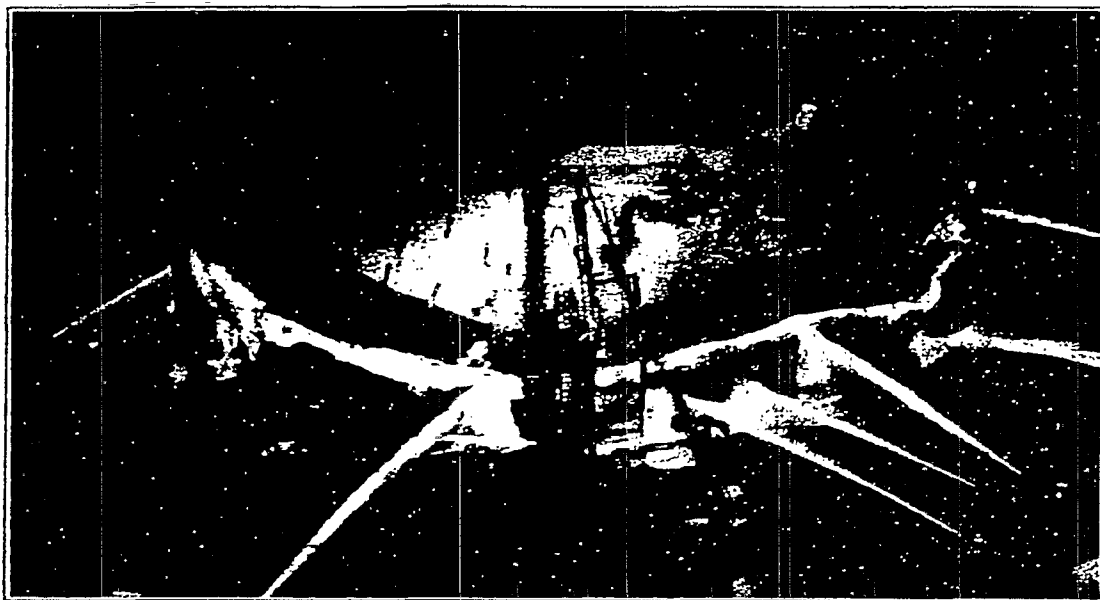
The results were entirely satisfactory. Two fires just like the previous ones were extinguished with a single portable lowering the foam 20 feet through the asbestos tubes. The rate of application was only about 200 g.p.m. of each solution and the first fire was put out with a total of about 3,300 gallons of each. In the second fire the tube was damaged a little and 3,700 gallons were used.

In this case the mixer was erected over a frame, the top of which was 20 feet above the oil surface. This spot was chosen rather than the high side of the tank, merely because of more favorable wind conditions.

We believe this method of foam application marks a distinct advance in the art. You will note the tests show that the basket method of delivery is not only far more efficient when there is a big drop for the foam, but is also considerably more efficient than the permanent box, even with little drop. Imme-



View of test fire when nearly out.



After the test fire was out.

diately this brings up visions of possible future foam systems consisting of mains and hydrants only with possibly smaller solution storage and smaller pumps and a more positive assurance of extinguishing the fire. Bear in mind also that the portables will be stored in a safe place and that they will escape the risk of being damaged by the falling roof, etc.

Quantities of Foam Required

115 Foot Tank

Method of Application	Total Gals. Each Sol.
Dropping 20 feet from permanent box.....	34,000
Dropping 10 feet from permanent box.....	11,000
Dropping 3 feet from portables without asbestos tube.....	11,000
Dropping 3 feet from permanent box and portables.....	8,000
Dropping 20 feet from portable with asbestos tube.....	4,000

From many angles, therefore, this latest development in foam fire-fighting equipment is perhaps as much of a contribution to the fire-protection activities of the oil industry as were our pioneer tests conducted back in 1909. And since protection against fires is a matter in which this company has always been glad to cooperate with other members of the industry, this description of our newest development can close with the same words that were used in the article published in 1914—"The Standard Oil Company allows other oil companies to use this process free of charge."

A set of drawings and permission to build the equipment described will be furnished upon application to H. H. Hall, Chief Engineer. If more than one set of drawings is required, these will be furnished at a nominal charge. Any well-equipped sheet-metal fabricating shop can build the portable mixers; the asbestos tubes (or material for making them) can be obtained from suppliers of wire-inserted asbestos cloth.

CHAIRMAN PRUSSING: The subject is now open for discussion.

W. F. ROONEY (Tide Water Oil Co., New York City): What kind of roof construction do you use?

MR. DONOVAN: There are some questions I can not answer. Perhaps Mr. Prussing can tell you about that.

CHAIRMAN PRUSSING: We have been using a lot of gas tank roofing. We do not use the standard combination tubing. The Foamite chamber is fastened at the roof. If the roof goes it takes the chamber with it.

MR. ROONEY: Do you use just one mixing box with the portable tubes?

CHAIRMAN PRUSSING: One mixing box alone will not take care of the fire. That was proven.

MR. ROONEY: When I examined the drawers of the portable chamber I noticed that in the inflow pipes near the bottom of the chamber you have set glass.

CHAIRMAN PRUSSING: Those are the windows in the bottom of the chamber.

MR. ROONEY: I presume the only purpose of those windows is to show when the hose has reached the connection.

CHAIRMAN PRUSSING: That is all. The mixing chamber is attached to the asbestos tubing, and on the bottom of the tubing is a sort of a dishpan made of metal or asbestos, and the windows are for the purpose of watching the mixing chamber.

Starting with these metal baskets, there is a water connection, on top of that there is a goose neck, which is a standard, from that there is an asbestos tube, and at the bottom of that is a basket or a reflector, so that the entire apparatus can be made up for any particular occasion without any loss of time.

MR. ROONEY: Do you have to adjust these to suit the tank at the time of the fire?

MR. DONOVAN: These tubes are carried in stock, made up in various heights or lengths.

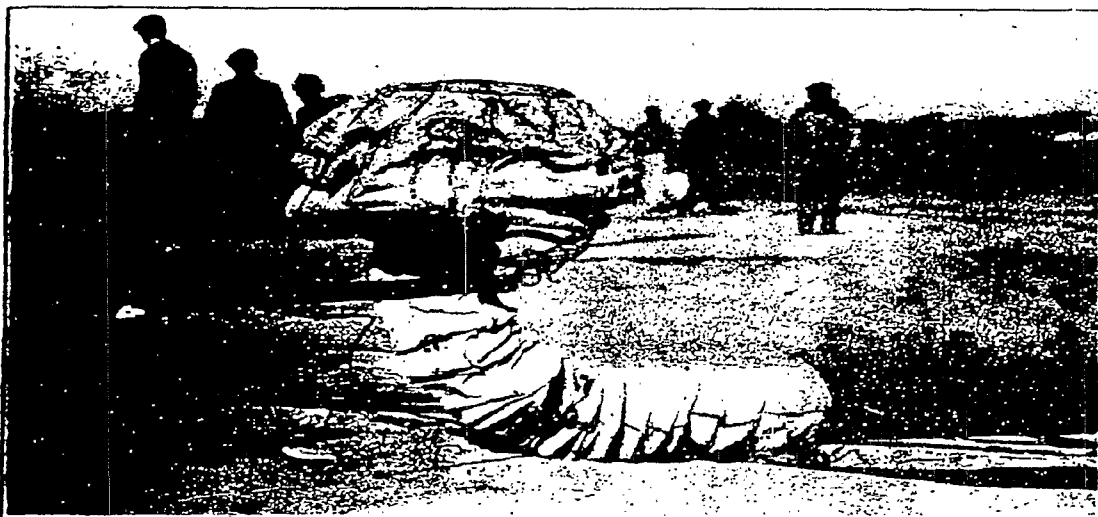
MR. ROONEY: Then does the tubing have to be cut at the time of fire?

MR. DONOVAN: It is either cut at the time of the fire, or kept in stock in certain lengths.

R. J. LAUDER (Roxanna Oil Company, St. Louis, Mo.): I would like to know just the number of men required to operate the portable mixer and carry the powder.

CHAIRMAN PRUSSING: We have found that the portable mixers can be erected by four or five men.

In order to train the men to handle these portables, the Standard Oil Company of California cooperated with the other companies in the training of regular



Asbestos tube contracted.

fire fighting forces. In some towns foam is being used and 100 men are being trained in the use of these portables.

W. T. FILMER (Sheet & Tube Company, Youngstown, Ohio): Has anything ever been done about the distribution lines? Could they be carried under the surface and forced up through the oil? Sometimes when the foam is used on the surface of the oil, it splashes the oil, and causes the fire to spread.

CHAIRMAN PRUSSING: At a fire test some experiments of that kind were made. One of the permanent mixer tubes was let down on the inside of the shell and submerged. This formed a sort of a slide, and the foam slid down the tube under the surface of the oil and then came up through the oil. This was not very satisfactory.

Another test was a floater made of metal and buoyant, which was attached to the mixing box. This thing was shaped something like an automobile disk wheel with a hole in it, and placed across the center of the tube, giving an impact for the foam as it descended. Being placed in a vertical position, naturally it would take the impact of the foam, and it would strike the surface of the oil with less velocity.

Another device was a 25-inch casing attached to the inner shell of the tank under the mixing chamber, the tube descending to the bottom of the tank. This was perforated at various points with two-inch holes. This was under the theory that the flow would go down under the oil and build up and discharge with less violence to the oil surface.

We are hopeful that this type of apparatus will be successful.

S. L. NEWCOMB (Standard Oil Co., New Jersey, Elizabeth, N. J.): In reading these articles, we rather thought that it was the idea to do away with all permanent mixers and use the portable mixers. Is this right?

MR. DONOVAN: I think you are right. I think that was Mr. Hall's idea, that the use of the portable mixers in fighting fire would result in less loss of time and oil.

MR. NEWCOMB: We have been using the portables, and in using the center column in fighting fire we found that before we could bring the column to the side of the tank the tank would boil over, and we had to use it through the Siamese connection.

I do not think we should do away with the use of the permanent mixers altogether, as it has been my experience that if one of the lines on the portable mixers does not work right the rest of them are usually affected.

And when we have fires that boil over before the men can reach the tank to get the portables set up, we need the permanent mixers. I know that we would have had considerable loss if we had not been able to use the permanent mixers. Of course, in this case, there was not much of a boil over, but it does not take much of a boil over to make the men run.

The Experiments Not Made With Crude Oil

MR. DONOVAN: The fire prevention work in the company does not come under me; it comes under the fire chief, Mr. Hall, and I am not entirely familiar with all situations; but ordinarily a tank does not boil over that quickly. That would not be true of refined oil. What kind of oil was in the tank?

MR. NEWCOMB: I think it was crude oil.

MR. DONOVAN: These experiments were not made with crude oil. Crude oil boils over very quickly. Where we are using these portable tubes is where there is refined oil, in storage houses or bulk stations.

MR. ROONEY: In connection with permanent types of mixers, I doubt if we would agree to do away with them entirely. We have a number of 24-foot tanks located pretty close together. If a fire breaks out in one of these tanks we can cover the surrounding tanks with the permanent type of mixer while we are using the portables on the fire, and if we did not have the permanent I do not know how we could take care of a large fire.

Have any of you gentlemen ever had any experience with foam generators? We have four of them, and we find that there are some places where they are successful in protecting the slope, and we find them quicker to hook up than our permanent.

S. L. NEWCOMB (Standard Oil Co., Elizabeth, N. J.): I would like to know how many men it requires to carry the powder to your generators?

MR. ROONEY: I do not know exactly. We have always used them in our refineries, where we have plenty of men to carry the powder. I do not think it takes more than five or six.

W. T. FILMER (Sheet Metal & Tube Company, Youngstown, Ohio): In conducting experiments with your foam generator, how do you handle a broken tank?

MR. DONOVAN: We have made some tests on that. We have let the fire go until the whole ground was on fire, and then have had men ready to carry the tanks and other men to carry the powder and we put that fire out in 12 minutes.

We used four cans, and had one man to open the can and another to mix the powder.

MR. FILMER: How do you transport the generators?

MR. DONOVAN: We carry the generators mounted on trucks, which can be handled by one man. I believe there are five cans to our truck.

CHAIRMAN PRUSSING: It has been my observation that these generators have been bought more for use at marketing stations and places where there is a chance of small fires. They are purchased with the thought of their usefulness and not as to the number of men required. A number of them have been sold, but their usefulness is limited.

MR. NEWCOMB: We considered purchasing a number of them to use as in emergencies. Our central pumping stations are located on the outskirts of the refinery and we considered the advisability of purchasing them to keep out there so in case of fire we could use them immediately.

We found, as far as protection was concerned, that if we had enough to protect our 15-foot tanks we could not load them fast enough to take care of the fire.

We had a large tank which we tried to protect by three generators, and it took two men to each generator, one to feed the powder and another to open the cans.

ADJOURNMENT

Thursday, September 29, 1927

GEORGE F. PRUSSING, Chairman
Union Oil Company of California, Los Angeles, Calif.

The third session was called to order at nine-thirty o'clock by the ~~chairman~~ George F. Prussing.

CHAIRMAN PRUSSING: The first speaker on the program, I am going to ~~present~~ without any further introduction, Mr. C. L. Swim, Skelly Oil Company, Tulsa, Oklahoma.

The Promotion of Safety in a Producing Department

**C. L. Swim, Skelly Oil Company,
Tulsa, Okla.**

The principles of safety are identical wherever you may consider them but the application may vary somewhat depending upon the phase of industry considered. This is true in a producing department of an oil company, because there are some factors peculiar to these operations that make them at once different from most if not all others. To mention one or two, there is, first, the scattered personnel which may be made up of small groups located in as many places throughout several states; and second, the inherent hazards which go with every effort to deal with natural forces, especially in drilling operations where the character, location or extent of the force is unknown.

Every effort which seeks to change the habit or attitude of a man must, to be successful, proceed along a line of interest to that man. This is true of any plan to promote safety and in this connection we should always remember that, true to the nature of the human race, self interest is one of the greatest actuating forces. The application of this to safety I shall try to demonstrate.

Safety must come from the top of your organization down and never the reverse. If your executives are sold on safety you are fortunate even as I am. If they are not, their interest lies in your demonstration to them that safety and the prevention of accidents is good business; that accidents are one of the very real wastes of industry for which no one can show a gain or an advantage; that a decrease of accidents reduces confusion, lost time, and costs with a direct and unmistakable increase in profits. Then, too, the executive more than the other classes we shall discuss, is more susceptible to the humanitarian appeal.

The next to consider in your safety program are your superintendents and foremen. These are your key men. Safety comes from the top down and I am fully persuaded that unless and until you have these superintendents and foremen sold on safety you are in a large measure wasting your time in going to the men with your safety program. Concentrate on these and let the process be continuous.

Where does the self interest of these men lie? Each one of them holds his position because of his indicated or demonstrated ability to work with men and to accomplish desired results. His personal success and his chance for promotion depend upon his ability in this direction and this being true his self interest lies in anything that will help him attain this objective. Sell him safety and your program for securing it, not only upon humanitarian grounds, but upon the basis that accidents are one of the costs of doing business and that you can

help him accomplish results with less accidents, and hence less cost so that the profit side of the operations, of which he has charge, is increased; and that this puts him in a favorable light compared to the man in a similar position who disregards safety and as a consequence has higher costs due to accidents. Sell him the proposition that his value to his company depends upon his ability to accomplish results at a profit; that his organization has only one pocket book; that into this goes all income and out of it comes all expense; and that it matters little how many barrels of oil he produces if he does it at the cost of preventable accidents with resulting decreased profits or a loss. In other words convince him that his personal fortune is involved in safety.

There is a third group in a consideration of the personal elements involved in the development of a program of safety. The workman—the man on the firing line where the accidents happen—is, of course, the one who has the most to gain and yet who sometimes seems the hardest to reach. To him an accident is a personal matter and it would seem easy to find his interest, yet experience has taught some of us that some workmen do not, apparently, see the necessity of giving special thought to this and base their lack of interest on the fact that they have never suffered an accident and by a curious line of reasoning assume they never will. To reach the various types of individuals making up any group of workmen, a continuous program of education, involving every known method of appeal, is needed. Some can be reached by being made to realize that they may be injured by the careless act of a fellow workman so that they do have an interest in the broad idea of preventing injuries. Examples of this from your own organization can usually be brought to their attention, such as a recent case in my own company where the careless act of one man caused the death of himself, another and the serious injury of three more.

Outlining the Lines of Action

Now that we have considered the groundwork necessary for a successful furtherance of safety, let us briefly outline the lines of action. In the first place there must be a clear placing of responsibility for accidents and this should be upon the superintendents and foremen. The obligation of a man in one of these key positions is to obtain results without accidents and every accident sustained by a man under his supervision should be charged to him. Workmen try to please their foremen and superintendents so that the opportunity of indicating his belief in safety first is accorded such a key man every day.

One company has been using the plan of its safety director sending a report each three months to the executive officer in charge of the producing department, which report is a summary of the number of lost time injuries for the quarter year just preceding for the men under each superintendent, with a rating on the basis of the ratio of such accidents to the average number of men employed. With this report goes a letter pointing out significant records and which shows that each superintendent receives a copy of the report and letter. The effect from this has been marked in that it is at once apparent to such executive that although two groups are similar as to number of men and character of work and working conditions, yet one group is having a considerably more serious accident experience than the other. This results in the superintendent hearing from the man who gives the pay check and in turn a determined effort on his part to locate and remedy the trouble.

You will note that by this plan every key man is criticized or praised to his superiors in a completely above board fashion. This is important, for to accomplish results the man who keeps the safety motor wound must be on terms of

frank friendliness with the superintendents and foremen, and in addition to this with the men as well.

Carry your message of safety to the men in the field and do not make the mistake of thinking your work as safety director is an office job. Get acquainted with the men and go to them to do it; get more than a speaking acquaintance with your superintendents and foremen, ride with them all day, learn their problems and sell them your proposition that when accidents are reduced lives and losses will be saved and their personal value increased. Get your key men to arrange safety meetings for a discussion of their own problems. Encourage good housekeeping and arrange for first-aid instruction and training of first-aid teams such as is given and sponsored by the Bureau of Mines, for accidents decrease in the presence of these two.

As all of you know the Bureau of Mines is willing and anxious to give first-aid training wherever as many as 15 can be brought into one group. You can supplement this, however, by getting the Bureau to train some of your own men who can then go from one plant or district to another, and by fitting their time to your operating schedule almost every man can be reached. My company has by this means given the complete course to about 600 men this year, and the Bureau has been kind enough to examine those trained and has awarded certificates to a large number.

Few Accidents Due to Improper Equipment

It has been demonstrated by carefully kept statistics that about ten per cent of all accidents are the result of improper equipment or the failure to have the most safe working conditions. May I earnestly suggest to you that your company adopt a standard of safety equipment and standard for working conditions and do this as thoroughly as the American Petroleum Institute has covered the matter of standard operating equipment. When you have adopted such standards you will display to your employees additional evidence of your intention to reduce accidents and you will largely eliminate the most costly ten per cent of your accidents, for the injuries resulting from this cause are, considering the number, some of the most serious ones sustained.

Another successful plan used by a producing organization to reduce accidents is an inspection, from time to time, by a safety man having a practical viewpoint, of the physical equipment in use and the working conditions. If you know your key men as you ought, this can be handled without there being any feeling on their part that you are on their properties to criticize, for you will be able to sell them on the proposition that you are there to help them reduce their accidents which is one of the yardsticks by which they are measured at headquarters. To be sure, this plan cannot be effective unless your executives are ready to approve the changing of the conditions or equipment that appears to be an invitation for an accident to happen.

Keep accident statistics so that you are able to know currently the experience of each group. This will show you where to devote your major effort and make it possible for you to commend the district showing a good record and to do it while the record is being made, also, you can go to a superintendent with an unfavorable record to help him correct it before his year's standing is ruined.

In this connection I recently had an interesting experience. A few years ago when we first began on safety one of our old producing districts was found to have a bad record that was outstanding. With an average working force of about 100 men during all the time in question their record for lost time injuries has been: 1923, 57 injuries; 1924, 40 injuries; 1925, 12 injuries, and 1926, 9 injuries. In the early part of this year the number started to increase. I called the super-

intendent's attention to this and received from him an immediate letter of thanks. He told me he had not realized there was an increase and promised to find the trouble. That was three months ago and they have not had an injury since. I know that superintendent and all of his foremen and when I go there I feel I am among friends.

In the beginning I said that you must organize for safety from the top down and I should like to stress that now. With your executives ready to look at working conditions, equipment and the records of men from the safety standpoint; with your key men feeling that management is in earnest and that you are a fair, honest and frank friend who is trying by all reasonable means to save lives and losses and to help them make a better record; with the adoption of a safety standard for working conditions and equipment and with periodic inspections to keep these up to standard, you are well on the way to reduce your accident frequency.

Courage and Incentive to the Workers

When you have done these things you have provided encouragement and an incentive to your workmen to do their work the safest way for they will see it is the popular way. There are, however, some men who are already so steeped in carelessness or have a don't care attitude and a few of these may have reached key positions. Let us consider these for a moment. The superintendent or foreman who after full opportunity does not seem willing or able to realize that safety pays by any test, is, in my opinion, a liability to your organization and needs consideration by the executive department. There are some workmen whose records show they sustain or cause frequent injuries by their carelessness and if these can not be changed to safe workmen by a frank friendly talk from their chief, they should be required to labor in a field less dangerous than the producing department of an oil company and this for their own good as well as that of the industry.

A case in point happened in our refining division. At the end of 1924 it was found that a certain boilermaker had suffered ten injuries to his eyes in the preceding twelve months. Investigation disclosed that he wore his goggles around his neck. The superintendent called him into his office where he was reminded of this and told his work was entirely satisfactory but that the next time he was seen at work without his goggles in the proper place he would be separated from the payroll. He is still with us and has not had an injury since.

The development of safety to a satisfactory degree is not the work of a day or a year and efforts to reach this standard, to be successful, must be continuous. I have restricted myself to a discussion of methods that have proven successful and I am confident the adoption of these suggestions varied to suit your conditions, will, if seasoned with frankness, friendliness and earnestness, enable us to come nearer our goal of less accidents in the petroleum industry.

CHAIRMAN PRUSSING: The producing end of the oil industry is a large part of the work of the safety man. A safety man working for a company that does not produce does not work very long for that company, and Mr. Swim has read a splendid paper on that subject.

I know that in our company when we made our first analysis we had to see where our accidents were happening, and we found that out of 1,000 drilling men and 500 producing men, 55 percent of our accidents came from the thousand men.

The most hazards are in the producing end of the business.

Mr. Swim's paper is now open for discussion. Who is going to be first?

R. S. BONSB (Standard Oil Company, New Jersey, New York City): Just to

start the discussion, I will say that I do not think the accidents are due so much to the natural hazards as to the type of man that you have to deal with.

The type of man that you find in the fields where there is the greatest difficulty is a difficult type to handle, and that is what makes it so hard for the safety man. He will rush pell mell into things, not take time to consider, get into impossible situations, does not read very much, and is a real problem.

I want to emphasize the need of standards in safety. I think that is the greatest need. Due to the lack of a standard way of meeting situations, one man will do one thing in one field under certain conditions, and another man will do something different.

I think that if every local had a set of standards telling what to do in certain cases and certain kinds of accidents, it would be of great value, and I think one of the things we should do is to work out some standards to be sent out in this way.

The greatest thing is the drawing up of a set of standards, and this step has been made, and the first set was issued in the "Clean-Up."

The second point is this bird that is always having accidents. I think that if a man has had the same type of accident two or three times he is a good man to replace, because there must be something wrong with the man or the job.

We want to do what we can to make the job safer, but after we have done that and he keeps on getting hurt he is unfitted for that job and should be transferred.

Sometimes a man is kept on a job because the foreman or manager thinks that he is a good man, and they could not get along without him. I had a case of that kind once.

The Good Worker Was Laid on the Shelf

A certain workman kept getting things in his eye. I spoke to the manager about it and he said, "Yes, but he does very good work."

Then I spoke to the manager of the plant about it, and he said, "Oh, he is a very good man. We could not get along without him."

About two weeks later this man got something in his eye that put him on the shelf permanently, and the man that the company could not get along without is unable to work at all, and the company that could not get along without him is still running without his help.

Would it not have been kinder to have let him go when he would have been able to find something else, instead of keeping him on until he had an accident which disabled him? He was unfitted for that job.

MR. SWIM: I agree with everything Mr. Bonsib has said, but I want to say that I have just a little different angle on this thing. Probably I should have embodied this in my speech, but I did not, so I am going to say it now.

I feel that the producing end, and particularly the producing end of the oil industry, has, and is, overlooking a bet in not standardizing upon safety equipment and safety working conditions. My company has been just as lax as anybody, but we have started on the right track at last. Day before yesterday I sat in conference with every superintendent in my company discussing that situation.

In the accident that I mentioned where one man was burned to death and three were injured, the wind was blowing from the south and blew into the engine house disturbing the air hose on one of the engines. This engine, a new type of construction, began pulling gas into the engine from one of the intake pipes. One of the boys got excited and jerked the spark plug wire off the engine. The engine died down and he started to put the spark plug back, and there was too much gas in the engine and it exploded.

When I started digging into the thing I found one thing which I wish to point out to you—the air intake pipe on the engine is on the outside of the engine house.

We have come to the conclusion that the manufacturers must fix that engine, or we will quit buying them.

MR. BONSB: It strikes me that the proper person to look into these things and carry out these suggestions is Mr. Blakeslee. Is he here? He is missing some good things if he is not.

Let's get safety equipment. Impress it upon the purchasing agents that it pays to buy safe equipment. Sometimes purchasing agents can not see that quality pays, because they feel that they want to save money for the company, but maybe we can impress it upon them that they can save money for the company that way.

H. A. MATIER (Union Oil Company, Los Angeles, Calif.): When we started in California a number of years ago to make them see the necessity of safe equipment in the prevention of accidents, we practically had to go out and dig in new earth. Every company had its own idea of the matter.

One man would go to a company where he was unfamiliar with the conditions and try something that he had used somewhere else, and which would not do at all for this particular case, and it was a terrible state of affairs.

Unsafe Equipment Scrapped After a Conference

Finally a meeting was called of the oil company representatives. The labor representatives and the oil company representatives were at this meeting and talked the situation over, and we had a real house-cleaning and got rid of our unsafe equipment.

I think all of us should have a house-cleaning of this sort and get rid of the unsafe equipment and practices.

Then let us get after the manufacturing companies and see that they put safe guards on the equipment that we buy, and have a standard about that. If we get together on that we can get results, and that is what we are here for.

My other idea is the training of the men who have been in accidents, and are unable to continue on the job as safety men. These men make the best safety men because they can tell the others what to do, they have had experience.

We have a case of a driller who was hurt, and Mr. Prussing got a job for that man as a safety worker, and he is doing good work.

CHAIRMAN PRUSSING: The thing that Mr. Matier means is the training of the man who, first of all, is familiar with the job.

There are two ways of putting men into the safety work, not only in the oil industry, but in the other lines as well.

One is to take men into the safety work and teach them everything there is to know about it, and the other way is to take a man who is competent to hold a drilling job, or a job in the producing end, who has been injured, and place him in the safety work. This man is not only qualified as a driller or worker, and therefore familiar with the work, but he is also qualified by his experience to help prevent accidents.

We were fortunate in being able to use a man who was a first-class driller, but who had become incapacitated for that job. That man was turned over to the safety department and put in the work in the drilling gang. He became the "father confessor," as it were, of the entire gang and did good work in that department. He was looked up to by every man as a person to whom to go for advice.

I think that the high priced men should be used in the safety work. The safety man has a hard enough job as it is, with most of the men thinking that he does not know what he is talking about, but they will listen to one from their own gang. He goes into this work with a real knowledge of the job.

I would like to hear from Mr. Currie about a little book which is being prepared.

V. R. CURRIE (The Texas Company, Houston, Tex.): I felt for a number of years that we lacked a little book or pamphlet of some kind that would have in it

some new general or model speeches on safety, a book that you could put in the hands of your foreman and to give him ideas for talks.

While Mr. Nicholson was laid up this summer I asked him if he would not write me a few such talks, and we have published in pamphlet form 50 short talks on safety. I have 100 copies of these on hand this morning, and if any of you want some we will be glad to give them to you.

MR. BONSB: I am not going to discuss Mr. Currie's book, but to get back to the standardization of safety methods, to be effective these standards must be 15 per cent mechanical and 85 per cent human. We want to be careful not to forget the human side of it.

The other big thing is for you safety men to impress it upon your purchasing agents that quality is what counts. He may think he is saving money for the company by buying something without regard to quality, but in the long run he is not.

You, of course, can not tell your purchasing agent where he shall place his order, but you can help a lot by drawing up specifications that will show him what you want. Then ask him to place the order where these things can be obtained; let him decide where, and if he has the specifications he can see just what you mean.

One thing that we are specially interested in is welder's gloves. We could not tell our purchasing agent what particular kind of gloves to buy, but we could make a drawing of what we wanted.

Brief Discussion of Safety Kinks

S. L. NEWCOMB (Standard Oil Company, New Jersey, Elizabeth, N. J.): I think that those who were here last year will remember that I presented a paper in which I spoke of the work of the safety men as a whole, and stated in that paper that I felt we were covering too much surface.

I think that Mr. Swim's paper has gone a long way to getting back to the fundamental point. I did not rise to discuss Mr. Swim's paper, but I would like to say that I appreciated and enjoyed it very much.

I had a few minutes' talk with Mr. Blakeslee concerning the staging of accidents and near accidents for the purpose of taking pictures, and I would like to ask that Mr. Blakeslee tell us something about it.

CHAIRMAN PRUSSING: I think that Mr. Blakeslee will have an opportunity of telling us about some of the scandalous places he has found in his investigations a little later. (Of course, he found none of these conditions on our properties).

Our next speaker, Mr. H. W. Boggess, of the Sinclair Oil & Gas Company, Tulsa, Oklahoma, is not present, so I am going to ask some of our friends to give us a few words, and the first man I am going to call on is Mr. E. D. Murphy, Mid-Continental Petroleum Corporation, Tulsa, Oklahoma.

MR. MURPHY: I believe they asked us if we would not say a few words on the safety "kinks." I am not full of "kinks," I have tried to keep straight.

I was out with Mr. Blakeslee when he was taking those pictures. One thing I learned from the taking of those pictures was the interest aroused in the hazards in accidents. When those pictures were taken the accident was staged so that the points he wanted to bring out could be obtained, and the men all gathered around us, and discussed it and showed a great deal of interest in it.

Now I am using pictures in the field and in the refinery and explaining it so as to arouse the men so that they will be on the lookout for hazards. I think this is a good way to do, as it impresses it on their minds.

CHAIRMAN PRUSSING: We also have had that experience in showing the pictures, and have found it to be quite effective.

We have also found it effective to post up on the bulletin board where all the men can see them, pictures or notices of the accidents which occur in the plant under some such caption as "This bonehead stunt was pulled today."

All the men see them, and it makes the other men careful so that their picture or name will not be put there.

One man conceived the idea of placing photographs on the bulletin board of accidents each day, under the caption of "The prize bonehead stunt of yesterday."

These are nine by ten pictures, and they illustrate the little things that can happen in a plant. Sometimes it is just a tool left in a dangerous position, sometimes it is a posed photograph of something he happened to catch on the move, and had it staged so as to get it in the camera; and these things are very effective.

The men always go to the bulletin board first to see whether they are photographed or not.

Activities of An Organization With 1,200 Men

I am going to call on Mr. C. L. Hightower, of the Texas Pacific Coal & Oil Company, Thurber, Texas.

MR. HIGHTOWER: Some of the things I am going to say to you have been related here this morning and some in the past, but perhaps one or two of the ideas may be new to you.

In the first place our organization is a small one, about 1,200 men, and it is not so hard for our safety organization to work with them as it might be with a larger force, and we feel that our safety department has produced results.

The first question that we asked was as to the best way to get results, and we worked under the assumption that educating the men was the most efficient. Working under that assumption we decided that direct contact with the men in the field was necessary. Then we began holding meetings every month in each district, and the safety director and representative from my office meet each month with the foremen, superintendents, managers and the men in the field.

In order to assure a program for the meeting we always send out a list of suggestive subjects for discussion. These suggestions are made up from reviews of accidents. Then, if our program committee has failed, and program committees composed of workmen often do fail, we have something to talk about.

We hold these meetings on the company's time, and pay the men for the time spent attending the meetings.

In some of the more isolated districts we hold the meetings in the evenings because we have found that the men in those districts, not having much entertainment, will attend, and when such meetings are held it is our policy to provide some special entertainment to show the men that we appreciate their interest. We supplement this work with our bulletin service.

We have a suggestion system which is very successful. We started this system in April, and since that time 50 suggestions have been submitted, 45 of which were accepted and awards paid.

We are planning to have a six months campaign, and offer prizes for the best suggestions. We include suggestions for the improvement of apparatus, and we have received suggestions that have saved the company hundreds of dollars.

We have attempted occasionally to have efficiency talks given by the superintendents and foremen, and at this time we are arranging for one of the executives to attend the meetings and give the men a talk.

On the first of each month we give what we call a field report. This report is a record of the work of the man. If it is a good report he is complimented, if it is bad he is criticised and his errors pointed out.

Another thing that we have accomplished is a little pamphlet. This was made up by the foreman and superintendents. It includes the company's policy pertaining to safety, and then outlines the life insurance for employees, and then presents written instructions for each and every employee of the company, such as "Hand tools should be kept in good order at all times. Burrs and metal slivers from punches, chisels

and hammers have caused many eye injuries. There is a tool for every job. Use the right tool at the right time."

These and many others are for the carpenter, but we have a set of such rules for all employees.

We appreciate that in presenting these rules we did not include all the things that could happen and that should have been included, but we do feel that this has been a step.

When this book first came out I was a little skeptical as to how it would be received, so I talked it over with each superintendent and they took the matter up with the foreman, and it was discussed with each representative, and practically all of the men approved of it and said it would be a good thing, and we keep them on hand to give to the men.

It is not my purpose to hold up our organization as a flaring example. I appreciate that there are many rough spots, but we do feel that we are making headway.

We have had a reduction in the number of accidents, and in 127 days we have had only 15 absences due to accident. I cannot give the record for the year, as during the last twelve months our company has been undergoing a period of reorganization and the records are incomplete.

Three Things That Should Be Stressed

Three things I would like to stress; from my experience I know that the management must be sold on the safety idea, or they will not see that the recommendations of the safety man are carried out.

I know of a case that happened recently. A recommendation was made by one of the men that the tool rack be repaired. The foreman agreed that the tool rack in the field needed repairing, but that was as far as it went. Incompetence on the part of the company is one of the greatest detriments to the advancement of the safety work. The workman's tools are what we should look to first.

Make a personal contact with your men. Mr. Swim stressed that. Get in touch with your men. Let them call you by your first name—I mean the men in the field, not your office associates—get to know them, and let them know you.

Third. Understand the work that your own organization is doing. Encourage your men to come to you with suggestions and then investigate them yourself. Get the men to make up a list of the hazards on the job and you will find this will be a benefit to you.

Five or six months ago I did not know much about the Petroleum Section, and I attempted to give a plan for the prevention of accidents, and fell short because I did not know the operation. I do not think that can be too strongly stressed—learn the operation.

MR. BONSB: I would like to ask you, Mr. Hightower, what methods you use to get the field men to read the instructions in your hand book.

MR. HIGHTOWER: Sometimes we hand a book of instructions to the field men, and sometimes the foreman or the man who employs them gives them a book when they are hired, with instructions to read and study it.

MR. BONSB: It is nice to hand out those instructions, and it is all right to have the foreman and gang leaders have them, they will read them; but how do you know that the field man will read that book?

MR. HIGHTOWER: We give all new employees a book of instructions, and then a week or so later the superintendent, or somebody, quizzes them to be sure that they have read it.

We see to it that our men are given personal instruction, and the safety department has, each month, a sort of a questionnaire, by which the men are tested as to their knowledge of the subjects outlined in this pamphlet, and I

think that we are getting good results. It has been brought out that the men read these instructions.

We had one instance where a man was working in the field and picked up a wrench to do some hammering, and one of his fellow-workmen stopped him, telling him that he had better see if that was the right thing to do, and pulling one of these pamphlets out of his pocket to see what it said, found, "Don't use a wrench for a hammer; use a hammer."

H. A. MATIER (Union Oil Co., Los Angeles, Calif.): This matter of handing a book to the new workman is one that I have thought over for the last ten years.

I thought that perhaps the National Safety Council could prepare a set of rules that would apply to most of the situations that come up, but the question arises as to the good they could get out of it. If we publish a book of this kind we should put in it a rule like this, "Be yourself. Use your common sense."

Common sense rules should be the nucleus of such a book.

R. E. DONOVAN (Standard Oil Co. of California, San Francisco, Calif.): I want to tell you some of our experiences along that line.

We have a book which we put out in California telling of the employees' benefit plans, stock investments and so forth, and not over 25 per cent of the men in the company know what those things are. How are you going to get them to read a hand book?

I think it was suggested in one of the papers that we try to put out rules applying to the general safety of the men. This might not work out, as we are operating in different states and under different laws.

In California there are certain state laws that we are required to live up to, and you might make safety suggestions that would conflict with these laws. That is true in other states.

We have had experience with hand books, but have never had good results.

The Safety Department Got Out a Questionnaire

RALPH E. MOTLEY (Atlantic Refining Co., Philadelphia, Pa.): I am going to do as they suggested at the banquet last night, start an argument.

You remember yesterday you heard me say something about certain rules being issued by the firm, and also that we were rather dubious as to whether or not they were read?

We decided to have the safety department construct a sort of questionnaire consisting of about 25 questions. These questionnaires were distributed by the foremen and each man got one with instructions that they be returned within 15 days.

Within 15 days 45 of these had been returned, and nine per cent of the questions were correctly answered, showing that the men had read the instructions.

MR. BONSB: How do you know that these questions were answered by the men on the job?

MR. MOTLEY: The answers were turned in by the men on the job. We have not tried to make sure that they really answered them. It shows that they must have read them or they could not have answered them at all, and if some one else did answer them, the men wrote the answers and would get the benefit that way.

We are getting up a special set of rules for each of the different crafts.

MR. BONSB: May I ask if you ever talked with the men to see whether or not

they were getting anything out of these instructions, or if they just read them to follow the instruction to read them?

MR. MOTLEY: I do not think that it makes much difference how they read them, so long as they read them. If we gave them the instructions and they do not read them it is not up to us. Of course we do everything we can get them read. I have not talked with any of the men concerning the handbook.

CHAIRMAN PRUSSING: Before we listen to Mr. Eggleston's paper, I am going to call on Mr. Owen Humphrey of the Standard Oil Company of New Jersey, Elizabeth, N. J., to speak to us.

An Outline of Three Safety Kinks

MR. HUMPHREY: I am just going to talk a few minutes on three so-called safety "kinks."

The first one has to do with the subject that we are talking about, and that is the handing of a hand book to the new employee.

When new employees are taken on they are given a hand book with instructions as to the proper procedure, and we emphasize the importance of following out these instructions and studying this book.

They are also given a safety talk by a prominent man in the company who has had a great deal of experience, and then he is given a card stating that he has received instructions from the foreman. This is a safety registration card, and after he has received instructions in safety from the foreman he signs it, and the foreman also signs it to show that he has instructed the man, and then the foreman returns it to the safety department.

This plan has been in practice for about five months and I can not say yet whether we can put our finger on any definite results. We are following it up and feel that it is efficient.

The reason we have the man sign this card is so that he can not say that he was not instructed by the foreman. Sometimes, after an accident occurs, the man will say that he was not instructed, but if we have his signature he cannot say that. Then sometimes the foreman is busy and does not take the time to properly instruct the man, and this card guards against that.

The second kink is the wearing of gas masks. We have been up against it here.

At the Bayway Refinery they decided on the canister type of mask, but we were not always able to know when the mask had broken down. So a committee was appointed to figure out a way by which we could tell when the man had used the canister for a certain number of hours, and to find out how many hours the canister could be used before breaking down. The committee devised this card which is attached to every canister.

After the man has finished using the mask he takes a pencil and checks off squares on the opposite side of the card the exact number of hours he has used the mask, then the next man to use it knows how long it has been used, and will not run the risk of wearing the mask when the life has gone.

We did not want to risk depending upon the ability of the man to detect the odor of the gas when the mask begins to break down, and so we have decided that the limit should be a ten-hour period, and we use this card to keep track of the time.

Third, we believe in selling the men safety shoes, and for some time we have been selling these shoes at cost. In the middle of the summer the sales lagged. We tried to think of some method to bring up the sales, and we finally decided to give a cap with the shoes; so with every pair of safety shoes that were sold we gave a

cap as an inducement to wear the shoes. It would also advertise the fact that the man was actually wearing safety shoes.

We first ordered some of these caps through our purchasing department, and they finally were successful in getting one of the manufacturers to make some of these caps, which we gave with every sale of shoes.

C. L. SWIM (Skelly Oil Co., Tulsa, Okla.): I would like to ask a question. I presume you hire a number of men directly into your laboring gang. What sort of instructions do you give those fellows?

MR. HUMPHREY: When a man is hired into the laboring gang he is first given preliminary instructions by the employment manager, which consist of directions concerning all hazards he is likely to come up against. Then when he comes on the job he is given a book of instructions by the foreman.

RAY E. MILLER (Marland Refining Co., Ponca City, Okla.): I might say that new employees just coming onto a job are always ready to receive instructions, and that is the time to get them; and in the plant the safety department gives them instructions after they have passed the physical medical examination.

MR. BONSB: Referring back to the beginning of your talk, Mr. Humphrey, just what is the idea of having the men sign the card saying that they have received instructions?

A Man Can't Go Back on His Signature

MR. HUMPHREY: Sometimes when a man gets hurt he says he never was told. If we have his signature that he has been instructed, he can not spring that. Then sometimes the foreman is busy and neglects to properly instruct the man, and if we have the signature of the foreman too then the foreman cannot say that he instructed him when he did not, so it acts as a double guard.

E. A. TIMM (Standard Oil Company, New Jersey, Bayonne, N. J.): At Bayway Refineries the men must come up to the safety department and sign a statement to the effect that they have been instructed in the use of the gas mask.

I had had cases where the men have stated that they had never received a gas mask instructions. That was before we started having the Canister Data Time cards.

CHAIRMAN PRUSSING: Has anyone ever tried the chemical devices? We have such a device at our plant.

MR. TIMM: I might say there is such a device under consideration.

CHAIRMAN PRUSSING: We are using a little tube through which the gas passes, and when the gas passes through this free of compounds it shows white, and when it is not free, it shows colored, and it depends upon the wearer to know when the change takes place. So far it has been successful.

S. L. NEWCOMB (Standard Oil Co., New Jersey, Elizabeth, N. J.): I happened to be a member of that committee that was organized for the handling of gas masks.

When we first took this matter up with our companies they insisted that the masks would break down slowly, and the men could detect the odor, and it was perfectly safe. We contended that the man might have a bad cold, and we did not want to take any chances of a man with a bad cold wearing a gas mask.

Another thing, the odor of the gas is considerably different there than it is in the laboratories. It does not have that rotten-egg smell that you are all familiar with, and the man might not recognize it.

The canister was used for a longer period of time than ten hours before it broke down, but when it does break down it goes rapidly, and we thought it better to be on the safe side and limit it to ten hours. They did not believe it, but agreed to run experiments, and they found that, as we had said, when this mask was used for a longer period of time than ten hours the break down was rapid.

For that reason we decided on this ten hour period, and we are working on a detector that will show when the mask begins to break, but even if the detector does not show a breakdown, the gas mask is not to be used for a period longer than ten hours.

V. R. CURRIE (The Texas Company, Houston, Texas): After the session started this morning there came to my mind a plan, which might be of interest to the members. I might say in the first place that for the last 15 years our central committee of safety has consisted of a committee composed of one man from each plant.

Our plant fire organizations, on the other hand, consist, naturally, of a fire chief, several assistants, lieutenants, captains and five men for each company.

At this particular plant they started to experiment in accident prevention along the same lines as they did for fire prevention, and have had very good results with this new organization, in fact have had only one loss of time due to accident since this new organization was formed.

They are now extending that same plan of organization to the different departments in the plant, and if they continue on the same basis, they will be able to show a reduction of 60 per cent in accidents this year.

Origin of an Interesting Resolution

While I am on my feet, there is another matter that I would like to bring up at this time.

During the week, while talking with the various delegates and National Council officers, the thought has come up that probably it would be to the advantage of all concerned if this Congress were held at one point every year, and I would like to present the following resolution at this time:—

"Whereas, the National Safety Council is more efficiently and economically held in its headquarters city, and

"Whereas, the cost of sending delegates is as low if not lower when the Congress is held in Chicago, and

"Whereas, the city favored by the Congress when moved from point to point gains only at the expense of the delegates and their employers,

"Be it therefore received that this Section is in favor of holding the Congress in Chicago regularly during the last week of September in each year.

"Respectfully submitted,

(Signed) Geo. F. Prussing,
Union Oil Co. of Calif.,
Chairman-Elect,
Petroleum Section."

CHAIRMAN PRUSSING: You have heard the resolution read. Are there any suggestions?

RAY E. MILLER (Marland Refining Company, Ponca City, Okla.): I move that we adopt this resolution.

MR. BONSB: I second that motion. Our section is getting larger every year and I think we ought to have a larger hall to hold our meetings in. Every year we have one of these small halls, and you know how uncomfortable it is. I think we ought to do something about this now, while we are all here. There are other sections smaller than ours that have larger meeting places than we have.

If we come to the same place each year there will not be so much that is new to see, and we may attend to business better. Most of us are familiar with Chicago and we do not want to see the stockyards, we have all seen them, and I think it would be better to have Congress held here every year. Of course it is nice to go sight-seeing, but your main purpose in being here is to get something accomplished.

I am strongly in favor of having the Congress at this place next year.

CHAIRMAN PRUSSING: It is a fact that this is the first Congress that we have held in which all the meetings were held in one building, and while there are lots of improvements that could be made, yet I think that it would be better to hold it here.

I am not touting for the Hotel Stevens, but in another year these boys and girls may have learned how to run a hotel and the accommodations may be better, and the service better. Are you ready for the question?

. . . (The question was put and the motion carried.) . . .

CHAIRMAN PRUSSING: As our time is getting short, I am going to call on Mr. H. L. Eggleston, Superintendent, Pan American Petroleum Company, Los Angeles, Calif., who will now speak to you.

How We Promote Safety in Our Natural Gasoline Plants

W. L. Eggleston, Superintendent, Pan-American Petroleum Company,
Los Angeles, Cal.

I am not a safety engineer, and am only involved in safety and accident prevention in so far as it has a bearing on the efficient performance of the work pertaining to the construction and operation of natural gas-gasoline plants. I have preferred to approach the safety problem from the standpoint of a practical manager of a department seeking to secure safe, satisfactory and efficient results from his department, and I have found that I frequently differ with bona-fide safety engineers in my beliefs and this is possibly due to the fact that I try to promote safety by attempting to analyze the *fundamentals of correct procedure* rather than to specifically encourage safety. I have much to learn from the safety engineer, but believe efficient performance will be more satisfactory than merely safe performance. I hope to describe the specific method we use—which we believe to be quite satisfactory as a means of promoting safety.

The natural gasoline problem is a serious one. The gas from producing oil and gas wells in an oil field contains natural gasoline. This gasoline can be profitably extracted in an absorption plant and a sale may be effected for both the gasoline produced and the resultant dry natural gas. The function of the natural gasoline manufacturer is usually to collect rich natural gas from the traps of producing wells, to transport this gas through pipe lines to a central plant where the gas is compressed to a suitable pressure for gasoline extraction; the gasoline is then extracted, and thereafter the gas is sold or disposed of for fuel purposes with or without further compression. Some plants make a practice of delivering the discharge gas at high pressures, either to public utility companies or to distant fields or refineries, and in some cases, dry discharge gas is supplied direct to gas lift installations at pressures ranging between 400 and 1,000 pounds.

There are two very dangerous commodities to take care of. The first is a very volatile gasoline—much more volatile than any product of the ordinary refinery—and the other is a flammable gas occasionally handled through a plant at varying pressures and at varying temperatures. Heat is necessary as steam must be produced by boilers for distillation, and there are other ignition sources that must be considered. Generally speaking, even in a properly designed plant, there are combustibles that present a serious hazard because of their volatility or the conditions under which they must be handled, and there are also ignition sources present which cannot, under ordinary conditions, be entirely isolated. The matter of safety and fire prevention, then, is highly important, and while, fundamentally, one might say that if combustibles and ignition sources are separated and kept apart, there would be little danger of fire, there are other angles to be considered. Usually, natural gas-gasoline plants must be erected in a crowded oil field with a very small ground space allotment, and must be erected quickly to take care of flush production, and frequently

must be in partial operation before the entire construction job is finished. There are several different problems that must be faced, usually in the following order: (1) design, (2) construction, (3) operation.

Design: If a plant is properly designed, the equipment will be suitable for the work and hazards will not be created due to excessive pressures on vessels containing combustible liquids or gasses. The equipment will be located properly so that combustibles and ignition sources will be segregated as much as possible. Other factors such as adequate water supply, fire protection, mechanical guards, railings, and so forth, will be provided, so that the plant will function properly with the minimum of potential hazard if it is properly handled.

Construction: During the construction, accidents will happen if the utmost efficiency is not preserved throughout; there is heavy equipment to be located quickly; there is necessity for welding sometimes in the presence of combustible vapors; and there is of necessity a constant pressure on the construction crew to make time in order to save the tremendous losses experienced owing to lack of facilities for handling gas which is being blown into the air. Accidents will happen if the construction crews throughout are not thoroughly familiar with their work, and if they do not exercise the greatest measure of precaution.

Operation: After a plant is erected the operators must proceed with utmost caution in the performance of their work to prevent fires and accidents; fires being the more serious because they result in most cases in fatal accidents. An accident or a fire is not efficient handling, so the secret of safe operation is efficient workmanship at all times.

Safety Synonymous With More Efficient Workmanship

Sooner or later, in a growing organization, the matter of safety must be considered from the angle of an actual campaign to produce *more efficient workmanship* on the part of the individual employee. About two years ago the Pan American Petroleum Company arrived at the point where it recognized the need for some control over the thought and action of employees while at work, and various methods in use by other companies to promote safety and prevent accidents were discussed at meetings held for the purpose. It was thought that by considering the schemes of other companies, and by discussing the problem in relation to the practices of other companies, that we would evolve a system of our own which would take care of our problems satisfactorily. At the outset, it was recognized that safety is *part and parcel* of the job of designing, building and operating natural gasoline plants, and that only when there is the utmost degree of safety can a job be carried on efficiently. We felt that if all our men thoroughly understood the work they were called upon to do, and that if they did this work efficiently and capably, we would have no fires, and no accidents. It was also at this time established as a law that sphere of accident and fire prevention in the natural gas-gasoline industry came under four classifications, in the following order:

- (1) Fire Prevention.
- (2) Accident Prevention.
- (3) Ability and equipment to fight fire.
- (4) First Aid.

We assumed that the first aid training and the ability and equipment to fight fire would not be needed at all if no accidents and no fires occurred, but that they would have to be provided and would have to be in readiness for instant use in case of an emergency, so as to take care of accidents and fires which might occur. We believed, then, that if we thoroughly educated our men by outlining carefully the work to be done, and by insisting on higher standards of workmanship, that we would save ourselves a lot of trouble, and we went after the problem from this angle. Naturally, our first step in education was to disseminate specific information, and

we considered employing an instructor who would make a specific study of our operations and hold classes for instruction. This idea we discarded because we felt it would be hard to retain the interest by class room work, and that it would be hard to arrange to reach every individual at a time when he was in a receptive state of mind, and when he could give undivided attention to the task of learning what there was to know about his work; also, we felt that the men best suited to give actual instruction in the work we were doing were the men who had charge over that work—namely, the manager, the superintendents, the foremen, and in certain cases, the men themselves. All of our men who had risen to responsible positions had been with the company for some time and had started at the bottom and knew, thoroughly, practically every angle of the work that was being done, so they were the men best fitted to instruct the others. We decided, then, that *we* would instruct, and that if our instructions were put into print and given to each individual monthly in the form of a bulletin, that every employee would permanently have a copy of all instructions to which he could refer at any time, and which he could study during his spare moments when he was able to give undivided attention to the study of the instructions.

The reason for putting our instructions in print and in placing them before every employee, we believe is well grounded. A man will readily forget lectures and information given verbally in instruction classes. He will soon tire of class room lectures, particularly on Safety and first aid, and the matter of class room instruction we believe should be eliminated at the start. Another means of instruction open to us was in furnishing on the bulletin boards of the company, posters, instructions and letters cautioning employees, but we believed that the benefit to be derived from bulletin boards was, of necessity, limited, although we do furnish posters supplied by the National Safety Council on the bulletin boards periodically. We felt at the start that if our bulletin placed proper stress on the correct procedure in the matter of design, construction and operation, we could reach every man with the desired information at any time that it was convenient for him to study the instructions given, and that he would retain those instructions and the information given to much better effect than if it were presented in any other way.

A Bulletin That Has Proved Effective

We came to the conclusion some two years ago that this bulletin, edited and issued along the lines indicated, would be the most satisfactory method of—

- (1) Preventing fire.
- (2) Preventing accidents.
- (3) Providing education in the best methods of fire fighting.
- (4) Providing education in best methods of first aid.
- (5) Elevating the morale of the entire organization.
- (6) Increasing the operating efficiency of the organization.
- (7) Lowering construction and operating costs.
- (8) Lowering the cost, visible and intangible, of accidents.
- (9) Stimulating the individual employee to direct his best thought and effort on his particular task.

We believe that we have made excellent progress along these lines, and we believe that it is largely due to the fact that we put all our instructions in printed form and place them in the hands of every man.

This was the first step, but immediately we had to consider the sphere of the ordinary house organ, and we decided that our bulletin had a definite object—namely, the training and education of our men in efficient practices, and that if we were to accomplish the desired end we would have to concentrate definitely on training and education, and would not have room for items of a comic, social, or athletic nature. Our first attempt was in January, 1926, and consisted of a ten-page mimeographed

letter size bulletin which contained a description of the flow of gas from the producing wells to the intake of our plants, outlining the proper operation, the proper equipment to use, and the proper way to take care of that equipment; also, in this first issue was an article on compressor room operation, dealing with the hazards to be expected, and indicating steps that should be immediately taken to prevent fire and accident. Questions were asked about these articles that would encourage a study of the subject matter presented, and announcement was made that in order to stimulate greater interests, these questions would be graded and a record kept of the grades, so that the interest taken by different men would be a matter of record. A blank sheet of paper addressed to the head of the department was also furnished, on which employees were encouraged to send in requests for information about any phase of the work with which they were not familiar. Succeeding issues of this bulletin dealt with various problems. At first, the articles given dealt with the most essential details of plant operation, and stressed always the fact that a gasoline plant was at best a concoction of the devil that must be handled with extreme caution if fire and accidents were to be prevented.

Actual instruction in proper design, proper ways of handling construction problems, and proper ways of operating, has throughout been the most important function of our bulletin, but, at the same time, the bulletin is an ideal medium for encouraging the men to more conscientious effort; is an ideal medium for creating a more active interest in the work they are doing; is ideal for transmitting definite instructions and orders for the conduct of the work. Commendation of good work can be stressed easily in such a publication and such commendation, if properly given, is an inspiration to those commended and to others who always have the good will of the management to strive for. Company, plant and department traditions may easily and conveniently be established by the proper wording in a publication that reaches every employee, and the old method of hit or miss endeavor is supplanted by one of specific instruction which reaches every man.

The Work Handled From the Manager's Office

At the outset, the work of writing, compiling, editing, printing, binding and distributing this bulletin was handled direct from the manager's office by several of the men most vitally interested in the matter of more efficient operation. The articles were written by foremen, clerks, laboratory men, roustabouts, and occasionally by outsiders, and the whole composition was directed and edited by the manager of the department. The actual work of printing was done initially on a ditto machine and later on a mimeograph which we stayed up nights to crank. Later, as our activities grew, we found someone who was willing to contract to do this work cheaply and in better shape than we were doing it, and we were thus relieved of the routine work of printing. As time went on, we found the time we had to devote to this important work was gradually growing less, and occasionally we had to resort to using re-prints from other publications which were suitable for use in our bulletin. We also found that if we were to get the best result we would have to detail a man who would specifically look after the selection of material and the editing of the bulletin. We selected a man in the department for this purpose, and without giving him any title whatsoever, sent him out to study the work of our various plants, and then to study the work produced by all the men of the department with a view to later recommending better practice, and to helping individuals in producing better work. This man might well be called a combination safety engineer, personnel manager, efficiency man, and editor, and he was selected because of his knowledge of the work of the department, his familiarity with the men employed in the department, and because he had a personality which gave assurance that he would be able to produce a result with everyone in the department without creating the slightest measure of dissatisfaction.

This description may seem somewhat detached from the specific matter of safety and fire prevention, but if you will bear in mind that, consistently, in every issue of our bulletin, we stressed the matter of efficient workmanship, safe practice, prevention of fires by a reduction of hazards due to better and more efficient workmanship, you will realize that these objects were always foremost in our minds, and that every man in the department had continually before him every encouragement to strive for fewer accidents and fewer fires. We were going further, in other words, than mere accident and fire prevention, and further by far than applying first aid to injured men, or by fighting fires that had attained disastrous proportions before they were extinguished. We believed that we could absolutely prevent fires and accidents, and that if we prevented them we would not require first aid nor fire fighting equipment, but we recognized that we would have to educate the men in first aid, and in the use of fire fighting equipment, and that we would have to supply the best of first aid and fire fighting equipment so as to be well prepared for any fires or accidents that might occur. They have occurred, but at astonishingly rare intervals, and in a very small way. We have not bothered much with statistics and we have only tackled the problem from an extremely practical angle, hitting where we felt we could do the most good. The fact that our accidents and fires have been far below normal, speaks for itself, and we feel that after 21 months of work along this line, we have accomplished a very good result, and have actually gone further than we would have if we had worked along conventional lines usually followed by safety engineers.

Prevention Ranks Higher Than Cure

We believe, in other words, in prevention more than in cure, and we have tried to prevent, but have always been in readiness to provide a remedy for any failure to prevent that might exist. Our fire fighting equipment is of the best and is standardized along practical lines, as is our first aid equipment, but we have found little use for either, and believe this is due to an intensive campaign that we have waged to educate every man in the best way to do his work with safety and fire prevention always in the foreground. I once heard a comment by a prominent safety engineer after a gasoline plant fire had resulted fatally for several men. The comment was that the first aid team had done very commendable work, and that it had established a record at this particular fire. The thought occurred to me that while the first aid team had made a record and had done commendable work, no amount of first aid would help a dead man, and that a better way to promote safety would have been to deliberately educate those men in the conduct of their work, and in the hazards they faced before they committed acts which resulted in their being burned to death. This, I believe, is true in every major gasoline plant fire; if the men had been previously carefully instructed, and if they had observed the details of their instructions, disastrous consequences would not have followed.

A picture of the make-up of the bulletins we have issued can only be had by a study of the bulletin itself, but the ground we have covered may be illustrated briefly by a summary and description of the articles that have been most important in the issues that have been sent out. To start with, we had a series of articles on compression and absorption plant operating, and had a very accurate description of the correct method of operating each plant. This description was usually written by a plant foreman and was shaped along standard lines that would give uniformity to all the descriptions. We then went into the matter of definitely classifying the combustibles and ignition sources. In one of our articles we very painstakingly classified all combustibles showing where those combustibles normally should be kept, and showing what precautions would be necessary in most of our plants to keep them confined where they belonged, and then we carefully classified all ignition sources and decided to eliminate a great number of these as not essential to plant

operation, and laid down definite instructions as to the confinement or the isolation of those that were necessary to plant operation. These classifications of both combustibles and ignition sources were very beneficial in fixing in the minds of the men exactly what hazards existed, and suggesting various remedies that would relieve them. The method of definitely taking steps to correct faulty practices was left for a period of about two months to the initiative of the men themselves, in order to stimulate thought on their part rather than to say definitely what should and should not be done. After we felt that these hazards had been fairly well covered, we went into the matter of first aid and we reprinted the best information that we had on the proper method of applying first aid for the more common injuries. In addition to our regular mimeograph bulletin, we distributed certain pamphlets that were available, giving definite instruction on first aid. We felt that this would quite possibly be better than holding first aid demonstrations that would possibly not serve the purpose, due to inability of most of the operators to attend these classes without interfering with their work.

A Code of Duties for the Various Employees

After the first aid, we concerned ourselves definitely with the duties of the different classes of employees and obtained from the men themselves an expression of opinion as to what their duties consisted of, and then co-ordinated these expressions of opinion so as to definitely formulate a code of duties for engineers, oilers, boiler firemen, absorption operators, mechanics, roustabouts, etc. Then, later, we took up matters pertaining to proper plant design, in order to stimulate thought on the part of the men in the plants, and requested them to submit criticisms of existing designs and to remedy, as far as they were able, faulty conditions. We derived considerable benefit, from a design standpoint, from the suggestions rendered by the employees.

In conjunction with the work we were doing in the matter of specific instruction, we endeavored by every means at our disposal, to encourage a study of the subject matter presented, and periodically tested the knowledge of the employees by asking direct questions in the form of examinations. These were carefully graded and certain benefits were given to the men whose grades indicated the most thorough study of our instructions. Also, we had, from time to time, articles on routine matters, such as the care of leather belting, the proper care of boiler tubes, the proper manner of operating gas engines, the importance of indicator diagrams in the utilization of horse-power, the relation of tests to operating efficiency, and such other matters that would encourage a more efficient result in the operation of our plants. These matters that were covered were carefully explained to be of prime importance to every man, and the fact was emphasized that the greatest benefit would be derived by those men who spent the most time in study and practice of these instructions because their knowledge of operating conditions and design would be enhanced by a study of our instructions, inasmuch as these instructions constituted perhaps the most complete single course in natural gas and gasoline practice available, and that they could not secure from any other known source information about the natural gas-gasoline industry that was as complete and reliable as the information we were furnishing.

One very important result was foreseen, and that was the matter of a definite increase in the morale of the entire organization. The men took a greater pride in the proper performance of their work and tried to outdo each other in doing their work carefully, safely and efficiently. There was evident from the start a more consistent effort to do good work than we had ever noticed before we made the start on this work.

This result has been maintained over a period of about two years, and we

still believe that we are securing exactly the benefits we expected to secure when we first started, and that we are really going farther than we ever hoped we would. The operations of our department are far more efficiently carried on. We believe we are getting better results in the matter of fire prevention and accident prevention, and we believe that the individual employee has been encouraged and stimulated to doing work of a higher character than would have been possible under any other condition.

Our methods and our results may be criticised by bona-fide safety engineers, and we may be neglecting a good many angles of the Safety situation that are important to them, but we firmly believe that we are pursuing the proper course, that we have definitely accomplished a decrease in our accidents and fires, and that we have obtained a more efficient condition within our department.

We believe, in short, that safety may be best promoted by attacking the fundamentals of *correct* and *efficient* operation because if any operation is performed correctly and efficiently, safety is a prerequisite. A thoroughly safe operation, on the other hand, may not be efficient.

Not a Handbook—But a Training Course

CHAIRMAN PRUSSING: Are there any natural gas gasoline men present who have any questions they would like to ask Mr. Eggleston?

C. L. CANFIELD (Sinclair Oil Co., Kansas City, Mo.): It seems to emphasize very clearly Mr. Swim's statement that the safety work must come from the management end, that it cannot start from the bottom.

R. E. DONOVAN (Standard Oil Co. of California, San Francisco, Calif.): I want to tell Mr. Eggleston that what he has classed as a hand book is not a hand book at all. It is a very fine training course. We have used something on the same line. A hand book is just a little book that you hand out to the men, and this is a course of instruction and we need it. It shows that Mr. Eggleston has gone into the matter thoroughly.

THOS. W. WADDINGTON (Standard Oil Co., Elizabeth, N. J.): It was my privilege and honor to be the first man employed by his father at the old Bayonne Works in New Jersey.

I think his paper was admirably rendered and his suggestions can be followed by others in the field. With certain limitations, something of that character would be a wonderful thing to follow out and use as an example. We know at Bayonne that certain lines of printed instructions have been used effectively.

MR. BONSB: I have had the pleasure of reading that paper, and I wish it were possible for all natural gas operators to have similar instructions.

I agree with Mr. Donovan that it is not a hand book. It is the finest set of instructions that I ever saw. The men are going to read that and study it. The natural gas operators are a pretty good type of men, but I do not believe it would work well with the average field man.

H. A. MATIER (Union Oil Co., Los Angeles, Calif.): I want to say a few words for the despised hand book. We have found new employees pathetically eager to learn something about the work and the company when they first come on the job, and that is the time to give them instructions and the time when they will learn the most, and if you have a printed copy of instructions to give them, they are going to read it when they are first hired.

This wonderful paper is not intended for new men, and my plea is for consolidation of thoughts that can be put into some kind of book or printed form for the new man, something that will make him feel that the company has his welfare at heart and will make him want to work for the company. That is what the new man needs. The time was that when a man first went on a job he was given tools and told to go to work and God help you. Mr. Burgess, the gen-

eral manager of the company I work for, sent me such a pamphlet. In it were instructions like "Don't couple your wagon that way, do it this way," and this was illustrated; and that was the kind of a hand book I was suggesting.

CHAIRMAN PRUSSING: The spellbinder is right. A new man coming on the job is pathetically eager to learn about the job, and all of us know it. There is no period during which he is so susceptible to suggestion as when he first comes on the job, and if printed or written instructions have any value they certainly are of value to the man when he comes on the job.

It has been our plan to give the men definite instructions during that period, and not to expect them to earn anything for the company for the first few days. One of the activities which I hope to see carried out in the future is the promotion of this idea.

I had in mind, when Mr. Blakeslee sent in his first set of pictures, that something in the way of a code could be made from each little item, and could be used as a poster for this section. In the past the oil industry has not received posters because they have not contributed anything on which posters could be made. Are there any further suggestions?

Several Questions Are Discussed

CHAIRMAN PRUSSING: Several questions have been handed to me. Here is the first one: Are trees close to storage tanks a fire hazard, and why?

S. L. NEWCOMB (Standard Oil Company, New Jersey, Elizabeth, N. J.): They are to a limited degree. Ordinarily your tree is higher than your tank. Moreover, attacks of lightning have influence over a given radius. On the other hand, if lightning strikes a tree that is close by a tank, the tank may be ignited. I know of one case where lightning struck a tree and four tanks standing 25 feet away were ignited simultaneously.

CHAIRMAN PRUSSING: It is not practical to leave trees standing in some of the fields. It is always an expense. We have incurred much expense where lightning has struck the tree and large tanks have become ignited.

MR. NEWCOMB: In the case I referred to, the four tanks were the old wooden tanks. We had the Johns-Mansville roofs put on.

CHAIRMAN PRUSSING: Here is the next question: "What results have been obtained with the question and suggestion box?"

H. L. EGGLESTON (Pan-American Petroleum Co., Los Angeles, Calif.): In connection with our question box we have a question sheet, and you can get the men to ask the questions and then give them instructions on those. The men will usually read the questions asked, but having them write the questions for the sheets is a little harder. Let them read the questions asked and then put in requests for the sheets.

RAY E. MILLER (Marland Refining Company, Ponca City, Okla.): This spring our central safety committee sent out questions which ultimately reached every man in the plant asking him to analyze the hazards of his work, and we got a mass of replies. There was a lot of chaff in it, but there was also some pretty good stuff. Then men brought up ideas that we had passed time and again and overlooked.

I do not like the straight question box idea. I have tried it from time to time, but I would say that it is far better to make the employees point out the hazards and ask questions.

C. L. HIGHTOWER (Texas Pacific Coal & Oil Co., Thurber, Texas): I might enlarge a little on our suggestion and question box idea. We pay two dollars for each accepted suggestion, and we encourage the making of suggestions, and encourage the men to turn in reports of the hazards, and that consists of anything that comes in as a hazard. Anything that comes in in the way of main-

tenance work we would not consider worthy of a reward. But for anything that is instructive, if we think the suggested plan is a good one, we give the reward. This, of course, requires constant following up, but you will find that many of the suggestions are good.

RALPH E. MOTLEY (Atlantic Refining Co., Philadelphia, Pa.): We have suggestion boxes at five main entrances, and from time to time we have received valuable suggestions. I feel that we will not have good results until we place the rewards for the suggestions on a monetary basis.

Last winter I tried a different method. We sent out pictures of accidents and asked the men to tell us what was wrong, and I got some of the best replies I ever read. They must have put a lot of thought on this. At different times I offered prizes for suggestions and ideas to put in a safety moving picture.

CHAIRMAN PRUSSING: Mr. Matier asked me just now about the cleaning of tanks. The technique of cleaning tanks was suggested as a subject for our safety committee to develop. That was developed by asking for suggestions from the superintendents that had anything to do with storage tanks. Out of what we received we evolved a simple code for cleaning tanks, and this was sent out to superintendents and foremen, and after several passages back and forth it was used and sent out by the manager of department to his own men with definite instructions.

MR. HUMPHREY: I might say that the process of getting suggestions was as follows:

We had what was called a "Coiner Idea Committee" and at each refinery this committee had suggestion boxes, and on these boxes were forms that could be filled out and deposited in the boxes. These were collected and considered by the committee, and if the local refinery agreed it was sent to the other refinery and then sent to the "Coiner Idea Committee" for its O. K.; and if the committee thought well of the suggestion, it gave a reward.

ADJOURNMENT

Friday, September 30, 1927

V. R. CURRIE, Chairman**Manager, Employment and Service, The Texas Company, Houston, Texas.**

The meeting was called to order at nine-thirty o'clock by Mr. V. R. Currie, past chairman.

MR. CURRIE: I regret to advise this morning that our chairman, Mr. Prussing, is somewhat under the weather and not able to be here, and the general vice-chairman, Dr. Anderson, has left for his home. I am therefore pinch-hitter for both of them.

The first paper on our program this morning will be given by Mr. T. N. Shaw, Midwest Refining Co., Casper, Wyoming.

How We Take Care of Injured Employees

T. N. Shaw, Assistant Director of Industrial Relations, The Midwest Refining Company, Midwest, Wyo.

The subject which has been assigned to me in its relation to Safety reminds me of that old story of the soap and perfume manufacturer's ad, "If you don't use our soap, for God's sake use our perfume." And so I say, "if you don't practice safety, for God's sake practice first aid." If you can't keep your men from getting injured, take the best possible care of them after they are injured.

Care of the injured employee logically begins with first aid, and so in dealing with my subject I am going to tell first how we are organized and equipped to handle First Aid.

Training—For a number of years we had most of our locations fairly well supplied with first aid materials, but it was not until the fall of 1922 that we started our first systematic training in first aid. The Bureau of Mines system of training was adopted as our standard and representatives of the Bureau came into our field to give the training. We have had them each year since and in each of our locations the training has been given. Last year at the close of the training period, we had nearly 100 per cent of our employees trained. First aid teams were formed in nearly all of our departments and a big contest conducted by the Bureau of Mines was held last fall.

Equipment—Our equipment consists of three types of containers. First we have a cabinet calculated to be fastened on the wall. It is about 8x16x22 inches inside measurement, is supposed to have a considerable quantity of each of the articles specified and is a supply base for the smaller kits of that particular location. It is usually located either in office or warehouse and furnishes dressings for injuries that are brought in. When located at "wild cat" wells or isolated places this cabinet is supplied with several remedies as well as first aid. We have 44 of this type in use.

A second type of container is a portable outfit and is carried on trucks accompanying large gangs. It is a box 5½x11x19 inches and is filled with an assortment of supplies suitable to the needs of a gang of a dozen or more men. We have 72 of this type in use.

One of these containers filled especially for severe burns or injuries is located in each of our 22 booster stations, which are fairly evenly divided throughout the field. These kits are sealed and marked "for use in severe cases only." At these booster stations we also have a stretcher and roll of blankets, so with each of our

field offices having equipment supplies are quickly available at most any place about the field.

A third type of container measures 3x6x9 inches and is equipped with a variety of articles for first aid but of necessity a small quantity of each. About 400 of this type are scattered throughout the organization. Each truck and car has one; they are supplied to rod and tubing crews, connection crews, drilling crews, etc. Before the small kits were put out we had an average of about 10 infection cases per month; now they seldom occur.

Maintenance—It is one problem to properly locate first aid equipment, but to keep the containers filled with supplies is another problem. Depending on the other fellow is not successful, and after trying several other methods we adopted our present Postal Card System. Each month a postal card is sent to each cabinet, the card has a return coupon addressed and stamped for return to the supply base. On this return coupon are listed the supplies needed. Since installing this system of checking, we have had no trouble from our kits being without supplies. A few of the smaller kits in the hands of the pushers in the Salt Creek field are checked and replenished by our safety inspector at the monthly safety meetings.

Medical Department—After first aid comes the medical department. Our present hospital in the Salt Creek field has accommodations for about 40 patients, but in emergency can care for twice that many. A nurses' home is operated adjacent to the hospital and will accommodate about a dozen nurses. The regular staff consists of two doctors and of course the number of nurses varies with the number of patients. Besides caring for the company's injured employees, this hospital serves the general needs of the community.

In each of two other locations of the company, we operate a hospital and employ full-time physicians jointly with one of the other companies; but in all other locations local physicians and hospitals are used.

When located where it is possible to use public hospitals and employ regular practicing physicians, I would strongly recommend it in preference to operating your own. The cost would be much the same, but even if a saving could be made it does not offset the grief attached to operating your own. It is harder to satisfy people with a doctor than with a religion; it is better to let them do their own selecting or at least give them a choice of several, and when you have your own hospital you can't do it. We can handle almost any type of injury in our hospital, but when specialists are needed we either call them in or send the patient to them. We would rather spend money to repair a man than to settle with him; however, when a permanent disability is incurred the case is turned over to our legal department to be settled according to the law in the state where the accident occurred.

Advantages of Picric Acid in First Aid

MR. CURRIE: This is a very important subject and I am quite sure we can have a lively discussion on it. Are there any questions you wish to ask Mr. Shaw?

R. E. DONOVAN (Standard Oil Co. of California, San Francisco, Calif.): Mr. Shaw, do you use picric acid for the big burn package you spoke of?

MR. SHAW: We use picric acid as first aid, for two reasons. In the first place, fire or heat that is hot enough to burn the flesh sterilizes the wound. Picric acid is also an antiseptic solution to help keep it sterile and it has an anesthetizing effect which is the most important part in our minds for using picric acid. It takes the fire out of the burn, it is cooling. I have used it myself, and it gives the feeling of rubbing a piece of ice over the burn; it is actually soothing.

What our doctors use in the hospitals varies. We have some who use picric acid, some who use tannic acid, and some who use mercurochrome, but of course we are not dictating to the doctors what they should use.

R. S. BONSBIB (Standard Oil Co. of New Jersey, New York City.): There are three points in connection with first-aid kits. One is that it is very important that you have those kits properly located, another that you use a seal on them. It is rather a peculiar thing that most people will very rarely break a seal, although it is a simple thing to do. Perhaps they have been taught that because the railroad companies have been teaching people the penalty for, and the inadvisability of, breaking a seal. If you put a seal on a kit, then, it won't be used until there is a legitimate use for it. If it is unsealed, the temptation to take material out of it to take home is very great.

The third point is to place first-aid kits where their use will be understood by the foreman or gang leader. It is a great mistake to do otherwise. Lots of times you will find a first aid kit in the field and people don't know how to use it. If you have iodine in there, they will put a dip on a wound and then bandage it. Another thing, they will break a bandage, throw it back into the kit. They will later take that dirty bandage and use it on another wound, causing an infection. A lot of things happen like that unless people are told about it.

T. N. SHAW (Midwest Refining Co., Casper, Wyo.): Mr. Bonsib brought out one point that I should like to take up, that of using a bandage and putting the balance back into the kit. For that reason, along with others, we discontinued using rolled bandages. We use nothing now but bandage compresses, and that is an individual bandage and does away with any possibility of using part and putting the rest back where it becomes unsterile.

First Aid Work of the Bureau of Mines

As you know, the Bureau of Mines has that as one of its hobbies. And while I am on my feet, I want to emphasize the importance of the work the Bureau has done in first aid. They have certainly given our company wonderful service, and their system can't be beaten. I don't believe there is another system like it that is any better. It is similar, of course, to the Red Cross and the Boy Scouts; they are all founded on about the same basis.

There is still another point I want to emphasize, that I forgot when reading my paper; that is, in making the statement that every car and truck is supplied with a first-aid kit, I hope you caught all that that means. It means that if one or two or three men are working where a first-aid kit is not handy or where, because of a more serious accident, more supplies are needed, all the men need to do is to go out onto the road and flag the first company car that goes by; wherever there is a company car, you get additional supplies, and in an oil field that is a very important thing because cars and trucks are coming all the time.

MR. CURRIE: Any further questions?

V. B. CURL (Maryland Oil Company, Berger, Texas): I should like to ask Mr. Shaw what method he employs, what one he has found the most effective, in training and instructing his men in first aid?

MR. SHAW: My answer to that is that the Bureau of Mines system of training is the best. The supplies in our kits are based on that training. It is a definite course, has been studied and improved upon time and time again over a period of years, and these improvement have been worked out by doctors of the profession, although the training has been given by what we call laymen—that is, men who have been trained by doctors have trained the employees.

The system was first developed for use in mines, but it is just as applicable in an oil field or a refinery as anywhere else, and their manual is available through the Bureau's office in Pittsburgh.

They found laymen were better trainers than doctors, because doctors get too technical, use too many Latin phrases and talk over their listeners' heads.

MR. CURRIE: I feel wholly incapable of introducing the next speaker in the manner in which I feel he should be introduced.

From time to time we have stressed the fact that accident prevention work should begin at the top and that without the cooperation, interest and support of the executives higher up, very little could be accomplished.

Our program committee is to be complimented and we are indeed fortunate in having at this session an executive who will present to us the safety idea from the executive's standpoint. It is my privilege, and a great pleasure, to introduce to you at this time, Dr. R. E. Humphreys, assistant general manager of Manufacturing, and member of the Board of Directors, Standard Oil Company of Indiana, Chicago, Illinois.

Safety From the Executive's Point of View

Dr. R. E. Humphreys, Assistant General Manager of Manufacturing, and Member of Board of Directors, Standard Oil Company, (Indiana) Chicago, Ill.

You will probably say about my talk this morning, what was said of Green's *History of England* when it first appeared. The critic who had attended a banquet the evening before said of the book that it contained much that was new and interesting, but the trouble with it was, the part that was new was not interesting and the part that was interesting was not new.

I merely hope to present a point of view that will afford a different lighting on a familiar picture, emphasizing different features in a way to give them a new interest.

But I trust, however, you will bear with me, because of the fact that I am actively concerned in a great industry and was at the head of a large oil refinery during the period of installation of safety methods there.

We live in an age of development. During my long career, I have seen the beginning and the development of many wonderful inventions, such as the telephone, the bicycle, the ukelele, the typewriter, chiropractic, the cafeteria, and many other such things. Life is growing more and more complicated and involved. Birth control is making birth difficult, and the machine gun is making death easy, and the saxophone is making it welcome. Alimony is taking the place of matrimony and prohibition is making us good, or at least it is causing us to die young.

I suppose you have all heard of the whisk broom cocktail they are now serving down in Louisville; with every cocktail they give you a whisk broom with which to brush yourself off when you get up.

We are just now having overnight service to Europe and I presume prohibition should be given the greater part of the credit for that. We have the automobile and now the neighbors have one, too. Thanks to the radio, a man can make a speech in New York and we can listen to him in Chicago; and thanks also to the radio, we can turn him off whenever we so desire. I know you will agree with me that that is a very pleasing thing to be able to do, and you will probably agree with me much more enthusiastically before I get through.

But seriously, my friends, I have just passed through the early part of one of the most interesting and important parts of all our development. The growth of safety programs in industrial life, the influence upon the happiness of the world is destined to be important and far reaching. The maiming and accidental killing of workmen in building and manufacturing operations has hitherto, as you know, been accepted as inevitable, but I do not think it will be so very much longer.

One of the earliest recorded instances of the kind of which I have any knowledge occurred during the building of the tower of Babel, and that is quite early, you will agree. The people of that enterprising city had a wonderful vision of a tower that

would rise up into the heavens and they set about the erection of this structure in order to hobnob with the gods in their own ethereal domain. But their purpose was thwarted by an industrial calamity, when they lost the power of understandable speech. No one could tell what a workman was talking about, and those of you who have handled crews of Slovaks and Turks will not doubt their descendants are with us yet.

However, an understanding of languages is not everything. I know a professor who speaks seven languages fluently, but his wife speaks only one, and yet I bet on the woman every time.

The maiming of workmen in the olden times was taken as a matter of course. It is not difficult to visualize the tremendous loss of life that occurred during the building of the great pyramid at Gizeh. The fellow who built that pyramid was some "geezer." Its base covers an area of 15 acres, and it looms 150 feet higher than the dome of the great Cathedral of St. Paul, which ought to impress every man—except, perhaps, some fellow from Minneapolis. Its engineering was so nearly faultless that its four great sides have a mean area of only six-tenths of an inch in length and twelve seconds in angle from a perfect square. A modern tailor can't cut out a vest nowadays and come as close.

Human Sacrifices Are Still Offered Up

What was it for? Only that the royal remains could be preserved until exhibited in a British museum or an American circus. I think every man should have a higher ambition than merely to be a success as a mummy.

But my admiration for the engineering is obscured by the realization that those ancient monarchs sacrificed thousands of their subjects merely that their carcasses might be preserved for all time from the ravages of decay.

We haven't been as careful of our workmen as we should have been. Human sacrifices in the building of bridges, the building of skyscrapers have all added a toll of death to the record of industrial progress. And why? Probably because engineers and manufacturers deemed these things inevitable and part of the press of civilization. But this idea could not persist forever. Aside from humanitarian considerations, the compensation statutes would sooner or later have made it too expensive, and I am of the opinion that if the idea of employees' safety had been effectively brought to their attention before, the manufacturers would have accepted it for their own sake. I am sure that was the case with my own company.

However, the idea and the necessity of employees' safety did not make much of a dent in the consciousness of the Standard Oil Company of Indiana until the year 1911, although accident prevention programs had been carried on as early as 1909. Even then the idea was accepted only with many reservations.

My company prides itself on being in the forefront in every movement that affects its business and yet it never rushes forward heedlessly and headlong. The safety campaign seemed an interesting experiment that might be worth trying once, and so in 1911 we put on a preliminary program at our largest plant, the Whiting, Indiana, plant.

In order that safety might have a fair chance of success, it seemed only right that we give it a department of its own and put it in the hands of a man who knew something about it. Industrial corporations are not like municipal corporations. They would not put a horse doctor in a hospital—and yet I am told that right here in Chicago at one time politicians tried to put a horse doctor at the head of the psychopathic hospital.

A new baby should not be trusted to the care of the cook and the chambermaid, the gardener and the chauffeur; it is a job for the mother, and no one else will do. Also, in the same way, safety should have proper leadership; it can't be left to the care of the foreman, no matter how capable he may be.

old type grease pits which were narrow and caused the operator to work in a cramped position. They were so short that a large car completely covered them, allotting no space for a hurried exit, and in some cases none at all, in case of emergency. To some it may appear that the hazard in the average small grease pit is of no consequence. True, it is seldom that anything serious has come from them, but the possibilities are great, for a large number of operators do not spend enough time and work on them to keep them clean. The pit having its floors and walls covered with oil, grease and crank case drainings is a very good setting for a serious accident if it is not so constructed as to allow the operator easy and rapid egress.

The Hazard of the Filling Station Pit

Just a short time ago one of our men was working in one of these short pits but, due to previous instructions, he had taken the precaution of moving the car forward far enough to allow for an emergency exit. While in the act of draining the crank case the wind blew a quantity of the drainings over the shoulder and side of his uniform, and when he had finished the job he requested the customer to wait until he could get out of the pit before starting the motor; but the customer failed to hear or heed the request. When the motor started, it backfired, and the flash, due to the gasoline dilution in the crank case drainings, ignited the man's clothing. He had presence of mind enough to lie down in the corner of the pit and smother out the flames, rather than to run out into the air where no doubt he would have been burned seriously. Now had the circumstances been just right—if the floor and walls of the pit had been covered with oil, grease and crankcase drainings, and the car had covered the pit entirely, this man might have been burned to death.

At the present time, when it is felt that a pit is the proper thing to install at a particular station, it is constructed wide enough to allow the free and unhampered movement of the operator, long enough for him to get out easily up stairways at either end, and all cars are drained directly into an underground tank through an adjustable pipeline. We are also trying out a number of the automobile lifts with a view to determining their merits as compared to those of grease pits.

Another important step was taken when an operating and fire prevention manual, containing a set of rules covering the operation of all equipment and the handling of petroleum products in a manner to conform with all state and national laws, was sent to all agencies.

No doubt these things are largely responsible for the scarcity of fires and explosions, and the reducing of the mechanical hazard to a minimum; but they have had only a small bearing on the more important safety angle—the human element. Therefore, the greater part of our work and this discussion, lies along the lines of safety education and sales; that is, the selling of safety to the men.

Periodical inspections of all stations and warehouses are made by the safety department, at which times the men are encouraged to discuss not only their safety problems, but their regular operating, sales, and service problems as well. It is felt that a great deal of importance should be attached to this policy, because it not only has a tendency to act as a sort of safety valve for their mental condition, enabling them to think along straighter lines, but gives us an opportunity to study their methods of thinking and working; and this, coupled with the general condition of the stations, gives us a very good foundation upon which to base our work with them. During the discussion after the inspection is made, the weak points discovered in either the equipment or methods of operation are pointed out to them with full explanations as to why they are

considered weak. The average man employed in our stations is capable of following instructions and rules better if he thoroughly understands the reasons for them. An inspection report is made to the general office with a copy to the manager of the division in which the inspection was made, outlining to them the things that were found and the suggestions offered to the man at that point, so that the divisional staff can follow up the recommendations and see that necessary changes are made and the suggestions put into effect.

Also periodical letters are written to the divisional staffs giving them a list of unsafe practices observed while making inspections, together with a list of the causes of all no-lost-time accidents; the lost time accidents are given in the formal monthly report, a copy of which goes to each divisional manager. This means is used in lieu of the regular foreman's meeting, as it is practically impossible to hold such meetings with the traveling personnel of the divisions; and it is felt that these letters will enable them to better organize the men and to make frequent inspections without the aid of the safety department. In addition to the periodical inspections by the safety department, which, due to the large territory covered, cannot be made as often as might be desired, the means of typewritten circulars and bulletins is employed in carrying on the campaign to the stations. This is for the purpose of getting to the men any information which might be of value in familiarizing them with thoughts or facts which will aid them in organizing safety at their agency. This method is also used for the following up and enforcing of the rules as outlined in the operating and fire prevention manual previously mentioned.

Influence of the Plant House Organ

Through the advertising department, the marketing department publishes a house organ, *The Marland Service Man*, which is a semi-monthly publication and was originated for the purpose of keeping the members of the various divisions posted on the operations, both business and social, of the other divisions, and to promote company spirit, sales and service. Due to the efficient manner in which this magazine has been published, it has become very popular with the entire personnel of the department. On account of its popularity practically every man in the organization reads it from cover to cover. This fact has caused a great deal of weight to be placed upon its effectiveness as a messenger of safety. In each issue at least one page, and more if necessary, is devoted entirely to safety. Ordinarily the safety page carries one or two short practical articles inspired either by accidents which have occurred in the past, or unsafe practices which have not yet resulted in injury. Then, too, a small amount of inspirational material is used along with a few safety slogans, and once each month a report of the divisional accident records is included in such a manner as to inspire friendly rivalry between the divisions. Each division is shown with the number of accidents occurring by month as well as the accumulation, with personal injuries and truck accidents separated.

In connection with marketing department safety, as is true in any other branch of the industry, I believe that the investigation of all accidents is important for the purpose of bringing out the true causes. However, we are handicapped with our investigations because it is impractical for the safety engineer to travel the required long distance to investigate them. The plan of following them up by letter was first attempted, but the results were not at all satisfactory. Later, it was decided to try the plan of having the men who are in closer contact with the stations do the investigating, and the traveling supervisor who works under the direction of the superintendent's office was given the responsibility of investigating all personal injuries with a view to determining the exact

cause and responsibility. The traveling truck inspectors, due to the fact that they are held, in a large way, responsible for the maintenance costs on the trucks and cars in their territory, were given the responsibility of investigating all truck and automobile accidents. As soon as an investigation is made a report is given to the division office with a copy to the safety department. So far, this plan has not been in effect long enough for us to judge it fairly; however, it is felt that it will be much more effective than the old method in that it will not only give us the correct cause, but will also impress the men with the importance of being careful and will help to jar them loose from the old idea that accidents are to be considered a regular part of everyday life.

We have not yet adopted a policy of discharging a man for his accident record, unless it is an extreme case, preferring rather to impress upon him the importance of safety and to try to make a better man of him. We believe that if a man gets off on the wrong foot it is better to spend some time and energy in trying to get him straightened out rather than to replace him with a new and inexperienced man. This policy has no doubt had a large part in the building of the spirit which exists in the department, and it is not desired to depart from it except in extreme cases where there is no alternative.

Regular Meetings Were Organized

Over the past few years a large percentage of the total number of accidents in the department occurred at the points where there was a number of men working and a fleet of trucks operating. When safety was introduced to the marketing department, one of the first thoughts was directed toward the elimination of accidents at these points. With that thought in mind, regular monthly meetings were organized in conjunction with local sales meetings. Our program covering safety as introduced in these meetings was outlined on a schedule plan.

The safety talks given are divided into two sections. The first section outlines the various departments of the company, and at the same time endeavors to familiarize the men with the company's policies and the attitude of the officials toward the employees through the industrial relations department and through other benefits given for the purpose of improving conditions generally. The second section is devoted entirely to safety discussions and the application of safety. In connection with safety discussions the showing of safety moving pictures has been adopted, which, no doubt, will be very effective and is to be improved upon in the future. I say improved upon for the reason that at present we are unable to show in the meetings anything other than general safety pictures. However, in the future, with the aid of a moving picture camera recently purchased, we expect to take the causes of past accidents and the unsafe practices as discovered through inspections, and work them out in pictures, possibly showing the right and the wrong ways of doing the various phases of work as applied to service stations, distributing stations, warehouses and trucks. This plan is an improvement in that the pictures will be the means of working out the details previously mentioned and will deal directly with the problems our men have to overcome. Also the fact that they are pictures in which our own men, our own stations and equipment, are the principals will tend to work up a greater interest in safety and in the company as a whole.

In these meetings all accidents which have occurred over the past month are brought up and discussed freely from all possible angles, the men themselves being encouraged to do the greater part of the talking. At some of the larger points, we are following the practice of having at each meeting some man in the local organization deliver a five or ten minute talk on some particular phase

of the work, in which it is suggested that the driver at angles, including safety, pertaining to that particular phase.

Out of seven of these ~~larger trucks~~ ~~which~~ ~~the~~ ~~last~~ ~~material~~ ~~to~~ ~~base~~ ~~com-~~
parative figures over the ~~last~~ ~~six~~ ~~months~~ ~~of~~ ~~1926~~ ~~as~~ ~~against~~ ~~the~~ ~~first~~ ~~six~~ ~~months~~
of the present year. ~~four~~ ~~showed~~ ~~a~~ ~~decrease~~ ~~in~~ ~~accidents~~ ~~and~~ ~~one~~ ~~of~~ ~~them~~ ~~being~~
perfect records for 1927. The ~~frequency~~ ~~rate~~ ~~of~~ ~~one~~ ~~of~~ ~~them~~ ~~increased~~ ~~and~~ ~~the~~
remaining one was the same for both years. The ~~total~~ ~~for~~ ~~the~~ ~~seven~~ ~~stations~~
shows in 1926 a frequency rate of ~~2.14~~ ~~and~~ ~~in~~ ~~1927~~ ~~of~~ ~~an~~ ~~improvement~~ ~~of~~
32 per cent.

The promotion of safety with ~~truck~~ ~~operation~~ ~~is~~ ~~different~~ ~~and~~ ~~more~~ ~~complic-~~
ated than it is among service station ~~attendants~~ ~~and~~ ~~warehouse~~ ~~men~~, in that in
most cases of truck accidents there are ~~different~~ ~~questions~~ ~~to~~ ~~be~~ ~~asked~~ ~~and~~ ~~an-~~
swered due to the fact that ~~instead~~ ~~of~~ ~~one~~ ~~thing~~ ~~there~~ ~~are~~ ~~two~~ ~~to~~ ~~be~~ ~~considered~~,
different local traffic rules and regulations, and a much more complicated piece
of equipment. The majority of truck accidents are of minor importance, but
still it is just as important that these minor accidents be eliminated because
usually the causes are practically the same as those of the more serious ones;
and if we eliminate permanently the cause of the slight accident we have done
a great deal toward the elimination of the other. About the same general plan
which is used in our safety program for the service station salesmen and ware-
house men is used in getting it over to the truck salesmen; that is, through the
above mentioned Marland Service Man, the traveling supervisors, truck inspec-
tors, and through circular letters and bulletins.

Effective Slogans Located on the Dash

Each division has one or more regular truck inspectors who inspect every
part of the truck as nearly once a month as possible, to insure the best condi-
tion of the equipment. As a result the accidents due to mechanical failure have
been practically eliminated.

In addition to this we have equipped each truck with two metal plates located
on the dash. One of these is for a driving slogan which is changed once each
month, and the other is a permanent plate cautioning all drivers against the
hauling of passengers other than company employees in the line of duty.

It may be that in the future we can establish some system wherein all drivers
with perfect yearly accident records will be rewarded, but at the present time
nothing along this line has been inaugurated.

There is one other thought on which we are working now and hope in the
near future to get action upon, and that is the distributing to every driver in the
department of a small card or pamphlet in the form of "instructions to drivers."
It will contain a list of suggestions which will not only tend toward the elimina-
tion of accidents but will help to promote courtesy on the road and the proper
care of rolling equipment, these suggestions to be worked out from, and based
upon past causes of accidents, unsafe practices, general courtesy which not only
prevents accidents but builds good will, and past experiences with maintenance
costs.

At the beginning of the year 1924, it was desired to work out some plan
whereby the highest type men among the agents and field men would be given
some special distinction and at the same time would act as an incentive for
others to build up and develop themselves. It was finally decided that each
year a number of men selected by a secret committee would be presented with
a small gold button bearing the Marland triangle trade mark and the words
"Honor Man." This badge was termed "The Merit Badge," and the men who
have so far received it consider it an invaluable possession. These men are
judged upon the following qualifications: loyalty, honesty, cheerfulness, sin-

and it would be foolish for a safety engineer to try to work out all of the details unless he had previously been through the mill in a similar manner.

There is one branch of the marketing department which has not previously been mentioned and that is the construction gangs. At the present time it appears to be the hardest branch in which to do any real safety work, and this is due to the fact that the personnel is continually changing. A job is completed in one location and the foreman moves on to the next job, which may be in an adjoining town or even in another state, and it is impossible for him to take with him the men he had employed on the former job. Therefore, it means that he is continually working with new men while the older men are no longer connected with the department. Due to this condition, our safety work has been handicapped, in that it is confined to the foremen who can do little more than direct the construction work in such a manner as to make it as safe as possible, and to talk safety to his men in a more or less general way, for it is impossible, due to their short time with us, to educate the men in all of the details pertaining to their work.

Inasmuch as organized safety in the marketing department might be classed as in the pioneering stage, it is not only new to the men on the firing line, but is also new to those in command; and as a result a large number of our methods are undergoing development through the experimental field. No doubt, there are a number of other ways and means in which marketing department safety can be successfully carried out, and as we progress in our work we hope and expect to develop some of them. Since our work has been largely along experimental lines the results have possibly not been as great as they would have been had the work been done altogether along established lines. However, the improvement for the first six months of the present year over the first six months of last year, has been very encouraging. The frequency rate on personal injuries for the first six months of 1926 was 48.20, while for the first six months of the present year it was 18.78, showing an improvement of 61 per cent. The severity rate for the first six months of 1926 was .29, as against .21 for 1927, showing an improvement of 27 per cent. The frequency rate of the truck accidents as based on the number of accidents per million miles traveled for the first six months of 1926 was 39.75, as against 24.78 for the first six months of 1927, showing an improvement of 38 per cent.

If such improvements can be shown through inspections and the talking of safety in general, it appears reasonable to believe that the teaching of safety in detail, which is planned for the coming year, will bring forth an additional substantial decrease in the frequency and severity rates for the year of 1928.

Staging the Accident for Motion Pictures

MR. CURRIE: The subject is now open for discussion. Any questions you wish to ask Mr. Hearne?

R. S. BONSB (Standard Oil Company of New Jersey, New York City): Mr. Mr. Hearne mentioned the taking of motion pictures as a part of their program. I am just wondering how you are going to stage these causes of accidents, or safety procedures.

MR. HEARNE: Our plan at the present time is to take the unsafe practices we have discovered and the causes of past accidents and reenact them, using our own men and equipment.

MR. BONSB: Isn't that rather an expensive way of getting it across? Wouldn't it be just as effective, and more flexible, to have slides?

MR. HEARNE: Possibly they might be, but movies make a bigger impression on a man's mind than slides.

MR. BONSB: I question the efficiency of motion pictures because of the technique required. You take the average person being photographed, he knows it, he is so self-conscious that usually it is very glaring on the screen, and so many mistakes are made that often the pictures appear very funny to the people who see them. It kills the effect. But you can take a snapshot quickly, and anyway most people aren't shy of those.

In our company we use slides effectively. They are very flexible. We make a series and change the order of the slides to fit any situation we meet that is interesting when we go through the plant; in that way we can show up any particular condition we may run across.

The average motion picture is expensive to make, and a safety man has to realize that there is a certain limit beyond which we aren't justified in going.

RAY E. MILLER (Marland Companies, Ponca City, Okla.): I can't agree with Mr. Bonsib, chiefly because he believes one thing and I believe another.

We can make up motion pictures at a very slight cost. I happen to have had a little camera work, and have made a few pictures in the past, although I don't think I could get a job at Hollywood. I have been able to make a few pictures that serve our purpose, however, and I don't believe the men are camera shy to an extent to bother anybody. We have tried to use the regular man on the job and I feel safe in saying that the average man on the job is really highly superior to the paid actors whose unfamiliarity with the work and the job and the materials causes him to act unnaturally.

It is simply a matter of training the workmen to forget the camera is there and to do the work as they ordinarily would.

We get those pictures made without a great deal of expense. The only cost is the developing of the film, because pictures can be taken on regular inspection trips.

We feel the men are interested in seeing the pictures move, seeing the men in action rather than standing still, and we are very much interested in the motion picture idea.

Some Experience in Making Motion Pictures

H. L. EGGLESTON (Pan American Petroleum Co., Los Angeles, Calif.): We have monkeyed with motion picture quite a good deal; although the expense is high, they are of definite value in fire prevention. For accident prevention, we don't believe it wise to reenact accidents because then we are working from the wrong angle, we are impressing the man how to cause accidents rather than how to prevent them.

We find that a motion picture without suitable titles is valueless; some titles should be used with it.

The field we try to cover is the fire prevention field. For our pictures, we build a fire and show the correct procedure of putting that fire out, something similar to Mr. Donovan's pictures. We just try to indicate the correct procedure and never go to any spectacular lengths, our sole purpose being to show the men the proper method of extinguishing a fire. From that standpoint, I think the motion picture is of value.

R. E. DONOVAN (Standard Oil Company of California, San Francisco, Calif.): I don't want to take up too much time, but there is one more use of the motion picture camera that probably hasn't been brought out. I carry a portable motion picture camera with me on the field trips I make. It isn't very expensive.

The chief value of the motion picture is in helping in the standardization of safeguards, especially in the producing department where the equipment is changing all the time which means changing the types of safeguards. You will have one division superintendent who believes such and such a guard is the correct one to

use, and the other believes the other one is, and before you get through you have an awful conglomeration. When you transfer one equipment to another, this money spent on the first is wasted, for the superintendent will throw the old equipment out because it doesn't fit. Things aren't standardized as they should be, and we finally decided upon a safeguard or a certain type of safety device, and take photographs of the ones we use—that is, moving pictures—and show them in other divisions, for in order to put this over you have to sell the men who are going to put them in.

It is true we have a system in the company now whereby there is nothing but a standard type of safeguard used. The type is ordered by the committee.

If you show the men the utility of the device through the medium of motion pictures, they are more likely to be willing to adopt it.

The cost of the pictures is about eleven cents a foot for raw materials, including printing and developing, but if you have your own laboratory, you reduce that down to nine cents per foot; and the two cents you save will take care of all the editing and title making. A hundred feet of film will put over an idea.

We believe we will get success out of it. We put personnel matters in the films, photographing some man who has been with us for 25 or 30 years, for instance; someone who has an exceptionally good accident record. Those things are interesting to the men and are one way of creating interest in your safety meeting and help you along much faster than if you just went in and talked to the fellows.

The Small Picture Film Need Not Be Costly

H. A. MATTER (Union Oil Company, Los Angeles, Calif.): I think we might divide the motion picture into two headings, for there are two separate features suitable to two definite things.

One is the picture for public display. Mr. Donovan and I were connected with the making of a feature picture. Roughly speaking, it was about 2,400 feet in length—a four-reel film with the best actors we could get. The result wasn't as good as the acting we got from the men pulled directly from the shop, for the shop men were entirely unconcerned, while the men from Hollywood seemed very much embarrassed. And that big film was made by one of the best camera men in the world, and its cost was borne by a good many of the film companies.

But the small one you make is not costly; you could take a small film and bring out the safety practices around service stations, for instance. You can show it in the schools.

T. N. SHAW (Midwest Refining Co., Casper, Wyo.): You know we could argue on motion picture films from now until doomsday. Just refer to the picture industry itself. A company may spend a million to bring out a picture that may be a knockout or a financial failure, and so it is the same with the films. We might make one that goes over big, and then we might make another that would be a flop. It all depends on how it is made and how it is received. I believe it is entirely possible to make motion picture films that will do good, as well as those that will not, but so far as the picture film being superior to the slide, I want to say this: The slide is an old institution and most of us get sick of seeing it; it has no appeal to the average workman, whereas there is a little novelty in the motion picture. I know that in our field if we go out and take pictures of some of our fellows we are asked on every hand, "When are we going to see it?"

I took some of the children in a picture at some of the schoolhouses. They stuck their heads out from the windows and wanted to know if that picture would be shown down at the theater. It is just the novelty of seeing yourself and the other fellow moving.

R. S. BONSB (Standard Oil Company of New Jersey, New York): I probably make more illustrated talks than anybody else, for I make an average of 250 illus-

trated talks a year, and so I know that you certainly can hold a crowd with slides if the slides are handled correctly. I grant you the film is a great entertainer, but for real instruction, for really getting over your point, use the slide. You can concentrate on the point you want to make; there is no flickering, no breaking of films, nothing else to take the mind off of the subject at hand.

H. D. KETTEL (Standard Oil Company, Baltimore, Md.): I gathered from Mr. Hearne's paper that they have developed a manual for fire protection at their stations. I should like to know what protection is considered sufficient for the average service station, what type of equipment and what number of pieces of equipment are used at the service station?

MR. HEARNE: The fire protection equipment that we use at the average station consists of one Pyrene, carbon tetrachlorid and one Foamite, two and one-half gallon size. Of course it all depends upon the size of the station, the number of rooms and the ground plan of the station whether you have more, but that holds true in the service station and the average bulk station.

In our larger bulk stations we have two and one-half gallons of Foamite for every thousand feet, as well as Pyrene.

MR. CURRIE: I want to extend to all those who took part in our program, and to those who participated in the discussions, our hearty appreciation, before we adjourn to meet again at the Seventeenth Annual Safety Congress.

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Power Press Section

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Tuesday, September 27, 1927

THEO. O. MEISNER, Chairman
 Manager, Central District, Safety Division, American Can Company,
 Maywood, Ill.

The first session of the Power Press Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, Theo. O. Meisner, manager Central District, Safety Division, American Can Company, Maywood, Illinois.

CHAIRMAN MEISNER: Gentlemen, it gives me great pleasure to open the first session of our newly formed Power Press Section. There will be very little discussion at this morning's meeting. On each seat you will find a program announcing the slides that will be shown, the firm from which they came and a brief synopsis. The slides are numbered, and when a slide is shown that you are interested in, check that slide and call for it in the discussion Thursday morning in this room. Tomorrow will be devoted entirely to Drop Forge work.

The Nominating Committee to select new officers for the ensuing year are: C. H. Gerding, Western Electric Company, Chicago, chairman; Mark A. Kroger, Safety Engineer, Chevrolet Forge, Detroit, Michigan and A. L. Kaems, Safety Engineer, Simmons Company, Kenosha, Wisconsin. They will report tomorrow.

There are a number of mighty good reasons for our forming this Power Press Section, and our good friend George Thompson is going to tell us that story. George doesn't need any introduction to this bunch.

The Purpose of the Power Press Section

**G. S. Thompson, Manager, Casualty Department, Detroit Insurance Agency,
 Detroit, Mich.**

Many new ventures go wrong because they deviate from the path of their original intention. Success can only be obtained when we definitely determine what goal we are headed for and bend all of our efforts in that direction. We are opening our first sessions. We are the Baby Section and I am inclined to say: some baby!

Now, boys, what is our purpose? First, what are we and what have we? What is our product and what is our equipment? Well, let us answer these in turn.

First, what are we? (I have not said who are we, as who we are matters little, but what we are matters much.) We are human beings engaged in preventing others from suffering and injury in the regular daily duties they are called upon to perform.

Second, what have we? We have years of experience in actual performance of tried and proven processes and constructions.

Third, what is our product? Now, if I should attempt to state all of our products

represented here today, it would consume entirely too much time. I will say this, that if our product was taken from our markets, we would cause the human race to go back at least half a century. In fact, the automobile would not be in existence or in common use as it is today. Electricity would be a laboratory product instead of a daily necessity. You know, we would still be boiling and cooking on a coal stove instead of preparing breakfast on the table. Again, who would go back to the old cast iron bedstead, when we see the beautiful creations of sheet metal, another of our products, and the kitchen utensils instead of cumbersome heavy articles. We have wonderful creations of sheet metal, aluminum, copper, and the like, so you see our product is absolutely essential to the comfort and luxury of our well-being.

Fourth, what is our equipment? We deal with the power press, foot press, punch press, hammers, steam, board, belt, rope, etc., shears and commonly called metal tools, and these are fitted with metal jaws, dies or cutters. Our experience has taught us that these jaws injure people, and very seriously so sometimes. Now, is it not evident to you that our purpose can be only one, and that is to pool our experience and present suggestions to conserve our manpower from injury and maintain our position in industry?

Every Member Can Accomplish Good Work

Fifth, how are we to accomplish this purpose? This is a problem that remains entirely in your hands. Your officers have labored all this year in organizing and assisting in local meetings, and they have produced wonderful results and are to be complimented on their untiring efforts. Now, it is your turn, and here is the place. No questions asked here by anyone should be allowed to go unanswered, and the answer should leave nothing to be surmised. I believe we take too much for granted and are inclined to "yes" one another when we really should "no" one another more. That goes both ways K-N-O-W and N-O.

We must expect to give as well as receive, and keep in mind the fact that all present are not tool designers. Our answers must be in primary language so that the layman can understand; and yet let us be thorough and build a mountain of safe practices that will be a monument of credit. Confucius said, "If I were building a mountain, I would not consider it completed until the last basket of earth had been dumped and graded." This should be our guide, not to just touch on our subjects, but to complete our line of thought. Then again, all accidents are not caused by dies. The machine construction is a matter of issue; and still another, don't forget the foreman and the workers. This is the biggest problem of all. Oh! if we could only find a way to keep the state of mind in perfect accord with our intentions we would indeed be happy men.

In conclusion let our purpose be to make our class of machinery better, our tools safer, and to present plans to conserve our workers from injury from all causes. Let this section be the clearing house for the desired information, not in these sessions alone but all year round. When you are face to face with a problem don't stand alone, but call on the members of the section and let us create a family circle that will extend from coast to coast, and from north to south, just a big happy family ready to do a good turn at any time and solve the problem, for you know—

There is a fellow in your shop
Who complains and carps and whines,
Till you'd almost do a favor
To his heirs and his assigns;
But I'll tip you to a secret
(And this chap's involved),
He's no foeman to be fought with—
He's a problem to be solved.

There is a man in your department
 Whose cussedness is such,
 He has no pride nor manners,
 No, nor gumption overmuch.
 'Twould be great to up and tell him
 Where to go, but be resolved,
 He's no foeman to be fought with—
 He's just a problem to be solved.

This old earth's (I'm sometimes thinking)
 One menagerie of freaks;
 Folks invested with abnormal
 Lungs or brains or gall or beaks.
 But we're not just shrieking monkeys
 In a big vast cage revolved;
 We're not foeman to be fought with—
 We are problems to be solved.

SO, BOYS, LET'S GO!

CHAIRMAN MEISNER: Mr. Thompson has brought out two very important things in his talk. Let this Section be the clearing house for the desired information, not in these sessions alone, but all the year round. We have an Advisory Committee functioning the entire year; we advertised in all the magazines and papers that we could find, but people seem to be backward in sending in their problems. You will find a lot of men around here with yellow badges on, who are supposed to know something about punch process, there is an exhibit in the next room with a lot of models and new ideas in the practice, etc. Some of these men will be around here practically all the week, and will give you the desired information.

Many Interesting Slides Were Shown

We were a little disappointed in getting up our program this year, due to the fact that it was so hard to get in material. It is a very hard thing for a few men to take pictures in their own plants and bring them down here and show them to you. The slides we have, some of you have already seen; they are the collection we have been adding to year after year as we put them on this type of program. We have 84 of them here. I feel safe in saying that if they are properly discussed and explained at the meeting Thursday, we will all get something from them.

(The slides were then exhibited on screen.)

(A recess was then taken for a few minutes.)

CHAIRMAN MEISNER: Boys, let's take our seats and get started; we have some more on the program this morning. Before we start with that, however, Thursday morning we are going to have a discussion of the 84 slides just shown you on the screen: so, get one of these programs, and I would like to have all of you come here Thursday morning prepared to discuss Power Press problems.

Now, some of you probably know, and I wish all of you knew, that we have a Power Press code, sponsored by the National Safety Council, which has been revised and recently printed by the United States Department of Labor. Mr. Keefer, who is secretary of that Committee, and chief engineer, Industrial Division of the National Safety Council, has been good enough to come here and is going to give us a brief resume of that code. We will have a discussion after that, as no doubt some of you will want to ask Mr. Keefer some questions.

A Brief Resume of the National Safety Code for Power Presses

**W. Dean Keefer, Chief Engineer and Director, Industrial Division,
National Safety Council, Chicago, Ill.**

First of all, let me urge every company in whose plant one or more power presses are operated to secure at least one copy of the Power Press Safety Code. Copies can be secured from either the National Safety Council or from the Superintendent of Documents, Government Printing Office, Washington, D. C., at a cost of 20 cents each.

During the past three or four years I have had occasion to talk to various individuals about the Power Press Safety Code, and these men, if not already familiar with it, invariably wanted to know the answers to such questions as:

What is the Power Press Safety Code?

Why was it written?

Who wrote it?

How can it be used?

So perhaps I could not use the short time allotted to me on your program to better advantage than by trying to answer these questions in the order in which they have been presented.

What Is the Power Press Safety Code?

This code is a set of minimum standards providing for the safety of the persons who operate power presses. The most striking, and perhaps the most valuable feature of the code is the chart which appears on page 6 of the printed book. This chart classifies the various methods of feeding presses and specifies in preferential order the methods that can and should be used to safeguard each classification. Each classification is defined, and each safeguarding method is so described and illustrated that anyone—an engineer, foreman, or even the average workman—can understand just what is possible and what is required.

Why Was It Written?

This code was written for two reasons: To promote uniformity and to save lives and limbs.

Uniformity. For the past ten years or more various insurance companies and state labor departments have been very active in developing standards, orders and laws to prevent accidents. Naturally, some of these standards, orders and laws have been very good; others not so good, and a few absolutely worthless. Unfortunately, until the organization of the American Engineering Standards Committee, there has been no group or body to sift the good from the bad and there has been a great deal of confusion. The insurance companies may require one thing; the New York State Board something else; the Wisconsin Board may have still another requirement, etc. The result has been that the average employer, even though willing to do everything in his power to prevent accidents, has become confused by the conflicting requirements and has often thrown up his hands and done nothing.

This condition is being improved slowly but surely through the work that is being done by the American Engineering Standards Committee. This organization, comprising representatives of six different groups or special interests—insurance companies, state and governmental boards, employers, workers, machine and equipment manufacturers, and engineering societies—is now looked

The code, of course, can never take the place of this section. Here you have the opportunity of bringing sketches or models of your most difficult jobs and of getting the personal assistance of the best experts in the country who are only too glad to help you in safeguarding such jobs.

On the other hand, the section can never take the place of the code in securing uniformity in state and insurance company requirements, or in selling the safety idea to the hundreds of plants which are never represented at Safety Congresses or conferences like the one which we are privileged to attend this week.

CHAIRMAN MEISNER: Mr. Keefer has just told us that eventually each State Labor Department will endeavor to adopt a code for their particular state. There is already one in Ohio; that is, a committee has been tentatively appointed to compile such a code, but owing to their particular laws they can not adopt this code as it is, and will modify it somewhat. No doubt other states will follow.

Another thing Mr. Keefer mentioned that should not be forgotten is that all die setters, supervisors, etc., should operate with a copy of this code. I am going to make a statement now that probably some of you will not endorse. I believe that every punch press operation should be operated with a guard, and everyone of them can be guarded if you will get enough people together to help dope one out. A lot of these slides shown here today are already shown in that code. Some of them will be turned over to the committee so that the code can be kept up to date from time to time.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session was called to order at nine-thirty o'clock by the chairman, Theo. O. Meisner.

CHAIRMAN MEISNER: As all of you gentlemen can see by the program, this meeting is devoted entirely to Drop Forge Work. Before we start that particular program, we have the report of the Nominating Committee and the election of officers. Mr. Kaems, will you read the report of the Nominating Committee.

Report of the Nominating Committee

Chairman, J. W. HENNING, Automatic Electric Company, Chicago, Ill.

Vice-Chairman in Charge of Program, J. B. GIBSON, Western Electric Company, Chicago, Ill.

Vice-Chairman in Charge of Publicity, W. F. DITTMER, Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa.

Vice-Chairman in Charge of News Letter, S. H. SLAYMAKER, Fairbanks, Morse and Company, Beloit, Wis.

Secretary, A. L. KAEMS, Simmons Company, Kenosha, Wis.

Exhibit Committee Chairman, W. J. LARSON, Clum Manufacturing Company, Milwaukee, Wis.

Statistics and Engineering Committees Chairman, T. O. MEISNER, American Can Company, Maywood, Ill.

Poster and Slide Committee Chairman, M. A. KROGER, Chevrolet Forge Division, General Motors Corporation, Detroit, Mich.

Membership Committee Chairman, W. J. GRAVES, Michigan Mutual Liability Co., Detroit, Mich.

CHAIRMAN MEISNER: Gentlemen, you have heard the report of the Nominating Committee; all those in favor of the adoption of that report will signify it by saying "aye."

All those opposed to the report of the Nominating Committee will signify it by saying "nay."

The report of the Nominating Committee is unanimously adopted.

I am now going to turn the meeting over to a man who has forgotten more about Drop Forge than I will ever know. I take great pleasure in introducing to you Mr. George Hodge, assistant manager, Industrial Relations, International Harvester Company, of Chicago. Mr. Hodge, will you kindly take the Chair?

GEORGE HODGE (Assistant Manager, Industrial Relations, International Harvester Company, Chicago, Illinois): Gentlemen, I have just come from a meeting and one thing the speaker pointed out was to be able to look the group, in fact, the individual, in the eye. I can't do that with you gentlemen in the back of the room. But I am sure any speaker would appreciate very much being able to look every man in the eye, and I think therefore we ought to fill up these front seats.

Don't forget to fill in the registration cards, which I presume you have all been supplied with, also the question card, and after the speaker finishes we can handle our questions by the written question, or we can handle them orally, whichever is your pleasure. However, if you have a very important question be sure to write it out.

I have had the pleasure in the last few years of discussing safety pretty much throughout the country, and in almost every group that I have attended I have been asked for an opinion on Mechanical Safeguards vs. Metal Safeguards, as they often put it; and, gentlemen, it seems to me that mechanical safeguarding is not only a part of the foundation of our safety organization but it is an essential part, and if a management expects cooperation of its employees in the prevention of accidents it must reasonably safeguard its machinery. That is the least it can do.

I am quite pleased in connection with this program to have a small part devoted to the mechanical end of safety. It is a very, very important part, and I know that the committee felt mighty happy when they secured the consent of Mr. R. T. Herdegen, president and general manager of the Dominion Forge & Stamping Company of Walkerville, Ontario, Canada, to present the subject of Drop Forge Safety to you this morning. I am happy at this time to present Mr. Herdegen.

Drop Forge Safety

**R. T. Herdegen, President, Dominion Forge & Stamping Company,
Walkerville, Ontario, Canada.**

About two months ago I had the pleasure of attending a meeting at Toronto composed of the Industrial Accident Prevention Societies, and as you probably know there has been a great deal of discussion about the word "industrial," but we will not go into that here this morning.

I was asked to talk at this meeting. I wrote a paper, and it looked to me like a pretty good paper. I went over it three times and put in some nice large words, and when the time came I went to Toronto and read this paper. After I was through I met a couple of fellows who said, "Well, it wasn't so bad, but why did you read it? It would have been much better if you had spoken." So, when the question came up this morning about talking, I said, "Well, I am not very successful with a written paper, so I will try to talk from some notes."

There is one thing that has always appealed to me, and that is the mathematical aspect of safety. I remember when I was in college we took a course known as "The Theory of Probabilities." I was very much pleased when, in about two or three weeks, the problem came up of what was the chance of getting two sixes to turn up when you shoot a pair of dice. I thought here was something that was going to be of actual value to me. So we found exactly what the chances were of getting double sixes; but the unfortunate part of it seemed to be that they seldom came at the right time.

That reminds me very much of a story they tell of a baron who found himself on the banks of a lake and in that lake there were 47 ducks. These ducks were swimming around and having a lovely time by themselves, while he sat on the bank with a gun, but the unfortunate part of it was that he had only one shell for his gun. As he sat there watching the ducks they swam about in a kind of line formation, and he figured that, mathematically, if he waited long enough he would be able eventually to get all of them with his single shot. And it turned out to be true. The baron watched his chance and he did get all 47 of the ducks.

Now, perhaps you wonder what in the dickens that story has to do with safety. I feel that it has a great deal to do with safety, because it shows that just as the theory about the ducks runs mathematically true, so the same rule applies to accidents. Many times in answer to some inquiry, we say, "We are getting along pretty well; we haven't had any serious accidents." The reason that man couldn't figure out about his accidents was because he didn't know the exact rule that applies to the particular type of accident to which his plant is subjected. At other times a lot of executives don't know they have accidents. That was exemplified to me

when we got out the pulley catcher. Do you know that in my inquiring around I was not able to find one single, solitary drop forge executive who had ever had a pulley come off? It seems to me that the Dominion Forge was the only plant that ever had that happen.

The management should realize that they are going to have accidents, and unless they inquire around they won't know whether they have had any accidents or not—unless they get into compensation difficulties, and that brings us to another distinct viewpoint on the matter.

I do not know whether the societies in the United States look after accident prevention and accident compensation, but in Ontario we have a compensation law and you can't keep your dirty linen in your own back yard. That was very well illustrated to me when I went before the Compensation Board some months ago in Toronto to discuss the question of methods of assessment. I got up before the Board and there were five members, each with a pad of paper on which he was making notes. After I had finished what I had to say, one of the members turned to the committee and said, "By the way, you have Mr. Herdegen's accident record here, haven't you?" He said, "Yes, we have it." He pulled out a sheet of paper and there was our accident record for the last six years. Now, if we hadn't been in a position to have our accident record examined, I would have found myself in a very embarrassing position. I wonder how many men in this group would care to have their accident records posted on the wall of this room.

Talking Is Not Preventing the Accidents

It seems to me that the fellows who do the largest amount of talking about drop forge safety are doing the least in their own plants. I know of several instances of that sort. When you come to the question of really doing something (and a lot has been done in this country for safety), there is something being done in drop forge shops also. But in many industries the most safety work is done by the larger organizations, and the smaller organizations seem to take the view that they cannot afford to do anything in the safety line; that it is an expensive proposition; it is all right, apparently, for the big companies to do something, but the smaller ones can't employ safety men or have visiting nurses.

Now, when you start out to do safety work you might just as well make up your mind that you have started out to spend some money. There isn't any kidding yourself on that point. There are too many managers whose idea of safety is to post notices of a big dinner. They get a room in a hotel and serve fancy food; then they pass around some cigars and they talk about safety. Then they go back to the plant. To do anything in safety, you have got to spend money. To convince anybody you really mean business you must start spending your own money. It is all right when you have a community drive for a fund to tell everybody else but unless you go ahead and spend your own money your interest isn't worth much to anybody.

The same thing is true with the safety requirements. Until a company gets busy and actually spends some money they are not in the safety movement at all; they are just running around, that is all they are doing. Now, it runs into rather large figures. I have been surprised sometimes at the amount of money we spend, but when you look at the total money spent and compare it with the accident record you can easily see that it has paid you in dollars and cents.

This year, unfortunately, we were not very busy; but when I left the plant our accident cost so far this year was only \$25, and I remember the time when that ran \$15,000. That, of course, is rather an extraordinary comparison, and we have been very lucky so far this year. Anyhow we have been shown very definitely,

and the way it started was, we got the superintendent, master mechanic and myself to make an inspection of the plant.

Now, for the small plant (and this is probably rank to you boys, but it is my opinion anyway), all of this talk is powder and shot in the air; it amounts to nothing. But if you get your superintendent and master mechanic, and they get your general manager and president to go through the plant and take a piece of paper and make a list, put down the things that have to be done, something has been started. Then let the president take that sheet of paper and put it on his desk, not in the desk. Then two weeks later let him call his superintendent in (not merely call up), and say, "Well, what has been done?" "Oh, done? Well, we made the list up." "Well, just exactly which things have been done? I have a few minutes spare time, and I would like to go out to the shop and see just exactly which of these things have been done." Well, as it turns out, the superintendent says it is a bad day, the master mechanic had a bad day, and it was getting along toward the end of the week, and so next Monday we will make our inspection. Next Monday, when you make that inspection, you will find some of those things have been done.

Now, that is my idea of tackling the mechanical end of safety work. In the final analysis, your foreman is not so much interested in the men who work for him, as he is deeply interested in the man whose name he sees on his pay check; he gives a great deal more attention and a great deal more interest to putting a guard on a certain hammer if he knows the man whose name is on his pay check is interested. You come out there tomorrow to see whether that thing has been done, and it is done.

Always a List of Things to Do for Safety

Well, we started this thing seven years ago, and I am telling you that I still have a list on my desk, and I don't expect, until I am six feet under, ever to part with that list on my desk. At first the list was long, and by the time that was pretty nearly done, I said, "Let's make out another list"; and in another few months we got two more. If you will keep that list with which the president of your company can check them up, he will learn a great deal more about his plant than he ever knew before. If the president of a company goes through, and you have a lot of guards out of place, and in a lot of instances you have flashings, he learns more about them.

Now, you don't want to take your president and show him a guard that is down in the corner somewhere, all covered up with a lot of junk; you are going to keep your shop cleaner and you are going to do better work.

On the question of guards, I think the average plant in the drop forge industry has got to spend a lot of money. A lot of them don't show any interest, but I hope in time to get some interested.

The first and most obvious thing to have in any forge shop is a scale guard in front of the hammer. You don't want to injure your customers, they are scarce enough without injuring them. Now, a scale guard means a scale guard in place. I have been through a plant where there wasn't a guard, and I said, "Where are the guards?" And the fellow says, "Well, we put them over in the shed." Of course, they didn't do anybody very much good. That is the first thing everybody should have.

The second thing everybody should have (and I don't think there is any excuse at all for not having it), if there are any board hammers, is to have some sort of an arrangement on top so that when those boards break, they don't break open and hit somebody. They should be in place, and that is a perfectly obvious thing.

Yet I have been in many plants where I have seen no guards at all for taking care of those boards.

Another thing there is no excuse for not having is treadle guards. I have been in plants with no treadle guards and I know instances of people tripping hammers accidentally, and the result was terrible. If a fellow isn't killed, he had better be lots of times. There is no excuse for not putting in treadle guards, and that comes back to the list again. You fellows, if you are in the accounting business, know the accountant comes around and figures depreciation on your plant. What does depreciation mean? Depreciation merely means that you are setting aside a reserve. The management expects its hammers to wear out; it expects its presses to wear out; but for some reason a lot of people don't seem to feel that guards are going to wear out. Those guards aren't going to last forever; they are going to wear at least as fast as the equipment. Treadle guards are going to wear, scale guards are going to wear, and the sooner we realize we have really got to do something of that sort continuously the better off we are—don't forget it—the better off our accident record will be, and the lower our accident cost will be. We will get the money back.

Two Buttons on Each Press Electrically Operated

Now, all hammers certainly ought to have scale guards. There are other things also that should be put on. We are much interested in pulley catchers' guards, but we are not talking about pulley catchers today.

In this Power Press Section I suppose a lot of you fellows are interested in presses. So far as I know, outside of ourselves, there is no other drop forge manufacturer that has its presses electrically operated. We have two buttons on each press, and we have those buttons arranged so that when a fellow runs that press he is going to block one of those buttons. We expect that. I have had friends of mine come through our plant and say, "Well, it is all right, but if they are going to block one of the buttons, what is the use in putting them on?"

Here is our answer. It seems in our education system that our two arms are better connected than the left arm and right foot; so that if you have two hands they work better than a single arm and single foot. I went through a plant about six months ago that didn't have any guards at all. Let us imagine there is a press right here, and there is an aisle coming down here. This press is here, and this finger gets here, and you have a complicated forge up. The fellow forging it was apparently living under the impression that it would never have to be trimmed. Right at this corner is a treadle lever, about two feet long. I said to the president, "Look at that"; he says, "Yes, it is very bad forging, isn't it?" I said, "Look at that;" he said, "Yes, it is complicated." I said, "Look at that treadle." I said, "Suppose you and I were walking by there and happened to trip that press and it cut a hand or a couple of fingers off." He said, "My God, that would be hell, wouldn't it?" I said, "Why don't you take that thing off?" He said, "We have had that thing there seven years and never had an accident." When I got back to the office I told him the story about the ducks. I said, "Now, here, you have been very lucky, but I am telling you that just about the time those 47 ducks are in line, you are going to lose a man's hand in that press." He said, "I guess that is so, I am going to fix it." If it wasn't so far away, I would like to hop on the train today and go to that fellow's plant and see if he has taken the treadle off.

We put those two buttons on our presses because some men handle some forgings better right-handed and some better left-handed. I used to imagine that about one person in every 10,000 was left-handed; but about one-third are, and a lot of people are left-footed, too, we found out. We put our treadle guards on, we started first with a certain foot and we found that a lot of fellows didn't want to use that

foot, so we put on a slide so they could use them with the right foot or with the left foot.

A lot of fellows in the press business do not feel like putting on these buttons because they feel that the workmen are going to block one of them. I think we have had one accident since we put those buttons on, and I don't care to tell you how many we had before that. It cost about \$100 a press; so, if you have got 20 presses you are going to spend \$2,000.

As the matter of goggles, I will just say that we believe in goggles and let it go at that.

On the question of material handling, all of us have our material handling troubles. I think that the material handling problems are rapidly being solved from an entirely different angle than you boys are working on, and that is this: In the drop forge business a lot of fellows found out their material handling was costing them a great deal of money, and that is a sort of thing every man can see very well. Most drop forge plants are increasing their facilities for handling material, and getting more trucks. Now, I don't understand this box loss, and I never did; it is a mystery. We have a place where we put our broken trucks and broken boxes and broken pieces of machinery, a kind of graveyard; I go by there every day and I can see what we are breaking up. I thought I could find a lot of portions of barrels and all that sort of thing, but I didn't. About every six months I buy a lot more boxes, barrels and that sort of thing, and where they go, I don't know; but I know this much: If you don't load those trucks, don't fill those boxes and those barrels so full, you don't have so much trouble. Here is 99 per cent of the material handling trouble. You attempt to put everything on one truck, while if you had two trucks you wouldn't pile them so high; but if there is just one truck and that is busy, you are going to pile everything you possibly can on that one truck, and you may have trouble. If you had two trucks and didn't pile them so high you might not have an accident.

The Problem of the Proper Floor Material

The next trouble in material handling is what the truck runs on. In the old days I know drop forge plants used just a sort of clay mud—I call it clay, of course, it had scale mixed with it, but even with that the trucks would stick and tip over and very often have serious trouble. The next idea that came along was concrete, and it looked fine at first, but as soon as somebody started to haul a dye block down that concrete, something happened. Anyhow it ended up on the pavement and there was a nice, big hole; and the next truck that came along made another hole; so pretty soon you have an accident. Now, for two years we repaired concrete, and it looked like—well, I don't know what Michigan avenue looks like, have done in the industries, in shops, in railroads and in street crossings, we have but it looks like Jefferson avenue in Detroit. Then we got a brilliant idea from the city, putting asphalt over this old concrete, and when it gets hard, provided the wheels of your truck are wide enough, and provided you don't overload your truck, it won't cause you any trouble. We have had that pavement down there two years and it hasn't given us a particle of trouble. That cost us \$2,500. I mention these things because I think they are big things that a lot of us ought to think about, but you are going to have to spend considerable money.

Now, I like this safety education fine, but I didn't exactly realize this outside safety business situation until a couple of days ago. It is funny sometimes how you go along; you think about it, but you don't realize exactly what it means, and I tell you that you can figure on it costing money to do that. I was talking with one of the officials of one of the six largest life insurance companies in this country. Their records show that for the last 50 years their death claims in seven per cent of the cases were due to casualties. For 50 years it stood practically the same,

without a change in the figures. Last year 40 per cent of those casualties were due to the automobile; in other words, with all the safety work which we have done in the industries, in shops, in railroads and in the streets, we have just been able to go fast enough to take care of the increase in automobile accidents. It is like a fellow who has a salary of \$200 and trying to save some of it. It doesn't make any difference whether he spends \$50 and his wife spend \$150, or the other way around; if the \$200 is spent, you are just where you started from. Now, as long as these casualties keep at seven per cent we haven't gained anything in the aggregate.

The final analysis of casualties in most instances is a question of loss of time in the shop. Now, you can talk about loss of time and the cost of training new men for half a day, and not get started, and a lot of companies have spent a lot of time and a lot of money on account of new men; but I take it that all their figures and all their computations do not show us what it cost to have a man out in the drop forge business. There a man is a much more important factor, I think, than in any other business. You boys probably know that I am very much interested in cost activities, and there is one thing we found in the drop forge business, we have discovered that the cost of running or the cost of making a forging is dependent to a very large extent upon the time that that forging occupies the hammer. In other words, it costs \$10 an hour to run a certain hammer. Now, it cost you the \$10, and also cost you \$10 to run the furnace; and unfortunately you burn just as much oil if you turn out 100 pieces in an hour as if you turn out 200 pieces, or if you turn out five pieces. The depreciation on that hammer is so much an hour. The auditor at the end of the year is going to chalk you up so much for depreciation. So, you come right back to the situation, that the big thing in the drop forge business is to turn out a large number of pieces per hour, and that brings us right back to this thing we are talking about. In other words, look at it carefully. You are interested in safety. This compensation that you talk about, that is interesting, but it is much more interesting to have a man go to work in the morning and turn out a large number of pieces, much more interesting than it is to have a new man try to run your hammer. And that isn't foolishness; that is facts.

Good Men on the Job Every Day

So that in your safety campaigns, when it comes to your education, when it comes to your guards and when it comes to your outside activities, your automobiles, your safety schools—it comes right back to the problem that what you want is the best men, and you want them there every day. Now, that is where safety means co-operative safety, cooperating together, to see to it that you have the best man for the job, and have him satisfied, and have him there. That also means the spending of money.

Now, I have talked quite a bit, and I am not going to talk any more. If there are any questions you wish to ask, I will be glad to answer them. But I just want to leave this thought with you, that your management can get large cash dividends by the expenditure of money in safety work, but they have got to spend the money, and they have got to realize it is a continuous expenditure. You have got to spend money on guards; you have got to spend money on public safety and you have got to contribute money to local safety work. But you will get your returns from two angles, more in the drop forge business than in any other business. I think the safety men in the drop forge business have got the best argument of any safety man in any business. In many shops the average press will just produce so many pieces, no matter who runs the press, but that most emphatically is not so in the

drop forge business. Why, I have seen shops where one fellow will turn out two or three times as many pieces as another man. It just so happens that that fellow has a certain action there, he doesn't seem to be hurrying, but he is there and he turns out the pieces; and the other fellow is running around with great apprehension, running here and there, but at the end of the day the number of pieces he turns out may be half the number of the other fellow. Business is mighty competitive. I don't suppose there is any business in which the production capacity isn't twice the demand, and the fellows who are going to survive in the drop forge business are going to be the fellows who have their plants well guarded, have good hammermen; and the fellows who have poor hammermen and unguarded plants, those are the fellows who are not going to survive. So it seems to me, if there is a safety man here that can't sell safety in the drop forge business, I think he is about the biggest dumbbell in Chicago today.

General Discussion of the Problems

CHAIRMAN HODGE: I don't think there is any question about the interest of the Dominion Forge & Stamping Company. I think one criticism on a lot of our programs at conventions is that we often get too many speakers on the program, do not allow sufficient time for the speakers and do not permit sufficient time for a discussion of the topics. I think the committee on arrangements is certainly to be congratulated in getting the speaker who presented this subject from A to Z. I think it was one of the finest talks on the subject I ever heard, and I am sure I express the opinion of the group here this morning in passing that along.

We have on the program some lantern slides, and as I understand these slides are presented from work at the Dominion Forge & Stamping Company, I think we will have those lantern slides at this time. It is possible that in your discussion there will be some points brought to your mind by these lantern slides, and then we can discuss them later on.

(Lantern slides were shown.)

CHAIRMAN HODGE: Now, gentlemen, we have a little time in which we can discuss the various phases of drop forge safety. Any question that you have in mind may now be put to the speaker.

WILLIAM SCHUELE (International Harvester Company, Milwaukee, Wisconsin): I would like to ask the speaker how they handle their materials from the car and get them to the hammer; and afterwards, whether they use boxes, trucks, steel or wooden boxes, or what they do use?

CHAIRMAN HODGE: The question is the delivery of materials to the machines and taking them away.

MR. HERDEGEN: I think the problem of handling steel is entirely a local problem, depending upon the relationship of your steel yard to your railroad and your shop. I think the installation is, of course, to have the railroad track come below the crane-way; the steel is then lifted from the gondolas in bundles and piled in the steel yard, being placed in such a manner that it can be picked up in bundles later on. When the steel is to be used, it is then picked up in bundles, and the entire bundle is taken to the shearing place, in front of the shear, and then fed to the shear. Now, then, the steel has a perfectly straight line passage from your steel yard right to the shear.

I visited a plant not long ago where it wasn't possible to run the crane into the shear house, but they had several large trucks equipped with wheels which made it possible to run on the railroad track. On top of the truck they had four rolls, and the truck was then pushed out to the steel yard, the crane picked up these bundles, and this truck was loaded up and rolled right into the shear. Any other method of handling the steel, inasmuch as it always comes in long bars, is very

cumbersome and very expensive. We do not open our bundles, because there is a disadvantage to that. In the first place, the bundles are all tagged and have certain heats and heat numbers, and God help you and your customer when you start arguing about a forging heat. It is a case of arranging with the steel companies, that the bundles be of such size that the cranes can handle them. It is a tremendous mistake not to be able to handle the whole bundle.

E. ROTH (Aetna Life Insurance Company, Hartford, Conn.): I would like to ask the speaker what his experience has been in electrical maintenance, due to the fact that I understand we have had a little trouble with that electrical cut-out, and also the magnetic cut-out.

MR. HERDEGEN: I would say that we have had very little trouble with them. There was one thing we did find though, we found that at first we had to place a booster in the line, to give us the requisite voltage in winter, because in the morning the load, due to lighting and breakfast cooking, lowered the voltage at the plant to such a point that we had a drop; so we put in a booster to give us full voltage. Now, we have a new line coming into the plant from an outside power company, consequently we will be able to eliminate the booster. But if you haven't the proper voltage, that is the cause of all troubles. If you get a low voltage, that means high current and all the other difficulties dependent on low voltage.

Experience in Electrical Tripping

MR. ROTH: Have you had any experience in electrical tripping; say, a forging is in crooked and the man tries to straighten it; have you ever had any experience along that line?

MR. HERDEGEN: If the forging was pretty crooked and the press came, we had to make a new die, but we never found anybody interested enough to get their hands in the way.

MR. ROTH: I find in my traveling around that a bunch of fellows try to save that unconsciously, after they trip the press, which is very easily done with the press running up, I would say 100 revolutions a minute, with about 37 stroke.

MARK A. KROGER (Chevrolet Forge, Detroit, Michigan): I would like to ask Mr. Herdegen about the use of that electrical push button system, which we have recently inaugurated on our presses as an experiment.

MR. HERDEGEN: Well, as I said, we go on the assumption that we block one button all the time. We have never tried it any other way. We get the result of having a double hand operation instead of one hand and foot.

It seems to me, to be frank, that the fact that we find it necessary to block one button is how most managements argue themselves out of spending some money. We supply every press we have with a little pair of tongs, so that if it is a forging that clamps, why, the fellow holds it with the tongs; and if we find one not using the tongs he is laid off for two weeks.

MR. KROGER: You feel, then, that in forging it is necessary to use a pair of tongs?

MR. HERDEGEN: Absolutely. If he is given a pair of those tongs and doesn't use them, he is laid off. I think I am correct in saying that the only accident we have had since we put in the use of these was because the man didn't use them. In other words, the only accident we have had in five years was that unfortunately he got caught before we had a chance to fire him.

MR. KROGER: I might ask the speaker or any gentleman in position to give me information on this point. Within the past year the company I am connected with now has had considerable trouble due to the chipping of keys, the operation of dies; and there has been considerable talk about treating these keys to avoid the

chipping. We have tried the treating process, and about the time we reached the stage where we thought it was O. K., along comes some fellow and shows that it isn't. The only way we have been able to get around that is to continually keep after the men through the foreman, to grind those keys.

G. A. KUECHENMEISTER (Dominion Forge & Stamping Company, Walkerville, Ontario, Canada): Mr. Chairman, I think the answer to that is coming out in the New Drop Forge Code.

CHAIRMAN HODGE: It is twenty minutes after twelve, and I want to leave a few minutes for you to visit the display of safety devices. I will feel that I have been an absolute failure as chairman if there is anyone in the room who has come to this meeting with some specific question on his mind, and hasn't put it before the meeting. Now, is there anything else to come up before the meeting?

I want to again express, in behalf of the Group, our appreciation of the very fine talk given us by Mr. Herdegen. I feel that we have had a most frank and free discussion this morning, and that our meeting has been of profit and interest to every one present.

ADJOURNMENT

Thursday, September 29, 1927

The third session was called to order at nine forty-five o'clock by the chairman, Theo. O. Meisner.

CHAIRMAN MEISNER: Before I start this program, I have a very sad announcement to make. Mr. Kroger, newly elected chairman of the Poster and Supplies Committee, had the misfortune to lose his wife last night at Muskegon, Michigan, through drowning. He asked me to tell you boys why he won't be here today.

The Industrial Commission of Ohio has requested this Section to send what pictures and models we have to Columbus to be shown in the Metal Section Exhibit of their Ohio State Safety Conference to be held in Columbus on November 9th and 10th. I have agreed to do that with Mr. Henning's permission to take them down there with me.

I think you all ought to know your new chairman. I am going to ask Mr. Henning to stand up, the newly elected chairman of the Section.

J. W. HENNING (Automatic Electric Company, Chicago, Ill.): I suppose it is in order to make a speech, but I am not going to make any. The only thing I would like to say is that while I am new in this game—that is, so far as the chairmanship is concerned—this fellow has had it for the last ten years. I have a good deal to learn and any cooperation I can get will be appreciated. I did have a little experience this year, in trying to get material together and it was quite a hard job. There is so much good stuff to be had that any little bit will help. I heard some appreciating remarks passed yesterday on stuff that people got and took home with them. They came a long way from home. What little we can give them ought to be given freely and everybody ought to give. Those who do give in that way, I know that the people will take it home with them and appreciate it very much. It helps the officers a great deal.

CHAIRMAN MEISNER: As you all know, this is a heart-to-heart round table talk on power press problems. We want you boys to present your problems and we will try and solve them here among ourselves. I have had a number of questions turned in here that we will probably get to later on in the session. We have a number of slides 8½ in number that were shown to us and we would be glad to show any one of them on request.

Who has a problem he wants to put up to this Advisory Committee? Who will be the first one?

MR. FOIGER (Williams Meyer Company, Elmira, N. Y.): I have a proposition I would like to get some information on, and that is a Bliss 3 press. We had a girl get injured on that press due to the fact of riding the treadle. The question is, is it better to have a foot rest parallel to the trip, or must the foot be removed from the trip every time the machine is operated? I would like to find out what the experience of the other fellow has been in connection with that. Is it better to have the girl raise her foot probably a distance of eight or ten inches or is it better to have a foot rest so that the foot can be slid in a sideways motion? What would be the better thing to do to prevent unconscious tripping?

CHAIRMAN MEISNER: We have a lot of men who have traveled around a lot in outside plants other than their own.

MR. BORAKS (Liberty Mutual Insurance Co.): That was a problem with us about 15 years ago, how to keep your foot on the treadle when operating a press. Now-a-days we don't find it because we arrange our work so you don't put your hand under the punch. If you do that, it doesn't matter. Some operators can work better one way and some the other way. I think the main thing to overcome is

to put the work under the punch without putting your hands under, so that it won't make any difference; because if you don't do that, there is bound to be an accident no matter how you arrange the treadle. The main thing is to feed the work without putting your hands under the punch.

CHAIRMAN MEISNER: I happened to be in a plant in Ohio a short time ago and I noticed a white spot painted on the floor alongside the press. I asked the man with me what that was for. They had a positive rule that when an operator had tripped the machine and he was doing any work around the die his foot had to be on that particular spot. I might say, there were no guards on the press.

MR. ROCKOFF (Detroit Steel Products Co., Detroit, Mich.): It seems to me that raising the foot a distance of eight or ten inches is very high for a treadle, anyhow. It might insure, to some extent, the operator, if he were standing to take it off. In the case of women, they are generally sitting. It seems to be a different thing, and in that case it aggravates that condition.

The Advisory Committee Will Study All Problems

MR. ROTH (Aetna Insurance Company): I would like to ask our brother to confine himself to his line of work. We may then be more able to intelligently discuss this problem. This power press proposition is a comparatively new one with us. Perhaps it is true that the foot trip is too high. Perhaps we have to arrange for different styles of dies and different kinds of feeds, but in some of them it is almost impossible to have an automatic feed because for instance if you have a spindle bolt, you have to put in a groove, or you have to make a short cut off in the different parts of the bolt. It is really hard to get an automatic feed on it that will prevent a slide feed. That is the reason I am anxious for the information.

CHAIRMAN MEISNER: Let me suggest this. I understand that the Section for the coming year will maintain practically the same Advisory Committee that was in vogue last year. Any time you run into a problem like that, if you will be good enough to submit a blueprint and address your letter to Mr. J. W. Henning, Automatic Electric Co., Chicago, he will pass that information around among that Advisory Committee and they will endeavor to solve your problem for you. I wish all you gentlemen would bear that in mind. That is the intention of the Advisory Committee.

MR. BORAKS: On this question that was just brought out, I would like to advise him to get in touch with the Wickwire Spencer Co., at Springfield, Mass.

CHAIRMAN MEISNER: Worcester, it is.

MR. BORAKS: They handle a line just like he describes. They have a line of feeds in there that are very cheap. They are cheap enough. If you are making ten thousand pieces, you can afford to build one. I am sure they will be glad to give you any information they have.

CHAIRMAN MEISNER: Does anyone else have a problem? Mr. Henning, I want to ask you a question. I was in your factory not long ago and noticed you had several automatic feeds. Could you give me an idea as to what these cost and what the increase in production was?

MR. HENNING: I couldn't exactly give you the costs. I think the one in the Exhibit Room which we borrowed from the Lytle Machine Company, is running something like three hundred and some odd r.p.m. I am not exactly sure, but I could get that price. The increased production is about 250 per cent.

CHAIRMAN MEISNER: You are satisfied that it pays?

MR. HENNING: There is no question about it paying, if you have production big enough.

MR. THOMPSON (Detroit Insurance Co., Detroit, Mich.): I want him to bring out for you the idea that you just don't have to make the one mechanism for one

specific part. In your experience, Mr. Henning, how many particular jobs could one of those equipments cover?

MR. HENNING: We have three parts on it now and we will have a dozen on that same part. Right now, we have three parts adapted to it. Before the year is up, we will probably have a dozen to go on the same feed. All we do is just change the width of the magazine and probably the length of the stroke. That is adjustable. Outside of that, as long as the piece is about the same, you can run a good many parts on it.

L. B. BEINECKE (Casualty Co. of New York): I want to know if there is any objection to the proposition of always guarding every part of the trip treadle on a punch press, taking that additional precaution? We all know that a guard will be left on when it shouldn't be or the guard will be taken off; we know they are supposed to do a lot of things, but somebody may accidentally forget the treadle. Don't you think it is a good idea to have it guarded?

CHAIRMAN MEISNER: Personally, I do. I know of instances where diesetters have attempted to work on a die with the belt on the flywheel, when a wrench or something fell off the table or press, struck the treadle and tripped the press, this resulted in an accident; to be sure I would suggest the treadle be guarded.

A. W. SHINE (Onweld Acetylene Co., Newark, N. J.): I was wondering if any of the gentlemen in the room have thread roll trouble; that is, how they are doing a thread roll operation, what automatic machinery they are using, etc., or whether they are still feeding the old hand method of the Bliss type machine.

Discussion of the Thread Roll Operation

MR. MARES (Perfection Stove Co., Cleveland, O.): What number is that press?

MR. SHINE: These are the regular pedestal type and bench type thread roll machine. We have a battery and a hand feed machine running about forty strokes a minute.

MR. MARES: I never had any experience on No. 21 press.

CHAIRMAN MEISNER: He means a regular thread rolling machine.

MR. MARES: The double crank?

CHAIRMAN MEISNER: No, he is talking about a thread rolling machine.

MR. MARES: The only one we have is the spanning machine and that is made up on the same principle as a DM Junior press sweep guard. The only thing about it, it swings back and forth from around this way, and you put the swivel down on the bottom and have it swing up that way.

CHAIRMAN MEISNER: Is that a vertical press?

MR. SHINE: I don't believe you get what I mean. You are familiar, no doubt with the bottom top of a flashlight thread on the flashlight cap. You have all seen the thread rolling on the cap. We have a machine, Bliss, in Brooklyn. We have an upper and lower spindle with a thread roller on the bottom and one on the top and the upper spindle is brought down under the lower spindle by a cam. Our trouble has been that in putting the cam on to the lower spindle and the upper spindle coming down, there is a flange on the upper thread roll to hold the work on. If they don't get their fingers away fast enough, it will carry around, the flange will catch them and nip their fingers. While you are breaking new operators in, you have quite a number of accidents, until you get them to the point of efficiency. We have installed the Bliss semi-automatic, shutting down the feed and we are now thinking of installing a battery of Cameron automatic. What I wanted to get out is, whether there is anyone in the room that had experience with other automatics and whether we have been going in the right direction. I was wondering if anyone has had experience in that line.

CHAIRMAN MEISNER: We have a number of those identical machines. In most

instances, we have been able to feed them automatically. We put a cam movement on and a rod through the lower spindle to knock the work off. Does it happen to be tin or brass that you are using?

MR. SHINE: Brass. We use 22, 24 and 26 gauge brass.

CHAIRMAN MEISNER: I will admit that not all of the operations performed on that particular machine can be done automatically, but reasonably small round parts can be fed automatically. You take big heavy tops. There isn't much hope of putting them on automatically, but with small parts such as I saw in the Exhibit Room, I haven't the slightest doubt you can perform that automatically.

MR. BORAKS: The regular line of gravity feed automatic feeds are good, but sometimes they run into a lot of money.

The Remington Repeating Arms Company has feeds for their flashlights and I know just what the gentlemen's trouble is. I think that an ordinary gateway or railway leading to the lower roll just by the weight of its own piece, if you keep your shoe on it, the weight of the piece will bring them down. It is very easy to inject the pieces. Now, you can't equip all your rolls immediately with automatic devices, so what we do in that case, is to use a stop screw on the machine so the rolls will only open any amount you want, I suggest that you don't allow the rolls to open any more than three-eighths of an inch. You couldn't get your fingers in easily and it will help until you get some kind of a feed there. They will get accustomed to handling that work, with the three-eighth of an inch space between the two rolls.

A Magnetic Electric Pickup Desired

CHAIRMAN MEISNER: Louis, do you think you could get some blueprints that you could send the gentleman to help him out?

MR. BORAKS: I will try, I won't promise, because we have to ask our insured for the privilege of that. If they will do it, we will send them.

CHAIRMAN MEISNER: Will you get in touch with him later? Who else has something to discuss?

S. H. GRAHAM: I would like to ask if there is a magnetic electric pickup for steel parts. We have used a small magnet for putting the pieces in the press.

MR. ROTH: The nearest I could give him, instead of using electricity, is to use a suction. That is the nearest thing I would advise you to use. There are a lot of disadvantages in using electricity. In the first place, you have a lot of contacts to contend with there, you know, and you must just catch yourself at the proper time. If you use the air, it is easy. I wouldn't recommend trying to use electric current to insert a piece into a die. I think the thing is all wrong. Air will do it. With electricity, you neither can hear it nor see it, until the damage is done.

MR. HENNING: Not long ago, I saw in one of the magazines where you can buy these magnet lifters and I believe, you are right that the NATIONAL SAFETY NEWS editor can give you that information.

CHAIRMAN MEISNER: I have a question that was turned in. I don't know who wanted the discussion, but it is a simple one and it ought to create a lot of interest: "What is the best way to determine the angle of a gravity shoot?"

A lot of people are starting to experiment with sliding parts into a die. Mr. Thompson, what experience have you had along that line?

MR. THOMPSON (Detroit Insurance Co., Detroit, Mich.): In chutes and slides for over two years, I have found that it cannot and will not slide through location. In bringing out the point that Mr. Henning has and in the machine he is showing you, you have got a complete amplification of the principles made automatic. Mr. Kaems has shown you time and time again that his parts slide, heavy or light. I suggest to you in most every instance, you have a piece that is unusual for slide

and location. There are three principles that you can use, one is the straight slide, one is the incline slide and the other is the curved. They will launch the piece for you in almost any position that you want it. As your production increases, the demand becomes more insistent; then you naturally go into the push slide feed; and that is simple to make in most instances, by merely taking your slide and putting it under your blanking die and blanking it out and then rifling out that aperture large enough to give your piece freedom, fitting it into your slide and pushing it over your die and it drops into location. It can't do anything else.

MR. BORAKS: Will you please ask that question again.

CHAIRMAN MEISNER: What is the best way to determine the angle of a gravity shoot?

A Simple and Common Sense Rule Explained

MR. THOMPSON: I want to illustrate a principle that perhaps the boys will get easier. Here is an ink well. This ink well has a square to it. No matter which way you look at it, you have the square of the sides, top and bottom. Here is a watch. The watch is circular. Still it has a square on it. It has a square two ways, it has a square that way with parallel sides, and it has the flat surface top and bottom which is a square. You only need three points of contact at the extreme, two points of contact at the minimum. Now, in finding the line of fall, if you have a piece that is like the watch sliding, if that went down, it would naturally from its weight and from its size, slide over the top of any die or go into the die at such an angle that it would clamp.

The rule that I have followed is this: First square your object. Regardless of what its shape is, it has a bottom to it or a top to it or a side to it. There is some way it lies. Take the piece and lay it down. Then square it in that position and then find its center of gravity, and as you know, the center of gravity of any piece is the amount of weight distributed in any one particular location. Draw your line from that angle and you will find when you have your square of your triangle, that that is the best angle at which that piece will slide. Don't try to push the heavy end of your slide or the heavy end of your object, don't put it behind, put it in front, because that is going to be your leading member in launching itself into position.

In my experience I have taken the three slides I have told you about. I put on a ball and almost any piece, merely put that on that slide and on that you can elevate it or raise it at any angle you want it. A set of those three costs about \$5. Then put your die down here and go ahead with it and play a little while. You are going to find the exact angle. Go to the die cutter and say: "Make it so and so." He doesn't want to bother with your problems. He will make it and you will feed it.

Is there any question you want to ask on the three slides? I gave that story to you in Louisville four years ago. It, more or less, gives you a complete resume of just how the thing can be done, the quickest possible way for you, that is what you want to know.

MR. WALTERS (General Electric Company, Lynn, Mass.): What the boy out in the shop wants to know is: "How can I do it and do it well?" We take a piece of 64-gauge stock or a piece of cardboard and we will shape it up the size of your stock. Then we work by a rule of plumb. We tilt it and bend it until we get it and it takes us but a very few minutes. Take a piece of scrap stock and play with it until you get it and you will find out that after playing a couple of times, that you will get it in a very few minutes in each and every case. Mr. Boraks taught us that.

MR. BORAKS: I will add that there is a very good point there in that formula

of making a model or a templet or a trial shoot, and that is the fact that it won't shoot. You will find out before you build your chute, which is a good thing to do. That little model is just as good as the one you are going to build for your trial, your experimental work in other words. If you don't now, it won't go on the trial model. You know you have to get another way to feed it. It is a good thing to do that before you make it.

MR. MARES: With that slide, you would still put a stationary guard around the die?

MR. JONES (Indiana Enamel Company): I can't see the necessity of the guard, if you are feeding either strip or blanks from an inclined chute. Of course, I am talking of our experience in the Middle West. We know that there are some states in which you can't operate punch presses with incline feeds for disc work, banking, trimming or forming, without you have some sort of a guard for the point of operation. I feel that if you have an automatic projector there to take the material away from the press, if it is small enough, that there is no need for a guard.

MR. PUTNAM (American Can Co.): What are you going to do when the piece gets caught?

MR. JONES (Indiana Enamel Company): Use a hook.

MR. PUTNAM: Sometimes they don't use the hooks even when they are furnished. I am for chute feeds with a guard around them.

MR. JONES: If you are feeding through an enclosure, then you have to have something to take it out with and the hook is the only means that we know of. I came in to try and get some information about punch presses and I feel the only way to get it is through a discussion of this kind.

Guard the Chute on the Die

MR. ROTH (Aetna Insurance Company): I would like to say a few words on this matter. It is a very delicate situation. I personally believe that if we put a chute on a die and don't guard it, we have only given the man partial protection. I don't think there should be any limit to a thing; when a man feeds a job down the chute, he does things unconsciously and we have a barrier there something that is mechanically directing him all day long; but the minute we leave it wide open, how do we know but the fellow is going to follow the piece into the matrix of the die? If we have that guard or gate or barrier around, there is not a chance for that. A finger is always easier to use than a stick. We have provided a stick for them. You can't stand there with a baseball bat. I like to talk to them in a practical everyday way. I find in my business that a lot of fellows will use this so-called chute as a go-between. They try to compromise with you. If we haven't gone full length, I don't think we have done our duty.

Some of these fellows may think I am a fanatic, but I think if we are going to protect the man, let us go the full road. If something happens, our consciences are clear, because we have done everything we should do. The chances are remote for having an accident if they have the guard on. There is always a way of getting that out, or you will have a knockout of the die. There is a way of eliminating that trouble, if you stop to consider your die construction, your die is going to work 100 per cent.

MR. SHINE: We use the chute feed, although not entirely; we are using some shoot feeds. We haven't them completely on all the jobs, yet. Last October, we decided at our safety meeting, that none of our operators were going to put their hands under the die or the point of operation, and inside of three days we completely took every hand from under the presses. It was simple, just wherever we could apply it immediately. We took the easiest job first, just got a pair of pliers. We did something to take the hands from the point of operation.

MR. JONES (Indiana Enamel Company): That man's views are just exactly along the lines of my own. If I can get the manufacturer to put on a chute that will satisfy me with my 15 years of experience, I will put up my reputation that it will go through. Of course, you must take into consideration that the chute must be built to meet the conditions of the press. I don't believe in interfering with the production of the machine. That is one of the important points from the employer's standpoint. I do not mean that you should leave the press, if it is a hazardous operation, without the enclosure about it. Every press must be guarded individually and I don't know of any means of feeding a press better than the chute. I am very glad that this lengthy discussion has come up in connection with the presses. We have a man here this morning from Massachusetts, I believe, Mr. Morrison of the Liberty Mutual, who has had considerable experience in the East with punch presses. I would be glad to hear Mr. Morrison's views on that.

MR. MORRISON (Liberty Mutual Insurance Company): I just dropped in. I don't know how far the discussion has gone. From an insurance standpoint, you men are all interested in preventing accidents, and in saving money. I am your insurance rate. So far as our experience has gone, I string along with Mr. Boraks, that a barrier guard makes it foolproof, does not interfere with production and does give credit on your schedule rate, which amounts to a lot of money before the year is over. Of course, from an insurance standpoint, we don't enjoy seeing our premium income cut down but if anybody having power presses will make them foolproof by putting on a barrier guard, we are tickled to death to see the premium reduced. My friend here says that he does not need a barrier guard in his plant, but all of us don't have a Gus Kaems around to run this proposition and I dare say he can get along as well without barrier guards in his plant as some other man with barrier guards. The personal element enters into that. I don't know whether that point has been made or not; but you do save a lot of money by getting full credit on a power press, by having it guarded with a barrier guard. This adjustable guard, that Mr. Boraks referred to, is a simple proposition. You do get full credit for that. This is a fine meeting. I can't help but reminisce a little bit. Any old room would be sufficient for a meeting of this sort. It is a great inspiration to come in here and see you men working on a particular problem that has had us licked for a good many years. I am tickled to death to see the interest here. Don't forget that a barrier guard adjustable, that you can make in your own plant will give you full credit, will not interfere with the machine and will make it foolproof.

Any Rule Demands the Proper Supervision

MR. JONES: One big thing along with that is supervision. That is just one thing that you must not forget. If you have a rule that a person must use a stick or some other thing to straighten the piece out, that must be a rule and it must be obeyed. We have our troubles when we get in a new man from other plants. We have trouble with that new man. He has been in the habit of doing it his way; we are all subject to habit, and it is hard to get over it. There is just one thing he is told. If he is caught once, he is told and the second time he does it, he lays himself off for one week. We don't ask any questions about that. He just does that himself and if he wants to work for us and wants to abide by our rules, it is up to him. If he doesn't, he automatically lays himself off. If he hits his pocketbook in doing something that he ought not to do, he will quickly learn that he must obey the rules laid down. That is probably one of the things that we are strictest on. It goes so far that a man working with a new man, seeing him do that, immediately steps over and says, "The old man will lay you off for a week. Don't do it, because you will surely get it."

S. H. GRAHAM (Wichita, Kan.): Two weeks ago, I had a man lose a finger on

ing this 15 per cent. we have saved the price of the guards on the money that we have saved by not paying that 15 per cent extra. We use slides and we guard the die at the same time. We make it foolproof. The man is human and when a thing goes wrong and he puts his finger there, we close it up tight so he can't get at it. We close it up all the way around. We have had cases where the person got his hand around back of the die. We closed it up all the way around so they can't get at it from any side. We find those guards have well paid for themselves. In Wisconsin, you have to show them that you have had the point of that tool absolutely guarded. If you haven't, there is no question asked, you pay 15 per cent.

MR. SHINE: I just want to cite another instance. I wonder if the members in this audience of Wisconsin appreciate how much money that penalty can amount to. In a maximum case \$2,000. Think it over. Will it pay for the guard?

MR. ROCKOFF (Detroit Steel Products, Detroit, Mich.): It seems to me that we can sum it up in two things: First, let's have discipline and put on a guard. If we begin it there, the question is answered for everyone in the audience. That is the way the proposition looks to me. Anything less than that would be partial protection.

CHAIRMAN MEISNER: I think we ought to get off this question. Here is one turned in by Mr. Graves of Detroit: How can we best reach and interest the tool and die men in the smaller and medium-sized stamping plants? Has anyone had any experience in that?

Safety in the Small Shop Is Often Lacking

MR. THOMPSON (Detroit Insurance Co., Detroit, Mich.): I say with tears in my eyes, my experience is that you don't get very far with the small shop. You know, safety in the small shop and in the small die and tool maker's place is purely local option with him. We realize today that the big organizations, with their persuasive methods, with their authority and control, can say, "You shall do thus and so. That is the way we want it done and that is the way we are buying it." Every man today who labors for a living is selling something and he only holds his job as long as he maintains what he has got sold, as long as he keeps it sold. You stick on the job and when you don't keep it sold any more, you just "ain't there no more."

The same thing applies in the small shop. The only approach we can get and the only success I have gotten at all, is entirely in getting the man on the top sold. He has many angles from which to look at this thing. He, perhaps, has a good tool and die maker and he can't afford to let him go, because he can't experiment with somebody else. His margin of profit is smaller because he makes less of any one material. I can't answer that question and I don't think anybody in this room can intelligently answer Mr. Graves' question. I can only suggest this: Sell the man at the top and you won't have any trouble. It will come down below and the fellow down below will eventually get it. If you can get contact with him, sell him, too.

CHAIRMAN MEISNER: Anyone else?

MR. ROTH (Aetna Insurance Company): I would like to add a few words to that question. When we speak about the small manufacturer of a small jobbing shop, for instance, there was a certain individual in the room who was getting his tool made on the outside. He gets a price of \$30. That fellow is not interested in the safety part of that die. He is interested in making it for \$30. That is what he is interested in. Those are the big problems that we run up against. He says he can't afford to consider the operator, his interest is in the money. He wants the money for his die. I am using him. What am I going to do? I can't rebuild the die. Those are the problems we have to face. They are serious problems. A man in a jobbing shop is there to make a die for almost anything. He figures on so much an hour on a die. If he can't make out, he is going to lose money. He is not going to fiddle around. He is after his money like our brother there says. He wants his

money. Those are the big problems we have to face in going around the country.

MR. BORAKS (Liberty Mutual Insurance Company): For a great many years, as you all know, a die maker was told to make a die that would meet with the specifications. He was not told anything about making a safe tool or making a tool that would get out big production. He was just told to make the die. That is what he has been doing for a great many years. I will venture to say that die makers are probably more interested in safety than any other part of the factory, almost. They are going to make the tool and they want to make a tool that is going to make the piece right to the millionth of an inch. That covers them. They figure if they get that die out and it is right, that is all. They don't know anything about a feed. Why don't they put safety on the die? We all know that is the thing they ought to do. Why not put the protection on the die? It is because they haven't been educated up to that. I went in as an apprentice in 1900, apprentice die maker. The main things that interested my boss were that I get out a die that would make the piece like the drawing and how long it took me to make the die. He didn't care anything about any other part of it. He was ready to jump on me if I didn't do those things right. Now the die maker has to be educated to make a safe tool and a tool that will get out production.

But the Small Shop Is Becoming Educated

That is just the way we are interesting the small shop. The small shop is more interested in making \$1.99 in the jobbing shop. The big people don't need the money quite as bad, but with the small people, it is a matter of life and death to them to be able to get a job out as cheaply as they possibly can. They can't even quote prices unless they get in line and do the stuff right.

The small people are getting educated. We go to the man who owns that small place or the works manager. We don't go to the die maker and show him what can be done. Mr. Kaems has a feed that he paid sixty-five cents to make and he tells you he has run it for five or six years and I believe it, and you can see what it is. A man making 10,000, 20,000 or 30,000 pieces can spend sixty-five cents. He can spend \$5, I say, to make that tool safe and they are getting educated to it. There is only one way to get out of this dangerous stuff, in our opinion. In our organization we say, "Make your dies so you don't have to put your fingers under the punch."

Every one of your die makers in your small shops has just as much brains as the boys in the big shops. They haven't used them. They have got ingenuity. They can make these feeds for you. The problem today is to interest the big man in the small shop to spend a few dollars for experimental work. If he makes one feed, he will make two, he will make three, he will continue to do it. There is no question about it, because he will get production and production is what he wants first. If he gets production and safety, too, all right, he will take safety. He is glad to have it, but the thing that we interest him on is the production. If you can show him a tool where he can get production at a small extra cost that will give him safety, too, why he is tickled to death. He doesn't want any accidents. He can't afford to spend a lot of money for guards or safety devices, but for a cheap semi-automatic feed, he will do it any day because the production is what gets him.

L. B. BEINECKE (Metropolitan Casualty Co. of New York): I want to introduce a thought. We can hardly expect the operator of the press to be sold on safety very easily if he catches us doing a half dozen things on safety. If you study the average machine shop, the mechanic is working carelessly. He will work carelessly. He looks upon that man as a criterion, as an example, and I think the man should be careful about the example set.

CHAIRMAN MEISNER: People who have just started on safeguarding power press dies are running into the problem of rebuilding old dies. We have a man here who

has had a lot of experience on it. I am going to ask Mr. Rockoff to say a few words along those lines.

MR. ROCKOFF (Detroit Steel Products Co., Detroit, Mich.): When it comes to the designing and building of new tools, that is usually a comparatively easy problem because the tool maker has more or less latitude when he lays out his design and he can insert safety ideas that he has in his mind. When tools have run in the shop year after year and everybody has become accustomed to them and they go to the management and tell them they want to spend a few dollars on this tool and a few dollars on another tool, they get your estimate probably on one hundred or two hundred different tools that will cost anywhere from Mr. Kaems' sixty-five cents up to \$25 to protect, probably running into an average of several hundred dollars at the least. They wonder what good they are going to get from it and it is a little hard to convince the management that it is worth while to build safety into old tools that are already running and yet that is the problem that confronts many of us today. Take the tools that are already in the shop and build safety into them.

Three Ways of Gaining the Point

Just offhand, I would say there are three ways of doing this. The first and the easiest (and you can do this while you are arguing with the management about putting on something that is worth while), is to change the method. Very often a little change in methods will make a tool reasonably safe without adding one dollar or one cent to the tool itself. I remember once in our plant we had a little piece to form. It was just a piece that was formed into a shallow V. It was a piece about twelve inches long and about two and one-half inches wide. I came through the shop one day. We had girls running some of our presses at that time. Here was a girl forming these pieces. She would take each piece from the stock pile and hold it in her hand that way and put it in this way. In other words, her four fingers were on top of the piece as she laid it in the die. I stopped. I told her she would never get any more fingers. All I got was a smile. I had no further authority, so I had to leave it at that. Fortunately, she never had her fingers taken off. All she need to have done would have been to start her die by putting the first piece in it, to take the next piece and slide it across by shoving it with the next piece in the die. That would have been at least partial protection. That is the first thing we can do, partially protect the die by changing the methods. We can change the method by a simple movement.

I remember another instance we had in what we call a spring stripper. A spring stripper simply consists of a plate set up on two springs which goes down with the ram and after the piece is punched the piece stays on the punch and comes up with this spring plate under until the spring plate reaches the top and the pieces go on up and the piece drops out. In ordinary practice, the man must reach under to remove that piece and if the press should repeat, at the very least he has some very badly smashed fingers. All we did in that case was to have the man take the next piece on which he was to operate and hold it under and as the piece stripped off the punches, he slipped it under there and the piece that had been punched slid right off before him.

I saw the same thing done at Kelsey Wheel in Detroit, in which they blank rim clips. I believe all the man had was a barrel stave and as the press went up he slipped it under and caught about twelve pieces on the barrel stave and pulled them out. It required no addition to the tool and it didn't require one cent expenditure. That is partial protection, of course. I do not want to be classed as an advocate of partial protection. It is better than nothing. It is one way of building safety into tools.

Of course, besides that we have the old familiar method of attaching a chute or a slide. We have done that, too. In most cases the cost of attaching a chute or slide

is so slight that the average tool maker or the average tool designer need not get any appropriation to get it done. He can sometimes slip it over and it does not appear in the general expenditure afterwards.

Then, the third method, of course, is the change in design. My attention was called to this third method particularly in connection with this problem we have before us here, this wooden model. In this case, by a slight change in design, that is by putting the pilot pins in the upper part of the die instead of the lower and then by having a set of primary gauges, as you might call them, to partially locate the piece, close enough so that the pilot pins will enter the hole, we can then put on a slide feed. After those provisions have been made for a different method of gauging, the piece can be mounted on the new press and equipped with a slide feed so that the piece can slide down into the die because there are then no gauge pins to interfere with its easy movement into position.



CHAIRMAN MEISNER: We have about seven or eight minutes. I am going to conclude this meeting at eleven thirty. I am going to give the people time to clean up a little before lunch.

MR. SHINE: I wonder if anyone could tell us how they handle their inspection, whether they rely on the die setters or whether they have a machinist go around and try the brakes out and also their hangers and overhead equipment. Do they wait for a breakdown to take care of that? I would like to know how they handle it to see if we are handling it right.

MR. HENNING: I can answer the way we handle it. We make a weekly inspection on everything. That is gone over every week and every press is recorded. In that way, we have very little trouble.

MR. SHINE: Who does it?

MR. HENNING: We have a machinist. He reports direct to the safety man and not to the chairman.

MR. LAW (Connecticut Mutual Insurance Company): We assign the machinist and also the man in the pressroom and it is his duty (he takes his lunch hour before the regular noon hour at twelve) during the noon hour to go over every hammer in the place. The man in the pressroom does the same thing. These machinists are there at all times. It is their job every day in the week. They are held responsible for all maintenance of presses or drops.

MR. MARES (Perfection Stove Company, Cleveland, O.): We make an inspection every day of the presses.

CHAIRMAN MEISNER: Who does it?

KEEP YOUR MIND ON YOUR WORK



-AND
YOU'LL
KEEP YOUR FINGERS
ON YOUR HANDS

MR. MARES: I do it myself. I make one trip a day.

MR. ROTH: It seems to me, that although in a big plant the shop committee functions to a certain extent, it is their duty to report any particular thing out of order and call it to the foreman's attention. I believe we overcome a lot of trouble by those methods.

MR. HENNING: That is very true, but your shop committee does not go into where they see the thing and report it. There are so many things they don't see because they are actually working. You have to get somebody that is uninterested in that particular job. You have to get somebody whose business is to go after each individual item and that is the only way you can keep them up, as a press has to be kept up every day. It can't be let go for a year and then have it overhauled.

MR. BORAKS: We have with us today the safety engineer of the Edison Electric Appliance Company and I admire very much the manner he has of inspecting his presses. I wonder if we could call upon him.

MR. OVERHAUS (Edison Electric Appliance Company): Every Saturday every press is inspected and also during the week every day I parade around and whenever I see anything, I stop the press and have it fixed immediately.

MR. BORAKS: Is there an inspection made after each job is made on the press?

MR. OVERHAUS: Absolutely.

MR. BORAKS: Every time a new die is set up, he makes an inspection?

MR. OVERHAUS: That is the system we try to install in plants where we have safety organizations. We try to get the man that this work has been assigned to to make the inspection after every change of job. In that way, we eliminate a good many conditions that might bring about serious accidents. I might further state that our experience in punch work operations for the last number of years has been very successful. We have shown quite a decrease in accidents in the last few years.

MR. JONES (Indiana Enamel Company): There is one more thing. On the average big press there are connecting links between your levers and each one of those links is connected together with a key. We have taken a tap or screw inside of each one of those keys and put a wire through there so your key can't shoot out. That has eliminated a lot of our trouble. A man lost control of his clutch and that is one of the biggest hazards I have found.

CHAIRMAN MEISNER: Gentlemen, I think we have had a good discussion this morning and I appreciate very much your coming here and taking part in it.

In closing the meeting, I just want to remind you next year to bring models of dies, pieces, parts you are having trouble with and in the meantime send anything you have to Mr. Henning; we will all get together and try to solve it for you. I want to thank you very much.

MR. THOMPSON (Detroit Insurance Company, Detroit, Mich.): Before the meeting is adjourned, it seems to me that it would be in order for us at this time to request our secretary to send a letter of condolence to our new chairman in charge of posters who has been unfortunate enough to lose his wife.

MR. ROTH (Aetna Insurance Company): I second that motion.

(The question was put to a vote and carried.)

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Power Press and Automotive Joint Session

Friday, September 30, 1927

THEO. O. MEISNER, Chairman Power Press Section
Manager, Central District Safety Division, American Can Company,
Maywood, Ill.

A. F. DUNNEBACKE, Chairman Automotive Section
Safety Director, General Motors Corporation,
Detroit, Mich.

The joint session of the Power Press and Automotive Sections of the National Safety Council was called to order at nine forty-five o'clock, Mr. T. O. Meisner, manager of the Central District Safety Division, American Can Company, Maywood, Illinois, representing the Power Press Section; and Mr. A. F. Dunnebacke, safety director of the General Motors Corporation, Detroit, Michigan, representing the Automotive Section, presiding as joint chairmen.

CHAIRMAN DUNNEBACKE: As you know, this Safety Congress is the first in which there has been a division in certain interests. For years conditions have been working up where it has been thought advisable to separate certain activities connected with the Automotive Section, and last year there was organized a Power Press Section. That the move was advisable is shown by the attendance at the Power Press Section this year. I think we all realize that about 70 per cent of the accidents are caused by punch presses and naturally there are a lot of fellows who wish to know more about punch press accidents.

However, we did not wish to conflict with the interests of the Automotive Section, and with the approval of both sections felt it would be advisable to have a joint session where one might have subject matter in which both are interested. Therefore, I think the program this morning is going to be of a great deal of interest.

When a man gets up to talk he likes to know the type of man he is talking to. It aids so much in what he says and how he says it. So I have been asked this morning to present a little picture of you people who are here.

I am going to ask those men to raise their hands who are strictly safety workers, safety engineers, safety directors, or safety inspectors—the men down in the shop doing actual safety work. (Forty per cent). How many men here have charge as personnel directors of organizations which have safety as a part of their activities? (Fifteen per cent). How many men here are superintendents, foremen or executives, either managers or heads of divisions or heads of departments, but who are actually engaged in the operating and production processes? (Sixty per cent). That is a very fine representation. I am glad to see it.

The first thing I am going to ask this morning is if there are any reports of any

committees or any resolutions to be submitted. Mr. Miller of the Chevrolet Motor Company has some resolutions to present and I am going to ask him to read them.

H. E. MILLER (Chevrolet Motor Car Company, Gear and Axle Division, Detroit, Mich.): Yesterday the committee was appointed to draft a resolution on the death of the wife of one of our Automotive and Power Press members.

"Whereas, While in Congress assembled the Automotive Section of the National Safety Council has been notified of the tragic accidental death of the wife of one of its members, and

"Whereas, God in His infinite mercy has seen fit to remove one who is highly respected," and

"Whereas, We deplore accidents of any kind and particularly those whose results are so tragic;" and

"Whereas, Our heartfelt sympathy goes out to our fellow member in this time of tragedy and sorrow; therefore be it

"RESOLVED, That this Section offer their deepest sympathy and condolence to this member; and be it further

"RESOLVED, That a copy of this resolution be forwarded by our secretary to our bereaved member, Mr. M. A. Kroger, of Detroit, Michigan, and that a copy of same be placed in the minutes of this Section."

CHAIRMAN DUNNEBACKE: This makes us realize that we never know who will be picked for an accident and we never know when it is going to strike. We have a very efficient member of this Section, a member giving his presence to this convention for three days, attending the sessions, and all at once he gets a telegram that an accident has taken his wife.

E. H. COTCHER (Supervisor of Safety, The Murray Corporation, Detroit, Mich.): I move the resolution be passed.

(The motion was seconded and carried).

CHAIRMAN DUNNEBACKE: For our first subject this morning, "Training Foremen in Accident Prevention," we have selected Dr. Harry Myers, of the Delco Light Company and Frigidaire Company, of Dayton, Ohio.

Throughout the whole range of life there are certain fundamentals governing man's every day contract. Dr. Myers has delved in and has grasped a wide range of that activity. He not only knows the philosophy of it, the esthetics of it, but he knows from actual shop operations, from actual work in factories and shops, the different links that connect these steps in our society. As personnel director of the Delco Light Company, he has been doing a very extensive work in foremen training, foremen development, and I know that he is going to give us a very interesting talk.

Training Foremen in Accident Prevention

Harvey Myers, M.D., Personnel Director, Delco Light Company, Dayton, O.

I asked Mr. Dunnebacke to take the census this morning that we might feel a little more acquainted with each other, a little more friendly perhaps; because I think these talks should be very, very practical, very personal; and certainly if we know each other better the result will be better.

I am sorry it has been my misfortune to be absent from the convention during these days. I know you must have had great sessions and I know now as you round out the closing day, you should be having an intense feeling of the need for action of some kind. So if you will allow me, I am going to get onto one of my pet subjects, which is that unless you carry this stuff back to your plants, into your work, and put it in operation, you have been a useless expense to your company. I want you to appreciate the seriousness of that problem. I know you will if you think it all over.

What are you going to do about it? What are you going to do about these things you have heard? Whenever a class leaves any of our rooms I wonder to myself, "What are they going to do about it?" Is this particular thing we are talking about going to show up in the plant in the next half hour, the next day, and so forth? Is this going to show up in your plants soon after you get back? Are your plants going to take on a different aspect because of your being here? That is the practical side of it, and folks, that is where most of us fall down. Some way or another we stop short of doing the necessary thing. One of the favorite questions I like to ask is this: What per cent of the things which you have heard or seen or read, that you have admitted would help you on your job and make you a better success in life, have you really done? I wonder.

Mark you this, of the things that will be said here this morning, the things you admit you can do and should do in the interest of your company and in the interest of yourselves, most of them you will forget. That is one of the reasons why they always take up the collection in church with soft music while you are still sitting, still in the atmosphere. They would never risk it after you get into the hall, because most of the people lose the atmosphere before they get out in the hallway.

How long can you hold an atmosphere? I wonder if you have read Elbert Hubbard? We have asked all our Delco people to read what he says about initiative. You have all seen that the world bestows its big prizes, both in money and honors, for but one thing, and that is initiative. What is initiative? It is doing the right thing without being told; but next to doing the thing without being told is to do it when you are told once. Hubbard divides the world into three classes of people: those who do it without being told at all, and to them go the prizes of life; those who have to be told once; and those who have to be told more than once. The successes of life lie in the first two classes.

The Measure of the Failure Class

When you have to be told more than once you are in the failure class. Is that logical? Watch yourself. Watch yourself in regard to anything that has been said in this convention that has been of new interest, anything in this whole convention about which you have said to yourself, "Yes, I am going to do that." Watch and see if you do it. Check up on yourself.

The first man we have any real record of having checked up on himself was Benjamin Franklin. If you have not read the autobiography of Benjamin Franklin, you should read it. We have sold over a hundred copies of that to our foremen in the Delco Light Company. Benjamin Franklin tells how he checked up on himself and made himself do the things that he should do. I recommend that book most heartily to anybody who, after he gets away from this convention, still finds himself not doing the things he promised himself he would do. You read that autobiography and I believe it will help bring the action that is necessary.

Here is another great big law that ties right in with Elbert Hubbard's talk on initiative, and that is this: My value is governed entirely by the amount of supervision I require. That is why the world bestows its big prizes on the people who don't have to be told at all, who need no supervision. That is why the man who can still do things when told once is a success. It means the least possible supervision. That is why those who have to be told more than once are in the failure class because they require the greatest amount of supervision and it is too costly; they fail. I am saying all this in a fond hope that the things which you promised yourselves you are going to do after this convention, you will do when you get back. Nothing could mean more to your plant, nothing could mean more to your personal success in life.

I am addressing a very mixed audience. I think 40 per cent are safety men. I wish I knew right now what your relation is to the foremen back in your depart-

ments, back in your shops. Then we would have a basis from which to start. I am talking now particularly to the safety engineers. I wish I knew how the foremen regard you. I wonder, because it would be entirely how you are now regarded in your organization as to how we must talk to you about training those foremen in safety work. I wonder if they are now interested in it; I wonder if they now look on you as the man actually helping production; or I wonder if they look upon you as a hindrance and hate to see you come into the department! The general managers who are here know what I am talking about.

I am wondering if the safety man in your organization is very popular. I am wondering if general managers here have an unpopular safety director. If so, he isn't a good one; and what is apt to make safety directors unpopular in their own organization is also apt to keep them from getting along well with the productive forces. You and I produce only indirectly. The employees get the stuff out. The foreman who directs getting the stuff out is making the money that is paying the wages, and I am wondering how you and I are regarded by the productive forces.

If you are not popular in your organization, I will bet I can point out one of the reasons. Did you every stop to analyze the difference between work and play? What is the essential difference? We say in Delco Light we are working on two big fundamental things, trying to make work a pleasure and trying to help people do well in life. One of the things which makes work distasteful, and the deep difference, I think, between men at work and men at play, is the question of authority. And I will say to the safety directors here, if you are not popular in your plant, ten to one you have used your authority unwisely. The very fact that you know you can stop a machine if it isn't fixed up with a safety guard, is a bad thing for you.

An Indication of Solid Character

That is one of the things which will keep you from being unpopular and unworkable in your organization, or wherever else you are. Nothing discloses real character like the use of power. It is easy for the weak to be gentle, but if you want to know what a man really is, give him power. This is the supreme test.

It is to the glory of Lincoln that having almost absolute power he never abused it except on the side of adversity.

Now when you go back and are inclined to talk hard to a foreman, knowing that you have the authority to close his machines down if he doesn't do what you want him to do, if you are going to get hard, nasty and unfriendly, just say those five wonderful words to yourself: "This is the supreme test." Just remember you are not measuring up under the test. How many thousand times I have said that to myself. I was going to lay somebody out because I had the authority to do it, but I caught myself and supervised myself, and I didn't.

What I am trying to say is that this is one of the ways not to teach foremen, by the authority you have. You can't train people by teaching if you don't know the fundamentals of good teaching. Most of the scrap back in your departments today is due to poor teaching, poor instruction. That is absolutely true. I will never forget the first meeting I had in the Delco Light. I was talking about the great need of better instruction; and the boss, Mr. Katering, came into the room. If you know him you know what a marvelous man he is. The boss listened for a while, then he got up; and he told me more about my own job than I had ever known.

He outlined three fundamentals as only Boss Katering can. He said, "Instructions degenerate and do not propagate." That is why it is so hard to teach. Instructions run out, they stop. If I tell a man a certain thing and it passes through four hands, you know what happens. Instructions do tend to degenerate, they don't propagate. They don't develop, they run out. That was the first thing Mr. Katering laid down. Instructions tend to degenerate, they don't propagate, and for that reason you have to be so definite in what you say.

Mark the next, too. He said, "You are poor instructors because you are poor actors. You don't like to do your stuff again and again in an interesting and entertaining way." He said, "Last night I went to see Ed Wynn. He is doing the same damn fool stuff that he did three years ago when I first saw him, and yet I sat there and laughed my fool head off; and then I thought: What has it cost Edwin to still keep doing that in such an interesting and entertaining way at the end of three years? Just the other day I saw his salary is something like \$5,700 a week! Why? Because he can do a thing over and over again and again and for years, and you like it."

Ketering said, "I am positive that most of your men want to do good work if you are smart enough to show them how in an interesting and entertaining way." Do you get that? Not with authority. Although it is true that most of our instruction in our organizations, in our plants, is given in the way of command. But are you interesting and entertaining? Take Ketering's word: "I am positive that 95 per cent of your men want to do good work if you are smart enough to show them how in an interesting and an entertaining way."

I believe that the foremen of your organizations will be interested in the safety movement if you are smart enough to take home the inspiration of this convention and give it to them.

Any Leader Has to Be "Smart Enough"

If you are going back in the same dill pickle state you came away in, if you have been anything but friendly and so forth, anything but pleasant and agreeable and cordial in your organization, and if you can't carry back from this convention this inspiration to your foremen, then you are not as good a safety director as you should be, and Ketering will say you are not smart enough.

Notice, he didn't say how smart; he said, "if you are smart enough." It simply means this, that if you are smart enough, if you can carry away the inspiration of this meeting, then I believe that your foremen are going to be interested in having you come in their departments on this question of safety; but if they are not interested, if they would rather have you out of that department when you come in, then, folks, you are defeating yourself in your project.

There was a third thing that Ketering said: "You are poor instructors because you are apt to teach the last thing you learned and not the first; so that poor devil is learning it from the wrong end." If there is some man in your department who is not as interested in safety as you are, just know that he hasn't the grasp of it that you have. Try to remember how dumb you were, how little you once knew, what first created an impression and interest in you. If you will start there and get that over to your foremen, I honestly believe that you will have interested them, and that is the first thing for you to begin with. If your foremen are not interested in safety I am very, very sorry for you. I believe that you can have interested foremen in this work, this marvelous work, if you will obey those things that Boss Ketering laid out. It is all in the teaching, and to get that started you must first have an interested group of people.

I believe, folks, that we go far afield when we consider safety something apart in itself. I have seen so many people do that, just as they have considered personnel a thing apart by itself. It is all a part of a big work, the development of the healthy, intelligent, interested working force and organization. The fundamentals that go into making safe departments are the fundamentals that go into making good foremanship. Good foremanship means safety and safety means foremanship. What are the fundamentals of good foremanship? When you go into a room do you say to yourself, "There is a good foreman"? When that department is clean and when it is in order, isn't that true? And right now when you go back, start the first thing to have a clean and orderly department and start the biggest thing for safety in your plant that you could ever mention.

The plants that fail are dirty, disorderly plants; the plants that succeed are the clean, orderly plants. Is that true in your experience? Can anybody dispute that? Have you ever seen a safe department that was a dirty department? Did you know that order, absolute order, is the first process of life? We approach the average foreman and the department is dirty and all disorderly. When you ask him about it he says, "I know why; they took one of my janitors away from me." Oh, what a mistaken notion of order. They are thinking in terms of order in janitor work. They don't think of order in the life process. We have all our foremen repeat this and mean it, "Order is the first step in production and if I can't manage the order of my department, I can't manage the department." Do you believe that?

The greatest step in low cost production and good production is order. We firmly believe in Delco Light that unless we can get a foreman interested in the question of order we can't get him interested in any proper question of manufacture. We go to great length. One of the little definitions of order is interesting. Order is a place for everything and everything in its place. In our definition of order we say, "A place is in order when there are no unnecessary things about and those things that are necessary are in their proper place." "No" in that sentence means not any, not even one. There comes the bite. Not even one. If you want to see how this is worked, come down to the Delco Works.

The Safety Movement Inspires Better Foremanship

I just want to make another point in conclusion. The whole safety movement means better foremanship; better foremanship means safety. The best foremen you have in your place are the safest foremen. Why? Because underneath the whole thing we know that the thing which makes for safety and makes for foremanship and makes for the better things of life, is the elimination of carelessness, and that is what is wrong with most of us. That is why we show such a low per cent in accidents. That low per cent most of you would have if you were honest about it. Don't you think that is true? Carelessness in your plants today is not only causing the accidents but is responsible for the poor work that you are sending out.

We know in studying the human side of this question, that the material side is rarely at fault. Most of the things you are sending out now to your customers are right, but not quite all. The big question is why aren't they all right? If most of the things are right it shows that your theories of manufacture, your theories of the fabrication of the articles, are pretty much right. The big question is, why don't they all go out right? Because of the human side—the failures, the frailties of human nature, and the biggest of all is carelessness. We have got a homely little definition for carelessness down there which I want to submit to you. "You are careless if you do not do anything as well as you can." Failure to do your best on anything means carelessness. You think that over, and then just ask yourself this: "How many times am I doing my best on a thing?" Folks, it is not added knowledge we need, it is an added something else that absolutely gets us by the nape of the neck and makes us do our very best.

Here is a little precept of three things that will absolutely eliminate carelessness in your shops and in yourselves: "Be clean, be orderly and have proper working equipment (and by equipment I mean everything that you use) and you can't be careless."

Folks, these things are all tied together. I can't separate them. Safety, accident way through, in shop or in home. I wish we had time for a discussion. I should prevention, is simply good foremanship, good managership, good management all the like to have your ideas. Of course, I am still wondering just as I did when I began to talk to you: What are you going to do about it when you get back?

AUGUST KAEMS (Kenosha, Wis.): I make a motion that we give this gentleman a rising vote of thanks.

(The motion was seconded and carried.)

CHAIRMAN DUNNEBACKE: While I should like to declare the meeting open for discussion, I hesitate because we have some other interesting talks and we need the time; but I think we will take about five minutes. There may be somebody here who has some particular thing he would like to have Dr. Myers emphasize more.

CAPTAIN FISHER (Illinois Manufacturers' Association): If I am quoting the doctor right, 95 per cent of the men will play the safety game if you are able to put it up to them. I am not asking a question, but I want to say something that will back up that sentiment. I have been doing this work for ten years, talking many times every day, and I get a better hearing in the shops and plants than a preacher does. Why? Because I talk along the lines of the things that interest men and that the men know are for their good; and I am constantly saying to managers, superintendents and foremen, "If you will get enthusiastic along this line the plant will get it." And it is true of my superintendents, like foremen, like workmen. It is amazing how much of the accident problem is due to the lack of enthusiasm among the foremen or the superintendent in putting this safety work up to the men. The men know it is for their good and they catch on and respond.

CHAIRMAN DUNNEBACKE: We will proceed to the next subject. The Fisher Body Corporation has done some wonderful work in safety, and Mr. N. M. Loney is here to tell us how they do it.

Application of a Cash Accident Prevention Bonus

N. M. Loney, Fisher Body Corporation, Detroit, Mich.

Some time ago I was confronted with the desirability of devising some way of bettering the performance in accident prevention in certain rather hazardous departments of the corporation with which I am connected. In order to meet the situation, the existing safety organization was expanded somewhat, the mechanical guarding was considerably improved, and a campaign of education was initiated. A little later, a cash accident prevention bonus system was installed, and as a result of these measures considerable improvement has been shown. I am unable definitely to allocate the improvement in the record to the various measures taken, but I believe that most of it is due to the cash bonus. I do not propose to go very far into the question of the desirability of such a system, but only wish to say that under a given set of conditions it has worked out very well for us.

It is very easy to decide to pay a cash bonus for accident prevention, but I found it quite a difficult task actually to set up the machinery by which this system would be administered. The reason for my appearance here today is that I believe, after considerable effort and experience, we have devised a system which may be of interest to those who may decide that their conditions justify the application of a cash bonus system, and this paper may be of assistance to others who may wish to use such a plan.

The first question which arose was: to whom shall the system be applied? An inspection was made of the records of payments for compensation and medical attention for several years back, and the departments where such payments had exceeded \$5 per year per man were selected as having sufficient expenditures to justify giving a bonus which would be worth while. This \$5, by the way, is the figure which was, more or less, arbitrarily selected as being one which would be large enough to attract the interest of the foremen, and still small enough to leave the possibility of an actual reduction in total cost of compensation and bonus. I might say here that our results have justified us in putting the whole proposition on a cost basis. The humane

side of it has not been overlooked, but we feel that this followed as a matter of course, and we all know that a policy which justifies itself financially is more easily installed and operated than one which has to be placed on an altruistic basis.

As stated above, this figure was adopted more or less arbitrarily after an inspection of the actual experience, but there is no reason why it could not be made considerably less as long as it produces sufficient remuneration to be worth mentioning. Most of the foremen whom we were trying to reach were those in direct contact with the workmen, each supervising on an average of 20 to 30 men, and this figure would produce an average bonus of from \$100 to \$150, which, if earned, would add materially to the foremen's earnings. The department foremen, who supervise the foremen, and who thus, in most cases, are one step removed from direct contact with the workmen, were also considered integral parts of the picture, and their bonus was made dependent upon the earnings of the foremen under them. All rules, of course, require exceptions, so that in order to take care of the exceptions a minimum for any foreman was set at \$20 per year per foreman, and a maximum of \$400 per year per foreman. Between these limits the system, which will be explained later, was allowed to work itself out to whatever it produced.

These limits having been established, the next question that came up was to make sure that the money appropriated was distributed on as equitable a basis as possible. This brought us immediately to the question of the relative hazard exposure of each foreman. Various insurance authorities were consulted, and a study was made of the available hazard ratings. None of these seemed to break down the hazard to fit the individual operations, and all of them were somewhat difficult to explain to foremen who ordinarily are not very well posted on this subject; I therefore conceived the idea of allowing the foremen to set their own hazard ratings.

Pointing Out the Most Hazardous Occupation

It happened that we had five mills doing similar work on the wood parts, and we had two press rooms and two die-making and maintenance shops. All together, these plants employed about 5,000 men, and the operations were quite similar in all of them; generally speaking, the hazard exposure in each was about the same. Small groups of these foremen were called together, and were asked, "What do you consider the most hazardous occupation in your plant?" In the case of the wood mills, the usual reply was that hand jointers, wood shapers and mitre saws were all quite dangerous and equally so. We said, "All right; then, we will tentatively assign to these machines 100 points on our scale of hazards." We then asked, "What do you consider the safest operation?" It was unanimously agreed that bench glueing of wood parts was the least hazardous, and we then set this up at 10 points on our scale of hazards. We then took up each machine or operation as listed on the rating sheet, which will be referred to later, and after considerable discussion fixed a rating on each between the above limits. In cases where helpers were employed, if there was a difference in the hazard exposure between operator and helper, this was fixed in the same manner.

Of course, quite serious differences of opinion as to the degree of hazard developed inside the various groups and between the different groups. In cases where the members of the groups differed, the majority was allowed to prevail; and the differences between groups were settled by a committee of superintendents of the various plants who finally adopted the figures used. These ratings were not entirely inflexible, as the safety department sometimes modified ratings for a particular plant or operation where conditions justified

this. For instance, the difference in the surface over which trucking was to be done might very well justify a change in the hazard ratings for this operation in the various plants. A record is being kept of actual experience, so that as time goes on it is hoped that these hazard ratings may be put on a more scientific basis, but since the whole underlying motive of the accident prevention bonus is psychological, we felt that if the men concerned were allowed to set their own ratings, it would be much easier to overcome the feeling that any individual was being unfairly treated.

As time went on, the system was extended to outlying mills, in one case to a saw mill, and also to take in the departments having to do with the preparation of metal (having first started with the stampings alone), and the hazard ratings for each department developed as described above. Attached in Appendix "A" are the following hazard rating sheets that have been adopted and are now used:

Wood Mill, Press Room, Die Shop, Metal Room.

These sheets are used as follows:

Assigning the Amount of the Bonus

A rating sheet is filled out in duplicate for each foreman by inserting in the proper spaces the average number of operators and helpers expected to be engaged under each foreman during the ensuing quarter. The rating for each operation is then multiplied by the number of workmen engaged on same, and the total extended and carried to a sheet total, which latter is the sum of the ratings of all operations under the foremen's supervision. The ratings for individual foremen are then added to get a total rating for the general foreman having several individual foremen under his supervision.

The next step is to assign the amount of the bonus. The theory here is to make the bonus of sufficient amount to be attractive and at the same time rather difficult to get. Considerable experimenting was done to fix a method by which any severe accident would eliminate the bonus for any individual foreman during the quarter in which it occurred, so that we, at this point, arbitrarily set up an allowance which may be said to express the probable normal percentage of time expected to be lost on account of accidents to the total time worked under each man's supervision. Any foreman exceeding this allowance would lose all of the bonus set up, and any foreman losing only a portion of the allowance set up would lose only a proportionate amount of bonus. You will note that the allowance is proportional to the hazard. The allowance is taken as one-tenth of the rating, and the bonus is based on twenty cents per point of allowance, or as a short cut, two cents per point of rating.

In the case of general foremen, the allowance is taken as one-fortieth of the sum of the ratings of the foremen reporting to him, and the bonus is based on forty cents per point of allowance, which, as a short cut, is one cent per point of rating. (Appendix "B" is shown as a typical summary for one plant.)

The allowance and bonus figures are then carried to a printed bulletin sheet, which is posted in a conspicuous place in the plant in a neat glass case, subject to the inspection of all concerned. At payroll periods the total time worked under each foreman is roughly computed, and the percentage of time lost is deducted from 100 per cent, and the result posted in the column shown.

It may appear that computation of the time worked under each foreman would be quite burdensome to the time department, but a little calculation will show that a five or ten per cent variation in the total time worked will only appear in about the fourth place of the bulletin rating, and will not

affect the bonus materially one way or the other. The reporting of the time worked under each individual foreman has been left to the foreman himself or a clerk, who reports to the safety man, who, in turn, ordinarily operates the system; and if the total time reported by the foremen checks within reason against the timekeeper's records of the total time worked, it is accepted as correct.

Here, again, I want to make the point of the psychological effect. It was felt that if the men were convinced that the system was being administered fairly it need not be scientifically exact to accomplish the result desired. Therefore, we accepted the approximation of the time worked, rather than going to the expense of actually keeping a check on the time records. In some departments it happened that the time was already kept as desired for this purpose, and of course where this was the case it was used.

When the ratings are posted at each pay period, there is also posted on the glass of the bulletin board a typewritten summary of the time losing cases, giving the name of the workman, name of the foreman, nature and cause of the accident, the time lost, and usually some warning pertinent to the record.

The Bonus is Paid at Quarterly Intervals

In the above discussion, the system has been referred to on an annual basis; in actual operation the bonus is paid at quarterly intervals, and new bulletins are posted at each quarter, no lost time being carried over from one quarter to the next; so that if a foreman has made a poor record in one quarter, he is encouraged to make a fresh start in the following quarter. At the end of the quarter the amount earned is computed in proportion to the time saved out of the allowance. A cumulative record is carried in successive pay periods so that the last column automatically gives the rating of time saved out of the allowance.

In conclusion, I wish to present some statistics as to the actual results accomplished during one year's operation of this system. It was applied to an average of 5,783 men who were supervised by an average of 215 foremen. The bonus set up amounted to approximately \$28,700 for the year, about \$4.96 per man and \$133 per foreman. The amount earned was approximately \$22,200, about \$3.84 per man and \$103 per foreman.

We had a couple of plants with a rather bad record—one plant in particular having paid during the previous year for compensation and medical service arising from accidents \$35 per employee. This plant employed from 500 to 700 men. In the succeeding year, we paid out in compensation something less than \$8 per employee, and for bonus about \$4 per man, so that there was an actual net saving in the total expenditure of about \$23 per man per year. Another plant paid in the previous year approximately \$40 per man for compensation and medical service, and in the succeeding year only about \$14 per man for compensation and medical, and a bonus of about \$4 per man, showing a saving of about \$22 per man per year.

In the plant in which there was the least improvement, the sum of the compensation and bonus paid just exceeded the amount paid for compensation alone the year before, and statistics indicate that the weighted lost time was reduced by approximately 70 per cent over the previous year in three of our plants, and from 40 per cent to 50 per cent in the balance. The actual net saving in the departments to which the system was applied was in the neighborhood of \$10 per man per year.

I trust that I may be pardoned for lugging these actual figures into this talk, but it again illustrates that any good safety device actually pays.

In the above figures, no allowance was made for the expense of operating the system. This was mostly done by the existing safety organization, and the total expense for this department was very little, if any, greater than it would have been if the bonus system had not been employed. When the system was first proposed, it was feared by a great many of the production men that production would suffer on account of it, but in the whole year's operation no complaint on this score has been brought to our attention, and on the other hand, it has undoubtedly served to increase production since it has prevented the unaccounted-for loss of time which inevitably occurs whenever a serious accident occurs.

In connection with the statistics, it is interesting to note that 35 foremen out of a total of 215 went through the entire year without an accident, but no foreman failed to receive some bonus. It has been found to develop a healthy spirit of rivalry, and the bonus, being distributed quarterly in the form of checks to the assembled group of foremen in each department, it gives the safety man a very good opportunity to review the record of each man during the previous quarter and draw the necessary lessons therefrom.

As we are extending this system to our outlying plants, we are saying to the foremen affected that we feel we have been paying the insurance company or the compensation department money on account of accidents which we would much rather pay to the foremen if they can prevent accidents, and at the same time we expect to make a saving on the total cost. Now that we have the benefit of the experience in the record quoted above, we are finding it very easy to make real safety men out of foremen who were formerly quite indifferent.

In closing, I wish to repeat that I am not advocating the adoption of the bonus system for accident prevention, as such. I only wish to give others the benefit of our experience with it, and in that connection I shall be very glad to answer any questions and to show privately to anyone interested, the actual detailed records which I have with me.

APPENDIX A

Hazard Rating Sheet for Foreman Thos. Caley. Dept., Die Shop. Plant No. 1.

Operation	Operators			Helpers			Miscellaneous		
	Rating	No. of Operators	Total	Rating	No. of Helpers	Total	Rating	No. of Misc.	Total
Stock Saw	25			25					
Mitre Saw	100	4	400	25	4	100			
Wood Turning Lathe	50								
Band Saw (Wood)	60			25					
Shaper—Double (Wood)	100			90					
Jointer—Hand	100	2	200	40	2	80			
Planer—Metal	30								
Planer—Wood	45			35					
Disc Sander—Wood	30								
Electric Welding (Spot)	30								
Gas Welding	40								
Pattern Makers	10								
Template Makers	10								
Apprentice (Pattern Makers)	10								
Emery Wheel	35	8	280						
Filing Machine	10								
Blanchard Grinder	45								
Slotter	35								

501

Hazard Rating Sheet for Foreman Sam Brown. Dept., Metal. Plant No. 1.

Operation	Operators			Helpers			Miscellaneous		
	Rating	No. of Operators	Total	Rating	No. of Helpers	Total	Rating	No. of Misc.	Total
Electric Welding (Spot and Flash).....	30								
Gas Welders	40								
Punch Press	70	4	280						
Milling Machine	40								
Auto Tapping	10								
Hand Tapping	10								
Power Square Shears.....	35			40					
Metal Band Saw.....	45	2	90						
Upright Drill—Single	30								
Upright Drill—Multiple	35								
Shaper (Metal)	35	6	210						
Power Hammer	15	3	45						
Disc Grinders	35								
Tool Makers	20								
Metal Inspectors	10	5	50						
Turret Lathe	30								
Emery Wheel	35	1	35						
Buffing									
Hand Rivetting	45								
Bench Hands	10	3	30						
Solder Wiping	40								
Solder Torch									
Metal Finish	20								
Metal Market	40								
Screw Machine									
Bench Hands	20	4	80						
Blacksmith									
Scrap Balers	20								
Tool Crib Attendant.....	10								
Painter									
Sweepers and Janitors.....	20								
Metal Inspectors	10	3	30						
Metal Flangers									
Tool Repairmen									
Buffing									
Truckers	55								
Sheet Steel Handlers.....	50								
Total		31	850						
FOREMAN: Sam Brown				Rating					850
P. J. GREEN				No. of Men					31

Hazard Rating Sheet for Foreman Joe Doe. Dept., Mill. Plant No. 1.

Operation	Operators			Helpers			Miscellaneous		
	Rating	No. of Operators	Total	Rating	No. of Helpers	Total	Rating	No. of Misc.	Total
Stock Saw	25	4	100	25	4	100			
Rip Saw—Self-Feed	40			30					
Double Cut Off	35			25					
Mitre Saw	100	2	200	25	3	75			
Jig Saws	60			25					
Band Saw	60			25					
Shaper—Single	100			90					
Shaper—Double	100			90					
Shaper—Box	100			90					
Tenoner—Single Saw	70	3	210	35					
Tenoner—Knife	60	5	300	25	1	25			
Jointer—Hand	100			40					
Jointer—Self-Feed	35			30					
Boring Machine—Single Spindle	40			20					
Boring Machine—Gang	65	4	260	65					
Boring Machine—Bevel	40			40					
Sticker	40			20					
Planer	45			25					
Linderman	50			50					
Router	40	2	80	20					
Dauber Bell	60			50					
Gainer—Multiple	50			50					
Gainer—Air	50			50					
Cluster Boring Machine	65			65					
Screw Driving Machine	20			10					
Nailing Machine	25			10					
Mortiser—Vibrating	30	10	300	20	5	100			
Mortiser—Oscillating	30			25					
Mortiser—Hollow Chisel	30			20					
Trucking	25								
Sweepers	25	4	100						
Gluing	10								
Saw Filers	35								
Plug Machine	20								
Repairmen	50								
Lock Groovers	75			50					
Portable Tools—Pillar Cleaner	25								
Drop Saw	25								
Stock Piler	25								
Dowell Machine	50								
Dip Conveyor	20								
Pattern Makers	30								
Car Loaders	35								
Stock Pilers	25								
Lumber Stackers	30								
Log Hookers	100								
Derrick Man	50								
Carriage Man	80								
Sawyers	30								
Mill Wrights	75								
Oilers	75								
Edgers	30								
Resaws	30								
Off Bearers	40								
Trimmer Men	50								
Hog Men	50								
Slashers	40								
Laborers	30								
Blacksmith	30								
Log Deck	60								
Ship Man	25								
Tractor Drivers	40								
Inspectors	20								
Stick Saw	40								
Cleanup Men	20								
Tenoner—Double	35	2	70	25	1	25			
Shaper—Box (St. Loom)	70								
Total		36	1,620		14	325			
Foreman Joe Doe				Rating					1,945
GENERAL FOREMAN: W.M. TOWN				No. of Employees					50

APPENDIX B

PLANT 10—MILL

Dept	Foreman	No. of Men	Rating	Allowance	Bonus
	Popovice	22	220	20	\$5.00
	Bowman	22	220	20	5.00
	Lucier	31	310	30	6.00
	BREFKA	25	750	20	8.00
	Wolnikowski	28	1,655	165	33.00
	F. Elton	19	1,680	170	34.00
	R. Brown	28	2,000	200	40.00
	J. Hicks	26	2,075	205	41.00
RA	FAUBERT	101	7,410	185	74.00
	Harvey	16	915	90	18.00
	Detloff	25	2,090	210	42.00
	Janusch	28	2,135	215	43.00
	Fournier	26	2,210	220	44.00
	Fred. Lutz	32	2,640	265	53.00
RB	SCHMIDT	127	9,990	250	100.00
	Dezelia	6	150	15	5.00
	Beeler	30	750	75	15.00
	Bielaski	31	775	75	15.00
	Joe Okroy	24	780	80	16.00
	Ephofen	27	865	85	17.00
	Luckritz	36	1,170	115	23.00
	H. Rand	44	1,835	185	37.00
	Gerow	45	1,955	195	39.00
RC	VAN SICKLE	243	8,280	210	84.00
	Metzinger	19	1,405	140	28.00
	Rozinski	20	1,435	145	29.00
	Brunner	28	2,180	220	44.00
	Dooley	33	2,170	215	43.00
	Teubert	38	2,245	225	45.00
	Cunningham	28	2,275	225	45.00
	Grahn	41	3,350	335	67.00
RC	LAND	207	15,060	375	100.00
	Lohrman	7	245	25	5.00
	Niewieroski (Sweep)	13	325	35	7.00
	Peller	30	750	75	15.00
	Ruemmele	12	1,560	155	31.00
	W. Jacobs (Checkers)	22	550	55	11.00
	TOTAL	837	44,920		\$1,267.00

CHAIRMAN DUNNEBACKE: There is no question but that the idea of paying a cash bonus to foremen for doing safety work which we generally consider as being a part of the everyday work, is rather revolutionary. However, it is also true, as Mr. Loney said, that any principle or any movement that you want and can put over through a financial means, instead of altruistic ideas, will go over quicker. Now, no doubt there is many a manager who would be willing to pay real honest money for safety work if he knew that he could get that money back. Here is one instance of a company that is doing that. They are actually paying out cash bonuses to foremen for doing safety work, and by doing that they are saving money. It is a business principle. They are not only saving money but back of it all they also get these other things that we get through humanitarian ideas, love of their fellowmen.

For instance, there is one case, Mr. Loney cited, where over the past year they paid \$35 compensation per man in the plant. After they put in the system the next year they paid \$8 and an additional \$4 bonus to the foreman, with a total cost of \$12 against \$35 the year before.

Here is a system, machinery that is all working and has been working for eighteen months. While I am not satisfied in my own mind as to whether we should pay foremen cash for doing safety work, here is a system that is working and actually paying money to the men. As Mr. Loney says, if you are interested in it, and want to go into it, you are absolutely welcome to his machinery.

H. E. MILLER (Chevrolet Motor Company, Detroit, Mich.): I should like to ask Mr. Loney what the reaction has been among the men on the production floor, the

actual producers, on the paying of the cash bonus to the foremen, when they are participating in none of the dollars and cents.

MR. LONEY: I am going to ask Mr. McCarthy, one of the operating men, to answer that question.

MR. J. MCCARTHY (Fisher Body Corporation, Detroit, Mich.): Mr. Loney stressed the point as far as the cash is concerned. The cash bonus has gone on for eighteen months, but I want to say that the cash part of it is practically out of their discussions at this time. The bonus affords the plant management an opportunity to see at the end of that bonus period what percentage of reduction has been made in accidents. Consequently, at the end of that bonus period, the whole period for all the foremen, the percentage is worked out. For instance, in one period it might be 78 per cent of the bonus paid. The next period will come along and if the bonus paid is less than the previous bonus period, we have had a greater number of accidents. If the bonus paid is higher, then the accidents have been less, of course. If it is higher, naturally a higher bonus is paid, and if it is lower, someone has to explain why.

The Foreman Sees the Injured Man In His Home

I will mention a welfare point. When a man has an accident the foreman doesn't let it go at that; it is called to his attention by the safety man and the foreman calls at the injured man's home that night to see if there is anything that can be done. He will get him in to work a great deal quicker by showing this interest. Don't forget the cash is some incentive of course. But they all want to get that percentage higher than it was in any previous bonus period. I can cite one shop in particular, the die shop, where in the last bonus period they had 96.6 per cent of the total amount of bonus that should have been paid. An unfortunate accident was all that kept us from 100 per cent.

The bonus is the greatest thing I have ever seen. A lot of people condemn the idea of paying cash to a foreman, but I have worked at quite a few manufacturing plants and it is the greatest thing I have ever seen.

As far as the workman is concerned the cash paid to the foreman seems to have gotten out of his mind entirely. The cash part of it seems to be forgotten. The chart being shown in their plant brings up the percentage. The men in the shop don't mention the cash, but they will speak of the percentage of bonus that was paid. It seems to bring out the point that accidents are being prevented in their department if the large amount of bonus is paid, and the actual cash being paid the foreman doesn't seem to enter into it. I have never heard a complaint about it. But the greater percentage of cash bonus paid in that department naturally makes them feel that they are helping to cut down accidents.

MR. LONEY: I should like to hear from any more of the Fisher Body men here operating the system or in contact with it. Have you ever had any grievance, fancied or real, on the part of the workmen on account of the foremen getting money? If any of you have, I should like to have you speak right up.

MR. MILLER: Our men have never participated in the actual cash plan.

MR. LONEY: The underlying theory is that this foreman, if you want to put it that way, is his brother's keeper in regard to accidents. It isn't the workman's job so much. It is the foreman's job to train the workman to be safe, and the foreman is being paid for his work in training the workmen, and not the workmen. It would be rather ridiculous to pay a man to save himself from getting hurt. The man who trains him, I believe, is entitled to his reward.

O. J. OLSEN (Fisher Body Corporation, Detroit, Mich.): Is Mr. Saborin here? Mr. Saborin is the general foreman over the metal shop: that is metal stampings after it leaves the presses. Mr. Saborin and several others, in my mind, stand out among all the foremen. The first thing Mr. Saborin did was to put his house in

order. That was housekeeping and that is the important part of the whole business in safety. Then he went further and equipped guards on the machines. All right. He wanted to go further than that. There were a lot of accidents occurring in the department. One of them was to a man who was continually going into the hospital for slight lacerations. So he gave the medical authorities a list of his foremen and when any of them had any accidents the first aid attendant notified Mr. Saborin several times a day in regard to them.

By this analysis Mr. Saborin found that a particular man was continually going to the first aid room. He looked into it and found that it could be corrected by putting a little tape on the man's finger; so the man gets this tape on the finger every morning or twice a day.

There is another man in our organization, a foreman in our wood mill, who has about 30 miter saws or table saws. This foreman has gone through 14 months without a lost time accident. The miter saw is a very dangerous piece of equipment.

You talk about the men under the foremen and their reaction to the fact that the foreman is getting a cash bonus. There was some little reaction to that, but it was only in a few isolated cases. I should like to have Mr. Saborin tell you whether in his group of men (I think he has around 250 men) has any experience with that.

Apparently the Bonus to Foremen is Not Resented

S. SABORIN (Fisher Body Corporation, Detroit, Mich.): The fellows don't feel they should be in it because we are keeping them working.

MR. OLSEN: They feel you are keeping them on the job. I think that is a good answer.

There is another man here, in the Press group. Mr. Schnapp, have you heard anything from the men under your supervision about resenting the foremen getting a bonus and they not getting part of it?

MR. SCHNAPP (Fisher Body Corporation, Detroit, Mich.): Not at all.

MR. OLSEN: Mr. Luce has charge of the press shop, is superintendent of it. Mr. Luce, have you heard in your contact with the foremen, anything about it? I know that Mr. Luce is very close to his foremen.

FRANK LUCE (Fisher Body Corporation, Detroit, Mich.): The press room workers are all working on piece work and we find that they like to get the piece work and they don't feel that the foremen are getting too much.

MR. OLSEN: You haven't heard any of the men say that they felt they ought to be a party to it?

MR. LUCE: No, sir.

R. F. THALNER (Buick Motor Company, Flint, Mich.): The testimonial from the foremen is all very well and good, but how many of the fellows come in and kick to the foremen? I think the testimonial you want to get is from the men in the department. They are the fellows talking it over.

MR. OLSEN: Mr. Thalner, I personally have gone down below the foremen.

CHAIRMAN DUNNEBACKE: I am going to reserve any future discussion on this subject until after the next speech. We may then have some time left and may have some more pro and con on the idea.

The third and final paper is one dealing with the question of safety as a part of every foreman's responsibility and the subject is going to be handled by Mr. Art Williams, who is now safety director for the Chrysler Motor Car Company. He has had many years of experience along safety lines with the American Telegraph and Telephone Company. He was last Tuesday elected to the chairmanship of the Automotive Section and I am sure we will get some very good information from Mr. Williams' talk.

Safety—A Part of the Foreman's Responsibility

A. M. Williams, Safety Director, Chrysler Corporation, Detroit, Mich.

I had a very, very nice long formal paper prepared here. I thought a whole lot of it. After Dr. Myers got through this morning I made up my mind I would put it in the waste paper basket. It seems to me that our whole job, before I get down to the subject assigned to me, is keeping this entire safety program and our educational program in very nice balance. What I mean by balance is this: We can start a safety inspector out in the plant and say, "Now, Bill, we have checked our accidents for last year and find that 85 per cent of them could not have been prevented by improved mechanical conditions. Fifteen per cent of them might have been. Therefore, weigh your time and let's go at this 85 per cent."

That is the job that we have to keep uppermost in our minds all the time. Naturally, as soon as he gets down on the floor he runs into Bill Jones and the safety competition is pretty keen. It is over in our place, has been running now for two years, and the management is doing a lot of racing and a lot of rooting. Some are on the carpet for bad records and some for good records, and every foreman is fighting to get his men back; no bonus in it, by the way, but just his own reputation and his own obligation as head of his department; his reputation is at stake. Naturally the foreman says, "Well, when am I going to get that guard on that machine? I put an a.d.o. (as we call them, merely a memorandum) through the maintenance department, asking for a certain machine, day before yesterday, and there hasn't been a darned thing done about it yet. When am I going to get it?"

To get the foreman away from the mechanical side of it and to talk about Bill Jones and Charlie Smith working on a sheeter, with long sleeves, possibly in violation of safety rules, to get him back on the educational side of it, is the big job, because every foreman (I know how they feel because I was a foreman myself for years) looks at the mechanical side of it; he is machine minded, material minded. And he doesn't give enough thought to that third side in the triangle.

I don't know whether we are going to tie a string around the fellow's finger to keep him in balance so that he will have something to remind him or not. If we don't, he is continually being driven right back to the mechanical thing instead of standing on two feet and saying, "Wait a minute, Bill; that thing is going through. I am making a memorandum now and we will see that you get it. But how about these new men down here? You had three new men yesterday. You go over the safety rules with them and see they qualify. They may not be, just through ignorance; they are green here and they may slip. If they do slip your record for the last year and a half without an accident in your department is knocked into a cocked hat."

Naturally when we started this, our foremen asked for help. They said, "If I am going to teach, if my job is partly that of a teacher, what have I got to work with?"

Well, we went through all the educational material we could pick up and you boys have contributed a lot of it. We stole your ideas wherever we could find them, we wrote many of you for ideas; remember the foremen were asking for this information. They were asking for help. We got out altogether six pamphlets, by trades, so that a man could have a first reader in safety to use in teaching the green man about the hazards of his job. We started each one of these with general rules that are common to all of the six.

Then the last part of the book is devoted to the specific hazards of the department that the man is working. "How about these new employees now? We are taking on a great big bunch of men and I can't see all of them. Can't you give us a lift?" the foremen asked.

So we set up a routine at the request of the foremen and when the new employee comes into the employment office and is qualified by the interviewer for the job, he

next goes to the physical qualifier; but before he goes, the qualifier calls his attention to the fact that he is going out on a welding job and there is a book of instructions to welding operators and he will be expected to learn those rules and stand an examination on them. But he doesn't get the book yet. He goes over to the physical qualifier and the physical qualifier notes on the card of introduction that he is going on this type of work. He also, while talking with him and getting his history and writing him up, checks that same angle and says: "You are going to be given one of these books and later you will be examined, because there is a safety campaign on in this plant and if you want to get yourself into ill repute, I don't know any better way than for you to get mugged up in an accident."

He goes back to the employment office and the clerk, after giving him the tools, gives him the book. The man who introduces him to the foreman talks to him on the way out. He is turned over to the foreman and the foreman gives him the final shot and says: "Some time in the next three or four days I am going to get to you and see if you can pass the examination on these rules." In the beginning, the question was whether the men would read the rule books. The question from the foreman was, "Will they read them?" I think they are put across in a friendly way and it brings out one point, if you will permit me to digress. As chairman of the Automotive Section, I am going to submit to the Executive Committee sometime in the next two or three months the plan of standardizing, or appointing a committee on standardizing, safety rules, safety instructions, for use by all of the plants, something that all men who are working in automobile plants will get in the same way, at Packards, at Buicks and at Chryslers. Therefore, when the man leaves your plant and comes to mine he is familiar with these rules, he has been over them and knows what to expect, and what to expect in the way of discipline.

Industry Parallels the Army Organization

I made a few notes here, getting back on safety as a part of the foremen's responsibility.

Industry today tallies very, very closely, or follows very closely the old military traditions of the Army. In fact, when we set industry up in large groups as we have today, we just simply stole the system from military experience; and we should gather this from it, that responsibility and authority always must rest on the same shoulders and cannot be split. There are many safety departments that are made responsible for the prevention of accidents. The responsibility is placed there, and the foremen feel that it is the safety department's job. My job is to get out production. Our job must square with the organization. It must also square with the man in industry as he is. In squaring it with industry, my picture is this, that we must place the responsibility for the accidents back on the same shoulders that carry the authority for the discipline, the authority for the production in each department.

In other words, we can say to the foremen, "There is your safety job right there on the floor, Bill. It is yours, and whatever you do with it, if it is a good record, will be yours; and if it isn't it will also be yours. We are going to help you shoulder it but we are not going to carry it for you. We are going to help you in any way we can. We have a potential malingering in your department which we are going to help you clear up. If you want some help in getting mechanical conditions corrected, we will do that. If you want an instruction book, something that you can sit right down with a man and go over with him, that will simply pin his attention and your attention right down to the high spots that this man must get to keep himself in the clear, we are going to help you.

"We are also going to do this: We are going to put a performance rating on the whole job; we are going to give your department a mark to shoot at and that is going to be determined with the rate of hazards in your department. So that you in

the press room are on an equal basis with the man out here handling material, or the man over here on other machine operations.

"And to get that we have worked out something that we are proud of. It has run a couple of years and the foremen are all sold on the fairness of it, and the man in the press room can compare his department with the man in the other department. We secured the figures from the insurance reports, worked them out and translated them through the wage rates in the different trades, so that it represents the thing in man hours, and the foreman has something in man hours that he can show every man in his employ. He doesn't have to talk to the man in dollars and cents and set up in his mind the thought that the company doesn't care anything about his life, that it is merely a dollars and cents proposition to them. When you talk in hours, that means the hours of time saved, and something of the loss that all of the men will sustain. For instance, here is a report that goes out to the physicians every two weeks. It is a performance rating report. The first is the inter plant, and the next is the intra plant. Each sheet in the intra plant shows each department, the name of the foreman, the number of hours allowed, the number of hours we might expect that we would lose due to accidents; also the number of hours that were actually lost, and then the percentage of hours saved, and they are rated on a percentage basis.

The Original Estimate Very Nearly Right

We worked these figures out expecting that we were going to shoot at it at 30 cents per hundred dollars of pay roll rate; and the first quarter that we ran this two years ago we came out almost to a cent. We were only 4 per cent off. This report takes us down to the current quarter, to the tenth of the month. This is the last report I have and there will be one other that will close out the quarter. This shows that, according to the insurance figures, on a basis of 30 cents per hundred dollars of pay roll, we could have expected 39,000 lost hours at all plants—39,000 lost hours. We didn't lose that many; we lost 12,000; so we made a net saving of 70 per cent. That will give you the picture of about what the rate will run for the quarter.

In press rooms (going back for one moment to pin down the 85 per cent theory due to education), we got across to the press operators in our plant this year that our amputations have been reduced 80 per cent. So we can feel we are getting down pretty nearly to the minimum of accidents from the educational side of it, so far as press operations are concerned; therefore, the 20 per cent will be largely the job of better dies and better guarding.

I will wipe the whole slate and bring this one point: If safety is a teaching job we will have to think of teaching and all the fringe that goes along with teaching. In our schools the teacher not only follows the curriculum and gives the student all of the material in the curriculum, but you have the adjustments that that person has to make to social and political life; and there is one big adjustment yet to make and that is the adjustment to industrial life. That is a part of the foreman's job as a teacher, and if in years gone by we had put our teaching on a premium basis or on a bonus basis, I wonder if we would have had the same value and would have secured the same value in this training (as you might call it), that we have secured in preparing young America for the place that he must occupy in social and political life.

CHAIRMAN DUNNEBACKE: We have ten minutes before twelve o'clock and as much thereafter as you wish to take for discussion. I will throw the meeting open to discussion on any of the three papers. Dr. Myers', Mr. Loney's or Mr. Williams'.

E. F. BLANK (Jones and Laughlin Corporation, Pittsburgh, Pa.): I am very much interested in Mr. Loney's paper on this cash bonus plan. It brings up three questions which I would like to ask. First, is not safety an operating problem?

Second, isn't the foreman's job one to prevent accidents or look after the safety of his employes as much as it is to get out production? And third, if this is true, why pay the foreman any bonus to do his duty? Mr. Loney stated that this plan wasn't a panacea for all the accidents. There are a good many other plans. It seems to me there are a lot of simpler plans that will get the same results. I think most of us have ratings and charts in the time and pay roll departments which take less time. It may not be so much work as it appears on the surface.

We are using the competitive plan and think we are reaching the workmen better than we have ever been able to reach them before. I have the same reaction that Mr. Miller had in regard to "Doesn't this react unfavorably among the men themselves?" It is a good thing for the foremen and makes them pay some attention to safety in their departments. I should think a plan which would let the men in would be much better; and as far as getting a reaction from the men themselves, about the only way you can get that is to put some "gumshoe" workman out there and let him find out what the men are talking about. They won't talk to Olsen or McCarthy or to the foremen because they know they are identified with the plan.

CHAIRMAN DUNNEBACKE: Mr. Loney, will you answer that?

Give a Bonus for Safety as Well as Production

N. M. LONEY (Fisher Body Corporation, Detroit, Mich.): If I understand Mr. Blank right, the first point that occurred to him was that this foreman was expected to produce safety as well as production. I am going to ask Mr. Blank an individual question. Does Jones and Laughlin Company pay you a bonus for good performance? The General Motors Corporation does. As you all know, they have a published system awarding every one a bonus according to production. If a man gets a bonus from his production and safety is equally important with production, why not give him a bonus for doing part of his job?

As I said in the beginning, if I conveyed the impression that in my mind this is the only system for securing safety, then I am all wrong, because this is only a tool. We are using all the other tools available. Please don't run away with the idea that we think this is the only way to produce results. As I remember it, the difference between Mr. Williams' system and ours is that we have possibly a little more tangible reward, and the spirit of competition for getting money I think is just as strong as the competition for getting on. I know I am interested in competition for the money I get and I don't doubt that our foremen are interested to know that they are in competition with the other foremen to get this financial reward.

MR. BLANK: Those three questions are pretty well answered. The only thing I would bring out is Mr. Loney's answer with regard to the bonus. As I understand, your bonus is for efficiency and good service. My point is that that bonus bit from the main event. We try to make safety part of the main event and not a side show.

MR. LONEY: As I stated in my paper, we have some pretty hard boiled production men who fought this system rather bitterly before it was installed. I asked the leader of this opposition, "Do you know of any case where this has interfered with production?"

He answered no; so it has not interfered with production, and the foremen have not sacrificed production to get it. I just want to repeat again that we tell our foremen, "Your job to get safety is just as important as to get production," and possibly we err in over-emphasizing the safety; but some of the departments of General Motors do what you propose. They make a certain assignment, the amount earned on account of safety. As I said a while ago, I believe that if the men

understand what it is all about, you get better cooperation. I don't believe that any manager can go out and explain to his workmen the insurance rating scale which is used in setting up these rivalry systems, which to my mind have this inaccurate feature, that they are somebody's opinion. Here is something that is nobody's opinion except a group opinion. It is a mere matter of arithmetic after you have the group opinion to apply it to the original case.

E. H. COTCHER (Supervisor of Safety, The Murray Corporation, Detroit, Mich.): You might be interested in knowing that the Program Committee of the Automotive Section, in suggesting this pair of papers, had in mind just this discussion that has come out. Psychologists tell us that there are two actuating motives that influence humanity, the financial motive and the vanity motive. As you will note, these two systems take into consideration these two motives and we put this on the program for the very purpose of bringing out the strong points of each of the motives. We mustn't overlook the fact that no individual is actuated entirely by the financial, nor is any individual actuated entirely by the vanity motive; so I have been gratified with the discussion. We deliberately set the stage for it. However, it appeals to me that there is something worth while in both Mr. Loney's proposition and the one that Mr. Williams is conducting, and I think if we follow out Dr. Myers' suggestion and try to dig out what we can from these things for ourselves and go back and see what use we can make of them, we will be doing well.

The Bonus as An Aid to Cooperation

CHAIRMAN DUNNEBACKE: Dr. Myers' talk created a great deal of interest, and it just occurs to me there is possibly someone in the crowd who would like to ask Dr. Myers a question on some phase of his subject. I think we still have time for a few words from Dr. Myers if anybody has some particular question he would like to bring up.

H. E. MILLER (Chevrolet Motor Company, Detroit, Mich.): Dr. Myers' message struck me as being so inspirational to all of us, whether we be safety directors, managers, foremen or what not, that I should like to go on record as favoring the printing of his message in pamphlet form. I should like to have a copy of it to keep on my desk as an inspiration for the years to come.

MR. SMITH (St. Louis, Mo.): I think there are two parts to both of these questions that might be well worth considering, and that is the case of the bonus, the fact that the foreman gets a bonus serves as an incentive for the workmen that come under him. In the case of the foreman who does not get a bonus, if he protects himself as a foreman he will get more wages.

CHAIRMAN DUNNEBACKE: The big point for me is, if everyone realizes that through the bonus system his foreman is going to give him more profits and he is reasonably assured that he can work from day to day without accidents, there is his reward. Anything else?

MR. COLE (Atcheson Graphite Company, Niagara Falls, N. Y.): During the discussion on this bonus, one gentleman brought out the point that the men were so interested in the percentage that they were carrying this thing on. I believe that this method has been a tool to create interest in safety. I should like to ask the gentleman who made the statement, if he believes now that if they took off the financial payment of this bonus it would interfere in any way with the safety movement in this plant?

CHAIRMAN DUNNEBACKE: That is an interesting question. I should like to know, myself. Suppose you reach your millennium of having no more accidents, or supposing you cut out the cash bonus altogether. Do you feel reasonably certain that the interest in safety would continue?

MR. LONEY: I am sorry I am not able to answer that question. It is a question that often turns over in my mind. All my life I have practiced the theory of not crossing a bridge until I came to it, and we are not anywhere near the portal of that bridge, so I beg to be excused from answering it.

ADJOURNMENT

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Public Utilities Section

New Section Officers

- Chairman*, CARL J. RUTLAND, Texas Power and Light Company, Dallas, Texas.
Vice-Chairman, In Charge of Electric Interests, W. R. LOYD, Alabama Power Company, Birmingham, Alabama.
Vice-Chairman, In Charge of Gas Interests, IVAN L. SCOTT, Wisconsin Power and Light Company, Madison, Wisconsin.
Vice-Chairman, In Charge of Telephone and Telegraph Interests, H. L. MEADE, Ohio Bell Telephone Company, Cleveland, Ohio.
Vice-Chairman, In Charge of Water Works Operations, H. F. WEBB, West Penn Power Company, Pittsburgh, Pa.
Secretary, C. B. BOULET, Wisconsin Public Service Corporation, Milwaukee, Wis.
Poster Committee Chairman, E. S. BEAUMONT, The Peoples Gas Light and Coke Co., Chicago, Ill.
Membership Committee Chairman, F. S. ARMSTRONG, Central Illinois Public Service Company, Springfield, Illinois.
Slide Committee Chairman, C. P. RYAN, Indiana Electric Corporation, Indianapolis, Ind.
Fire Protection and Prevention Committee Chairman, H. B. HARMER, The Philadelphia Electric Company, Philadelphia, Pa.
Statistics Committee Chairman, G. A. DOELLER, The Dayton Power and Light Co., Dayton, Ohio.
News Letter Editor, N. L. DEVENDORF, Consumers Power Company, Jackson, Mich.
Councilors:
C. B. SCOTT, Bureau of Safety, Chicago, Ill.
GEORGE C. A. OPP, The Detroit Edison Company, Detroit, Mich.
H. W. MOSES, The Edison Electric Illuminating Company of Boston, Boston, Mass.
J. C. HUBBARD, The Western Union Telegraph Company, New York City.
H. M. WEBBER, Illinois Bell Telephone Company, Chicago, Ill.
B. FRANK DAY, The Philadelphia Electric Company, Philadelphia, Pa.
HERMAN SPOEHRER, Union Electric Light & Power Company, St. Louis, Mo.
B. B. MCCULLOCH, Bureau of Safety, Chicago, Ill.

Retiring Officers

Chairman, GEORGE C. A. OPP, The Detroit Edison Co., Detroit, Mich.; *Vice-Chairman, Electrical Interests*, C. J. RUTLAND, Texas Power & Light Co., Dallas, Texas; *Vice-Chairman, Gas Interests*, C. HOWARD STEWART, Laclede Gas Light Co., St. Louis, Mo.; *Vice-Chairman, Tel. & Tel. Interests*, H. L. MEADE, Ohio Bell Telephone Co., Cleveland Ohio; *Secretary*, HARRY M. KELLER, Northern Indiana Public Service

Co., Hammond, Ind.; *Past Chairman*, B. B. McCULLOCH, Bureau of Safety, Chicago, Ill. *Committee Chairman: Publicity*, H. E. WEBB, West Penn Power Co., Pittsburgh, Pa.; *Poster*, IVAN L. SCOTT, Wisconsin Power & Light Co., Madison, Wis.; *Fire Protection and Prevention*, H. B. HARMER, The Philadelphia Electric Co., Philadelphia, Pa.; *Membership*, F. S. ARMSTRONG, Central Illinois Public Service Co., Springfield, Ill.; *Engineering Representative*, C. E. BEARDSLEY, Brooklyn Edison Co., Inc., Brooklyn, N. Y.; *Councillors*, C. B. SCOTT, Bureau of Safety, Chicago, Ill.; H. W. MOSES, Edison Electric Illuminating Co. of Boston, Boston, Mass.; J. C. HUBBARD, Western Union Telegraph Co., New York City; H. M. WEBBER, Illinois Bell Telephone Co., Chicago, Ill.; B. FRANK DAY, The Philadelphia Electric Co., Philadelphia, Pennsylvania.

Tuesday, September 27, 1927

GEORGE OPP, Chairman

Safety Engineer, The Detroit Edison Co., Detroit, Mich.

The first session of the Public Utilities Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, George Opp, safety engineer, The Detroit Edison Company, Detroit, Michigan.

CHAIRMAN OPP: The Public Utilities Section of the National Safety Council now opens its Sixteenth Annual Congress. We are happy indeed to greet such a large number in attendance. We trust that you will find these meetings of the utmost value to you; we are desirous of letting you see the officers of your section, that is the reason for the dressing of this stage. You doubtless have wondered who does the work of the section, and by reason of the fact that there is only one name signed to the letters you receive you doubtless have the impression it is a one-man job; but not so in the Utilities Section. In this Section every man works. We have had the most splendid display of teamwork in the past year that I have ever seen; it cannot be excelled on any college football team. Everybody works. It is with keen pleasure that we will proceed to the reports of our various officers; we will do it as hurriedly as possible, and we are going then into the program as outlined, because we are not going to keep you one minute over time, you can rest assured.

In the organization of the meeting the chairman is supposed to make a report the first thing; I am hoping there will be no need to make a report, and in view of the fact that we are going to have some discussion here, I will not make a report unless it is found necessary to bolster up the pages of the transactions; I do not think that will be necessary because of the interest in the Public Utilities Section and because of your active participation in these discussions, I believe there is going to be ample printed matter in the Transactions.

Now the next item, and one that really belongs to the chairman, as far as his part of the program is concerned, is the introduction of the officials; it gives me great pleasure to introduce the Vice-Chairman in Charge of Electrical Interests, C. J. Rutland, safety engineer, Texas Power & Light Company, Dallas, Texas.

MR. RUTLAND: I think we have had closer cooperation this year in our Public Utilities Section actively than we ever had before; possibly it is due to the inspiration that our good friend and leader, George, has given us throughout the year. We are building a foundation now for a still greater year.

We are going, of course, to need your support, the support of everyone, and we need your criticisms and your suggestions. One item in particular that I want to mention is the conference that was held in Kansas City about four months ago. I

was a little disappointed that we did not have more Public Utility men from that section of the country present.

The National Safety Council has held regional meetings in several different parts of The United States with the sole purpose of enabling some of you men who possibly are unable to get to the conference annually, to at least attend these regional meetings and get the good out of them. We were sorry and disappointed, frankly, that we did not have as many men from the mid-west and Pacific Coast districts at the Kansas City conference as there should have been.

I want to urge on you in this coming year to attend any regional conference that is held in your section of the country. I do not know just yet how many may be held, but you will be advised in ample time. We want you there, and we want you to participate in all the discussions.

You know it is a hard matter for just a small group of men to do a lot of work. There are just as many men and possibly more in this audience this morning who are capable of filling executive positions as the men up here now. We need new material, and new suggestions. The fact of the matter is we are almost crying for your help, not that the work is not going along fine, for it is, but it is almost getting beyond us.

CHAIRMAN OPP: In addition to the active part Mr. Rutland has taken in connection with the regional conferences he has been active in circulating questionnaires which have been of use to this Section, particularly on the question of unloading poles, on which we are going to have further discussion and demonstration this morning.

It gives me great pleasure to introduce one of your officials who has kept us very closely tied in with the telephone and telegraph interests, Mr. H. L. Meade, general plant employment supervisor, Ohio Bell Telephone Company, Cleveland, Ohio.

MR. MEADE: I have no special report to make other than what the Secretary will make; but I do want to say, however, that I am very glad to have had the opportunity of associating with you members, and I have enjoyed the work very much. I have become more intensely interested in the work by having taken active part in it.

CHAIRMAN OPP: Unfortunately our Vice-Chairman in charge of Gas Interests is unable to reach the meetings. I understand that there is a message from him for us through Mr. H. E. Barada of his organization.

H. E. BARADA (Laclede Gas Light Company, St. Louis, Mo.): Mr. C. Howard Stewart, Vice-President in charge of the Gas Interests, assistant treasurer of the Laclede Gas Light Company, St. Louis, Missouri, requests that I bring in his regrets at being unable to attend these meetings.

As it happens, this is the first Congress that Mr. Stewart has not attended since 1916, and you can readily appreciate that anything that would keep him away is important.

CHAIRMAN OPP: Now we will have the report of Mr. Harry M. Keller, manager, Safety and Claims Departments, Northern Indiana Public Service Company, Hammond, Indiana, as Secretary of this section. There is no man in the organization who works any harder than the "quarterback," the secretary of the Public Utilities Section.

Report of the Secretary

During the year just completed, your Executive Committee held five meetings—at Detroit immediately following the 1926 Congress, at Cleveland in December, Chicago in February, New York City in May and again at Chicago during June. The attendance was gratifying and reflected the genuine interest of those on the

Preventing Man Failure in the Public Utilities.	C. J. Rutland, Safety Engineer, Texas Power and Light Com- pany.	NATIONAL SAFETY NEWS N. E. L. A. Bulletin
Safeguarding Workers on Power Plant Con- struction Jobs.	C. R. Beardsley, Brooklyn Edison Company, Inc.	NATIONAL SAFETY NEWS
Selling Safety to Foremen.	P. L. G. Hasskarl, Safety Engineer, Penn- sylvania Power and Light Company.	NATIONAL SAFETY NEWS
Building and Maintain- ing Overhead Lines Safely.	W. L. Granger, Superintendent, Detroit Edison Company.	NATIONAL SAFETY NEWS N. E. L. A. Bulletin
When, Where and How of Accidents.	D. P. Hartson, Equitable Gas Co.	NATIONAL SAFETY NEWS A. G. A. Monthly.
Safety First and Last in the Power Plant.	Courtesy "Power", Author Unknown.	NATIONAL SAFETY NEWS N. E. L. A. Bulletin Power.

Your committee would like to express its appreciation of the cooperation on the part of the author contributors listed in this report and recommend the continuance of the Publicity Committee as a definite part of the Sectional activities.

H. F. WEBB, Chairman

CHAIRMAN OPP: Last year it was the pleasure of your committee to establish a Fire Protection and Prevention Committee. Not only have we upon our own sectional program a feature address on that subject, but an entire session of the Congress is devoted to the matter of study and consideration of fire protection and prevention features. Our Fire Protection and Prevention Committee is headed by Mr. H. B. Harmer, safety engineer, Philadelphia Electric Company, Philadelphia, Pa.

Suggestion Needed For the Committee

MR. HARMER: I have no set report for you, but I would like to tell you a little story. A lady and gentleman stopped on the corner over here in Chicago, not so very long ago, and they asked the boy on the corner to direct them to Adams Street. He said, "I don't know where that is." They said then, "Where is the City Hall?" He said, "Oh, I don't know." They said, "Where is Clark Street?" And he said, "I don't know where Clark Street is." Then the man said, "Well, you are pretty dumb, aren't you?" And the boy said, "Well, I know I am, but I am not lost."

Now, ladies and gentlemen, we are going to get lost in this new endeavor of ours if we do not get from you, the members of this Section, suggestions as to what you would like to have us cover.

I can hardly see why fire prevention and accident prevention have been divorced so long; I think the time has arrived when we must all realize it is one subject that must be covered by us in a subject in itself, in its entirety. That is all I have to say.

CHAIRMAN OPP: Of course we cannot live unless we grow. The world does not stop; no part of it stops; and of course the growth of your section in membership is a very important feature, so it gives me very great pleasure to introduce the man who is responsible for the splendid growth of the membership of the organization in the past year, Mr. F. S. Armstrong of the Central Illinois Public Service Company, Springfield, Illinois.

Report of the Membership Committee

I am not responsible for the Section's growth in the least. I have written a good many letters, but the Utilities Regional Membership Committees and Mr. Opp are the ones who are responsible. I have had splendid cooperation from the Regional Committees, and if it had not been for them I don't know what we would have done. We would probably have suffered a loss.

It seems to me that if the safety story is worth listening to, or worth talking about, that everyone who is interested in it should be a member of the National Safety Council.

I should judge from glancing over this audience that there are about 400 or 500 men here. Now, why can't you, each one of you, appoint yourself a committee of one to get another member for the National Safety Council during the coming year? If you have any hesitancy in approaching anyone to join, let me suggest that you write to the chairman of the Membership Committee, or to the chairman of the Utilities Section, and if he is a live prospect at all, we will get him in.

I appreciate the work and the assistance that the regional committeemen have given during the past year, and at the close, or some time during this meeting, I would be very much pleased if any of them are here. If you would come to me and introduce yourselves so that I may know you personally.

Letters are cold things. We need to get our hearts against each other, so that we may know each other.

Now as to the new companies that have joined our membership, as I read the names, if there is anyone from those companies representing them here. I wish they would please arise so that we may all know them.

Division No. 1.

Plymouth Electric Company, Plymouth, Mass., F. M. Howell.
Manchester Gas Company, Manchester, N. H., Wm. T. Jebb.
Public Service Company of New Hampshire, Manchester, N. H., Rogert G. Moss-crop.
Bangor Gas Light Company, Bangor, Maine, A. H. Sargent, Mgr.
Burlington Light & Power Company, Burlington, Vt., D. W. Jardine, Mgr.

Division No. 2.

Philadelphia Suburban Gas & Electric Co., Philadelphia, Pa.
Erie County Electric Company, Erie, Pa.
Mutual Telephone Co., Erie, Pa., John Z. Miller, Gen. Mgr.
Luzerne County Gas & Electric Co., Kingston, Pa., A. J. Llewellyn.
Northern New York Utilities, Inc., Watertown, N. Y. John N. Carlisle, Pres.

Division No. 3.

W. Harry Angle, Hagerstown, Md.
Petersburg Gas Company, Petersburg, Va., W. H. James, Mgr.
City of Lynchburg, Department of Water, Lynchburg, Va., Richard F. Wagner.

Division No. 4.

Maumee Ice & Storage Co., Toledo, Ohio, M. J. Uline, Vice-Pres.
Indianapolis Power & Light Company, Indianapolis, Indiana, J. J. Steurewald.

Division No. 6.

Lincoln Water & Light Company, Lincoln, Ill.
Rockford Gas Light & Coke Company, Rockford, Ill., H. S. Whipple, Mgr.

Division No. 7.

Eastern Minnesota Power Company, Pine City, Minn., J. W. A. Drummond, Gen. Supt.
Water and Light Dept., Power Plant, Hibbing, Minn., E. B. Scott, Safety Engr.

Arkansas Utilities Company, St. Louis, Mo., W. H. Timm, Secretary.
 Northeastern Iowa Power Company, West Union, Iowa, E. S. Schreiner, Operating Manager.

Division No. 8.

Central and Southwest Utilities Co., Dallas, Texas, J. A. Reid, Safety Engr.
 Southwestern Public Service Company, Amarillo, Texas, L. L. Ferree.
 Gulf Public Service Company, New Iberia, La., C. O. Culver.
 Central Power & Light Company, San Antonio, Texas, J. B. Morton, Safety Engineer.
 Panhandle Power & Light Company, Borger, Texas, Victor O. Shawgo.

Division No. 9.

Southern Nebraska Power Company, Superior, Neb., E. W. Gray, Asst. Mgr.

Division No. 12.

Telluride Power Company, Richfield, Utah, L. R. Fournier, Gen. Supt.

Division No. 13.

The Arizona Power Company, Prescott, Arizona, L. V. Seares.
 Los Angeles Gas & Electric Corp., Los Angeles, Calif., D. L. Scott, Manager of Public Relations.
 Upper Verde Public Utilities Co., Clarksdale, Arizona.

New Foreign Members.

Kaministiquia Power Co., Ltd., Fort William, Ontario, Canada, G. Gilbert Miller.
 Montreal Light, Heat & Power Consolidated, Montreal, Canada, C. S. Bagg, Secretary and Treasurer.
 Hilo Gas Company, Ltd., Hilo, Hawaii, Frank Wilson, Mgr.
 Porto Rico Irrigation Service, Guayama, Porto Rico, A. Lucchetti, Chief Engr.

The summary of all figures shows an increase in the Section by new members during the year of 35. Cancellations of membership were 12. The net gain in membership therefore totals 23.

F. S. ARMSTRONG, Chairman.

CHAIRMAN OPP: We have had in mind for some years the idea of introducing new members, but it has not been practical. We are very happy to have had the response made by these new companies in sending their delegates to the Congress.

The Membership Committee's work might be elaborated on a little bit more in connection with the fact that Mr. Armstrong has taken rather seriously the fact that 12 companies have retired from our membership this year. But just to console Mr. Armstrong, let me say, those 12 companies had a total number of employees of 2,189, and of that number over 1,700 were taken back in to the Utilities Section by reason of consolidation with bigger companies. So our net loss is small.

On the other hand, the new members constitute companies with from 30 employees up to 3,000, in two cases, so the additional number of new employees added this year is 12,505. It has made a net increase of 23 members and 10,316 employees.

Report of the Past Chairman on Plants Visits

Now we have, as a member of the organization, the chairman of the previous year. He is known as the "Past Chairman." I do not like the term. It sounds too much like a "has been," and in the present case I am going to call that officer the "Present Chairman of Last Year," so as to get away from that particular inference. It is a pleasure to call on Mr. McCulloch, who will now give us the details of the arrangements he has made so splendidly at the Chicago end for the reception of this Congress.

B. B. McCULLOCH (Secretary, Bureau of Safety, Chicago, Ill.): Mr. Opp has told you how well each member of the sectional committee and each of the officers

of the section handled his work during the past year; the result has been that there was very little for the past chairman to handle. For that reason, and the fact it is already late, and we have quite a program to take care of, I am not going to attempt to make any report on any activities I may have been connected with during the past year. But I do want to take just a minute or two to make an announcement of what has grown to be one of the features of the Annual Congress, and that is the annual plant visits.

I do not think there is any other section in the Council that takes as much interest in these plant visits as is shown in the Public Utilities Section.

This year we have made arrangements to visit four plants; that is, you have your choice of any one of the four visits. They will be made Thursday afternoon at the same time, 2:30 p. m. I will read the list.

Chicago By-Products Coke Company Plant

You are invited to inspect the plant of the Chicago By-Product Coke Company, at 39th Street and Crawford Avenue, on Thursday afternoon, September 29. Busses will leave the Stevens Hotel at 2:15 P. M.

This is a combination coal and water gas plant covering about 175 acres of a 600 acre track.

Coal gas is produced in 110 ovens which have a rated capacity of 24 million cubic feet daily. The by-product coke is supplied as required to the eleven foot water sets of which there are nine with a rated capacity of 30 million cubic feet. Total rate of gas production is therefore 54 million cubic feet per day.

Guides will explain the details of construction operation, fuel storage and consumption, by-products and other interesting information.

Crawford Station—Commonwealth Edison Company

Largest station in the world, it has a capacity of 335,000 K.W.

The last unit installed has a capacity of 94,000 K.W. and is the largest single unit put into service up to the present time.

Covers a ground area of 72 acres.

Has a daily output of over 4,000,000 K.W. hours.

Which requires 2,800 tons or about 60 cars of coal a day.

Three hundred and seventy-five thousand gallons of river water are pumped each minute for condenser cooling water.

Coal cars are unloaded by a car dumper which completes the operation in less than three minutes.

Carried 185,000 tons of coal in storage at the plant at the beginning of the Coal Strike, April 1st—enough to carry us at normal loading for 10 weeks.

Energy transferred between our station and the other stations is done by cables laid underground and operating at 66,000 volts.

Construction work is in progress for the installation of No. 6 unit to be available August, 1928, and will have a capacity of 100,000 K.W., twice the capacity of our No. 1 unit installed only three years ago.

New Rapid Transit Shops, Niles Center, Illinois

When these shops are completed they will have cost approximately \$4,500,000. The ten separate units necessary to consolidate all the shops in one location will cover an area of five acres.

The first unit is the paint shop which is 200 by 224 feet in outside dimensions. The walls are of old English brick with cast stone trimming. This paint shop is modern in every particular and is considered the last word in paint shop construction and facilities.

Illinois Bell Telephone Company

More telephones are served from this office than are in use in such cities as Akron, Ohio; Birmingham, Alabama; Omaha, Nebraska; or Syracuse, New York.

Each day a half million telephone connections are handled through the office.

During the busy hour of the day the equipment cares for twenty calls each second.

In order to care for this volume of business 18,000 vertically moving rods are used in completing the calls, an average of three rods being used for each call. Each rod is approximately ten feet high and the size of a finger in thickness.

There are approximately 50 soldered connections in the average radio set. The equipment in this office has enough such connections to supply 140,000 radio sets.

The ordinary radio "A" battery will supply 1 ampere of current for 80 hours. The storage batteries at State-Central office would supply this amount of current for over four years.

While the radio set uses 2 amperes of current, the equipment in this office at busy periods requires as much as 3,600 amperes.

Equipment Housed in State-Central Office

Number of subscribers' lines served.....	16,112
Number of subscribers' stations served	41,726
Total number of calls handled per day.....	520,089
Maximum number of calls during the busy hour.....	73,377
Number of soldered connections	5,000,000
Number of selector rods	18,000
Weight of solution in battery tanks—tons.....	55
Number of plates in batteries	2,736
Capacity of 24 volt battery in ampere hours.....	36,000

MR. McCULLOCH: If any member desires to visit any other industrial plant here, if he will make his desire known we will make the arrangements for him to visit the plant.

CHAIRMAN OPP: It is fine to have this reception, and I trust all of the delegates will avail themselves of one of these four proposed visits, in addition to any others that they may care to make.

The next committee which we are supposed to hear from is that of the Engineering Committee; unfortunately Mr. C. R. Beardsley of the Brooklyn Edison Company, Brooklyn, who has been doing wonderful work in that capacity is unable to attend, and he has written his regrets. We are sincerely sorry that he cannot be with us to participate in the program which he helped to prepare.

It is the prerogative of the chairman to make certain suggestions to the incoming Executive Committee. It is to secure, if possible, an intensified interest in safety work, and the most effective safety work, in the Public Utilities Section, by the various methods available.

One of the most constructive of these, it seems to me, is the taking of a Congress like that assembled here today to the doorsteps of the various members, if it is possible, and it can be done to a limited extent by means of regional conferences or regional safety meetings.

Last year we had a wonderful series of these meetings, beginning at Grand Rapids on March 21 and 22, Kansas City, April 13, 14 and 15, both of them wonderfully attended meetings—Newark, New Jersey, April 27, in which our Engineering Representative, Mr. Beardsley, participated; Sheboygan, Wisconsin, June 14, in which your chairman had the pleasure of participating; and the Michigan Industrial Safety Congress, June 28, 29 and 30, in which we gave active participation; and

down at Blue Ridge, Asheville, North Carolina, August 5, 6 and 7 in which your chairman had several assignments to handle on the splendid program.

Now we want a wide diversity in the holding of these regional conferences this coming year. We want your participation in them. If you have any suggestions to make to your various committee chairmen as to the selection of a location be sure to let us have those suggestions.

If, perchance, a regional meeting comes to your vicinity, get out as big a representation of delegates as possible. It is a wonderful way of introducing the National Safety Council to those who are not yet members of the organization, to take advantage of the meetings, and especially for those various members who, due to distance, or due to vacation periods, or due to many other excuses given in the numerous letters of regret, doubtless are unable to attend today; so it is my sincere wish that you participate in the regional meetings, whenever and wherever held.

Another suggestion to the members of the Executive Committee is that they by all means retain the chairman of the Membership Committee of the past year. His work bespeaks his merit.

The next item is a matter that has given me keen pleasure. Last year, as an innovation, as a much desired move to broaden our activities and interests, we started to increase the official family by the addition of so-called Councilors. And good Councilors they have been, every one of them participating with utmost diligence and earnestness, not only in the correspondence that has of necessity radiated from them, but also by active participation in our meetings, and my next recommendation is that the Councilors be retained by the incoming officers.

These councilors, for the year (unfortunately they are not all here today), are none other than our good friends Mr. Charles B. Scott, Mr. H. W. Moses, Mr. J. C. Hubbard, Mr. H. M. Webber, Mr. B. Frank Day and Mr. Herman Spoehrer. Have you a word to bring, Mr. Stiver, from Mr. Spoehrer?

Progress Through the Cooperation of All

E. B. STIVER (Safety Director, Union Electric Light & Power Company, St. Louis, Mo.): Nothing more than the letter he wrote you indicating that he could not be here, and setting out the information that he desired. I think he made it a point during the past year as to any questions brought up by you to take special pains to answer them, and help the Executive Committee in planning out its safety features.

CHAIRMAN OPP: That is splendid. It is much better to have it said from the floor than to have me read it, knowing his active participation in the affairs of the Council. I know it is a matter which requires his most personal attention that keeps him away from here today.

Mr. C. E. Morrison of New York was the final member of our Board of Councilors.

Now, for the sad words: It has been a year of intense pleasure, and one of fulfilling of desires on the part of those who want to do something definite and something concrete for the Public Utilities Section; and although it may be with somewhat of a sense of pride that those things have been accomplished, it nevertheless is fully deserved pride, I believe. The participation of all of the officers this past year has been an inspiration for one to do the utmost that is in him, and if there is any success attached to this Congress it belongs to all of the officers of the sections, the committee chairmen, the councilors, and all those individuals who, from the outset of the organization of the official family itself, have come in with valuable contributions. To each and everyone of those I extend my sincerest thanks. I wish to express thanks for the happy cooperation existing with the American Gas Association, the National Electric Light Association, the National Fire Prevention Association, the American Institute of Electrical Engineers and the Society of Indus-

trial Engineers with all of whom we have had very pleasant personal relations during the past year.

This morning's program was prepared not by a single individual. This time we have had no Program Committee Chairman sitting up burning the midnight oil, framing up something that he thought might be of interest to you, but we have solicited suggestions from the organization at large. We have had two entire sessions of our Executive Committee devoted to nothing but program topics, and then selecting the topmost speakers to present the points that we thought would be of most interest to you. So this program is not the result of any one man's effort, but is the composite work of your official family endeavoring to give you the very best there is in accident prevention. And certainly there is nothing that could be better than the first topic assigned on this program, and when it is presented by that most pleasing personality, Mr. Charles B. Scott, it is no wonder we have this attendance here this morning.

Qualifications and Work of the Safety Director

Charles B. Scott, Bureau of Safety, Chicago, Ill.

An ambitious committee, ardently interested in the cause of accident prevention, has requested the portrayal of the most suitable type of man and an outline of the most effective procedure for the safety director of a public utility. With respectful appreciation of the implied compliment, there comes a realization of the audacity of this attempt. The vocation and work are too new and undeveloped for that complete knowledge necessary in the formulation of practical and valuable conclusions either as to the measure of the man or the specifications for his work. Fortunately our Annual Congresses present a forum where, unashamed and without apology, we may freely and frankly relate our experiences and express our personal opinions. Such custom may make this talk pardonable.

The success of all human endeavor is dependent upon the competency and devotion of those charged with the responsibility of the undertaking. Many worthy projects have wholly or partially failed because of this; hence the importance of the right man for the job. In industry there is no more difficult task than the proper selection and placement of workers. Misfits are responsible for much woe and the slowing up of progress. It is not the purpose of this presentation, however, to deal with the general subject of human efficiencies and shortcomings. This problem has ever been with us and will be with those who are to follow. Any venturesome comment as to ways and means for selecting men of fitness and ability in industry or elsewhere is likely to be of questionable value. This may be true of comments designed for the selection of a single safety director.

There are preferred types of individuals for almost every vocation (if ideal types cannot be secured) and there are men with certain endowments that fit them for the position of safety director or safety engineer. Years of experience may justify reference to some of the more outstanding qualifications desired in one who is to make accident prevention his business.

Delight in work and pride in accomplishment are potent influences for success. This is especially true in the comparatively new vocation of safety director. Herein lies the fundamental and most essential qualification of the man best fitted for safety work. The desire to conserve life and to make the lives of others better and happier is the most effective stimulant in accident prevention activity. Safety workers with this incentive are more successful than others with a materialistic view prompted only by the economic results of their efforts. The safety director should possess and cultivate an agreeable personality and

those qualities favorable to personal influence. These serve well in the educational work constituting such a considerable proportion of the safety job.

It is of the utmost importance that the safety director shall have an appreciation of his position in its relationship to the operating organization. There are few, if any of us, who would not resent having some one, supposedly an expert, come into our immediate organization for the purpose of making adjustments therein designed for its greater efficiency. It is but natural for the man who has spent years in developing the plans and personnel of which he is in charge to believe his methods for carrying on his work are nearly or quite above just criticism. He, more than anyone else, knows the qualifications and shortcomings of the men associated with him. He is familiar with the hazards of machinery and other property and with the measures he considers advisable to overcome these hazards. To have some delegated one step into such a situation with a view of making innovations and changes in personnel, practices or machinery is quite apt to prove irritating. This relationship between the safety and operating departments requires tactful handling by the safety director. A tactless man cannot possibly secure and maintain the cooperation of the operating forces, and particularly is this true with respect to the supervisory operating forces.

Technical Knowledge of the Work Necessary

The safety director must not only have a fair understanding of human nature and its relationship to his work, but he must also have knowledge of the work he is trying to make safe. In order to take such steps as will make the performance of any class of work safe, the director must carefully and fully inform himself as to the details of certain operating technique. He cannot otherwise properly discuss the subject with those who are familiar with and engaged in the work. No doubt many failures in accident prevention can be attributed in part at least to lack of knowledge by the safety director as to the working operation he is trying to safeguard.

Summing up these needful qualifications for a safety director, we have the following:

He must be interested in and pleased with his work. He must be sincere and have faith in the results to be accomplished. He must have those qualities of heart, mind and conduct that insure respect and influence. He should have an appreciation of the relationship between his and the operating departments, and possess the tactfulness to overcome the difficulties presented by this relationship. He must know human nature and understand the work he is trying to make safe. These essentials, supplemented by diligence, patience, study and hard work will develop a most efficient safety director, save the lives of workers, and make him and them better and happier.

There are certain fundamental conditions that must be in evidence within the organization with which the safety director is connected. First in importance, his work must have the earnest and sympathetic support of the chief executive, a support that carries with it an appreciation of the needfulness of the efforts and faith in the results. The first task of the director is to establish the proper spirit toward accident prevention in the executive, his subordinates and the rank and file of employees. This represents the sowing period for the coming harvest and unless the most careful attention is given to the creation of a fertile and well planted soil, the reaping of a good harvest cannot be expected.

At this point in the progress of his work, the new safety director is confronted by a situation requiring the most careful thought and action. Much depends upon how he meets it and the program decided upon for his further activities. The director is justly pleased with his success so far and is at the peak of his

enthusiasm. His associates have confidence in his efforts and are in favor of immediately putting into effect an extensive organization and an elaborate and colorful series of stirring and attractive festivities under the guise of safety. The safety director should resist the temptation and inclination to do these things. The time calls for the most thoughtful preparation of organization and procedure and for earnest counsel and cooperation of executives, department heads and director in framing the plans to be followed. These plans must be sound, conservative and practical. They should provide for a simple safety organization with a minimum number of carefully selected members. They should be systematic and designed for continuous accident prevention and for that purpose only. If the probability of future changes is taken into consideration, the plans should be prepared so that afterward they may be made more elaborate instead of later curtailing them. To make the mistake of providing an inadequate organization and program is decidedly less harmful than to overdo these because the latter mistake is much more difficult to remedy. Time will not now permit detailed recommendations as to organization, the proper building of programs of activity and discussion on the many other important duties of the safety director. These features have already received much publicity and attention and are largely dependent upon the local conditions presented. Wise consideration of such conditions will determine most of these details.

The First Step Is in the Employment Office

In many operating companies diligent efforts have been made by efficient safety departments to employ every possible preventive measure for the minimizing of the number of accidents. These efforts have resulted in considerable progress in organized accident prevention. Certain plans, precautions and innovations have been successfully tried out in individual companies, about which the industry and safety directors generally are not informed. In order to give information as to the most effective of these developments, inquiries were addressed to a number of companies. The replies to some are herewith incorporated.

The following is quoted from the Rochester Gas & Electric Corporation, Rochester, New York: "The first step in accident prevention is in the employment office, with the proper selection of men for the job. Strong emphasis is placed on this, not only from the standpoint of securing and placing competent men, but the process carries through to the proper introduction of the new men to the job. In this company we conduct meetings of new employees where company policies, requirements and as much company atmosphere as possible are given to the new man. At these meetings the necessity of thoughtful and safe conduct is thoroughly emphasized. The next step in the progress of the new employee in which the safety director is interested is education on the job. This may require months or often years of training. Job education is conducted through job schools which are maintained by the company in various departments and through outside schools which have facilities for teaching subjects which are pertinent and necessary. Job training is prescribed for both the new and old employee where the need is indicated. We definitely locate responsibility for all operation, including accident prevention, with the operating superintendent where it belongs and make the safety director responsible for safety education in its broader sense and for an independent inspection service."

This same company makes these further important comments: "When serious accidents occur or accidents which by nature of their cause might have been serious, it is essential that the safety director have all the facts and present them at a meeting composed of the interested department heads, together with all the men who are familiar with the details, including the man who was in

charge of the work. The evidence thus presented is thoroughly discussed to the end that the necessary steps may be taken to eliminate so far as possible the recurrence of any similar accident."

The outstanding development in the accident prevention plans of the Commonwealth Edison Company, Chicago, during the past few years has been the fixing of departmental responsibility. This responsibility is not limited by the general conception of the term as applied to accidents, but includes responsibility for accident prevention work. The several departments of this company thoroughly appreciate and meet this broader responsibility and therefore take the initiative in lieu of the safety departments for planning the details of accident prevention involved in such matters as safe working practices, maintaining an interest in safety work, safety training of foremen and workmen, conducting safety meetings for employee groups, departmental committees and foremen. There has thus been established a definite and effective safety organization within each department, resulting in their continuous and diligent attention to all safety matters, particularly those applying to the work of the department. The results of these developed plans have been very satisfactory. This company reduced its lost time accidents 32 per cent in 1925 and made a further reduction of 18 per cent in 1926. The most noticeable improvement was in the street department, which showed a reduction of 40 per cent in 1926.

Each Injured Employee Is Personally Interviewed

The Edison Electric Illuminating Company of Boston, Massachusetts, follows the practice of having a representative of the safety department call upon and personally interview each injured employee as soon after the accident as seems advisable. These interviews are not only intended to show the company's regret for the accident and its interest in the injured employee, but also to secure the injured's opinion as to how the particular accident could have been prevented. This practice has resulted in establishing a better relationship between injured employees and the safety department and has brought out many valuable suggestions for the prevention of accidents. The Philadelphia Electric Company has substituted letters to the injured in lieu of such personal visits and this modified plan has also been satisfactory in lesser degree.

The Philadelphia Company, through its accident prevention department, emphasizes the importance of fire prevention and gives each individual employee a definite responsibility in this regard, with sufficient instructions with reference thereto. As a rule, safety departments are not sufficiently impressed with the importance of giving attention to fire prevention. This company also maintains an intensive program wherein all employees report unsafe conditions of the company's property or equipment. "This practice," says the company's safety director, "has a tendency to educate all classes of employees and make them individual safety inspectors."

Studies made by the Brooklyn Edison Company, Inc., of Brooklyn, New York, convinced the executives that the physical and mental condition of employees after excessive overtime work was quite conducive to accidents. Frequency was found decidedly greater on the overtime jobs. About three years ago an executive order restricted overtime in all departments and prohibited it in a few. In those departments having to do with physical processes in which it was practically impossible to eliminate it entirely, overtime was limited to an annual gross per person of 10 per cent. At first this was allowed to be consumed all in a short period. Later the 10 per cent limit was applied as a monthly check—that is, if a man works 200 hours normally per month, he may in addition work 20 actual overtime hours. Each request for permission to work overtime is carefully scrutinized for validity of reason. The average overtime for all de-

partments is now about 1 per cent. Each department's weekly return is tabulated and scanned by the executive. Coincident with this reduction of overtime and in part it is thought due to it, there has been a marked reduction in number of accidents. Greatest reductions occurred in the group which achieved greatest reduction in overtime, although that department had been by no means the greatest offender in frequency.

The West Penn Power Company of Pittsburgh provides special arrangements for accident prevention on jobs involving particularly hazardous work. These special arrangements are as follows: Each gang is provided with a safety guard selected from the men in the gang. It is the first duty of this guard to think, talk and plan safety methods and the foreman allows him such time as can be properly devoted to safety work. It is understood that he is not to leave the gang and that at any time he is not busy on safety work he will be engaged in his regular duties. The foreman appoints the safety guard to serve for one week until every man in the gang has thus served and then repeats the procedure.

There is no single phase of accident prevention work that can be relied upon to cure all of the evils of hazardous work and thoughtless performance by employees; nor is there any royal road to success that pioneers might point out to the new safety director. Like the other vocations, this comparatively new one requires much thought, ingenuity and hard work, and these must be carried on unceasingly. No one man is sufficiently equipped with wisdom and experience to perform the task by relying entirely upon his own efforts. Be he ever so well qualified he must have the sincere interest and hearty cooperation of all the men with whose safety he is concerned. Above everything else there must be maintained an earnest appreciation of individual responsibility throughout the entire organization, so inclusive as to take in every executive, supervisor and worker. The task of the safety director is one that will be found difficult but worthwhile, requiring ever present patience, diligence and faith, with a clear conception of human relationships and the true purposes of life in its higher and proper sense.

There is a Cause for Backsliding

I want to say in closing, and with the utmost earnestness and seriousness. I believe that there has been a backward swing in the progress of safety work. I believe that we have not made the progress that we should have made considering the time and money that have been devoted to the work; and I think there is a cause for this. I believe that safety directors have magnified the engineering side of accident prevention, and have sacrificed efforts that in the beginning were devoted to the human side of our industry. Therefore at this Congress I want to throw out a warning to safety men, of the peril of forgetting what was once the fundamental factor of accident prevention. There is no one other thing that will solve our problem, and in emphasizing this I am not losing sight of the importance of other things. But until you secure an appreciation from each workman of what safety means to the man himself and to his family, and until you get him to know that he is the most interested one in the cause for which you are working, you will never get anywhere in accident prevention. As for me and my household, we are going to go back and do some of the things that we have neglected. An understanding of human relationship, and an understanding of the purposes of life on the part of the safety director are the things that will enable him to accomplish his work.

Yesterday morning I heard another speaker say, "When you are selling a piano do not sell the piano, sell music; when you are selling an automobile, do not sell

an automobile, sell the great outdoors." How true that is! How much better is that plan than trying to sell the cold machine.

In selling safety, don't sell safety, don't sell printed posters and rules, supervision and safeguards; sell the conservation of life, sell human happiness, sell prosperity, sell a better employment relation and happiness, and all those things that go with safety work.

A true conception of safety in this way, an earnest heart, a love for man, diligent, hard work, square dealing, good character—these all combined will bring to you success in safety work.

CHAIRMAN OPP: Now we are going to get the executive side of the story, and it is going to be presented by no less a personage than Mr. Frank W. Smith, vice-president of the United Electric Light & Power Company, New York City.

Ways and Means of Impressing Executives and Operating and Designing Engineers

Frank W. Smith, Vice-President and General Manager, The United Electric Light and Power Company, New York City

The topic assigned to me would seem to carry the implication that some executives need to be sold on the "Safety Idea"; that they are not now sufficiently interested in the movement which has brought together today thousands of men who are devoting a large part of their time—some of you 100 per cent of your time—to the business of accident prevention.

There is no doubt of the interest in safety, the humanitarian interest in the protection of life and limb, held by all of us and by the greater number of industrial executives who have not been able to attend this Sixteenth Annual Safety Congress. The real question is: "Mr. Executive, what are you *doing* about it?" Are you merely authorizing safety work and approving vouchers for the expense involved, or are you personally getting right on the firing line with your safety engineers, your superintendents and managers, and helping them carry on the fight with your own personal efforts as well as your signature and your sympathetic interest?

An example of this practical type of interest in the safety movement was shown at the last safety rally of the Metropolitan Section of the National Electric Light Association held in New York City. This division of the association is made up of several thousand employees of the local electrical utility companies in greater New York. At this meeting there were present chief executive officers of nearly every one of the utilities in the district—presidents, vice-presidents and general managers. Many of them spoke, others encouraged the safety committees and employees by their presence and cooperation. There were more than 3,000 employees present at this rally and for "safety" the police were obliged to close the doors before the meeting could be gotten under way. This explanation is made because I do not wish, in the remarks that follow, to be understood as implying that on the whole the executives of the utilities are not actively interested in safety.

Since the earliest days of the safety movement it has been axiomatic that to succeed in any permanent campaign for the prevention of accidents it is first necessary to sell the safety idea to "the big boss" or, as we are more likely to say today, to the chief operating official. It was recognized at the start and it is just as true today that the safety spirit must saturate an industrial concern or a public utility from the top down; that the rank and file of employees, foremen, superintendents and even higher plant officials would not do their best

to prevent accidents unless they were sure that the top man was thoroughly sold on the idea.

And so from the earliest days of the movement professional safety men and others interested in the subject have made speeches and written papers on how to create and maintain the executive's interest in accident prevention. Undoubtedly hundreds of addresses have been made on the subject, many of them inspiring addresses, but largely they have sung the same song: "Show him it **PAYS** to prevent accidents"; "Convince him it is cheaper to **PREVENT** accidents than to *pay* for them"; "Prove the economic soundness of accident prevention"; scores of titles, but all using the same technique.

Now with your permission the speaker will depart from this technique, for it is his belief that the dollars and cents value of the safety movement has been very much overdone. Granted that money invested in accident prevention will—when the work is carried on in a thoroughly organized and efficient manner—yield a fair return on the investment; and let us go further and accept the statement, often made, that certain companies have secured a higher percentage of return on the money invested in safety work than on the investment in manufacturing equipment. Still I venture the opinion that it is a mistake to concentrate on the economic value of accident prevention in trying to interest executives.

Characteristics of the Executive

Let us examine for a moment this unusual species of man known as "the executive" or "the big boss," sometimes endowed also with such adjectives as "hard-boiled," "cold-blooded," "hard-to-sell," or just plain "stubborn," who, some seem to think, must have his interest in the saving of human life and limb created in some special mysterious manner. As a matter of fact, your executive usually has a wife and children; he probably plays golf (let us hope he does) or he is interested in some other attractive and health-giving, out-door sport. He has, or he ought to have, a sense of humor and enjoys a good story; sheds a tear in the theater now and then, and eventually goes the way of all flesh. In other words, the executive is usually an ordinary human being with the same warm blood, the same emotions, the same love of life and the same aversion to suffering and premature death—both for himself and the other fellow—that all human beings have.

Yet we too often try to interest such a man in the saving of human life wholly on the strength of the dollars and cents value of safety.

I have in mind an incident which illustrates the point I am trying to make—that the legend of the big industrial executive as essentially a cold-blooded business man is fictitious. Several years ago there was undertaken in New York City a campaign to demonstrate, through one week's intensive effort, that radical reductions in accidents—both public and industrial—were possible even in the rush and bustle of the biggest city in the world. The leaders of this movement felt that its success depended on their ability to secure the sponsorship of an outstanding man whose identification with the campaign would bring the interest and support of the entire community of seven million people. And so Judge Elbert H. Gary, chief executive of the United States Steel Corporation and one of the founders of the safety movement, was asked to head the campaign, which he consented to do.

Judge Gary, in whose death, a few weeks ago, the nation and the whole world lost one of its outstanding men, was at that time 75 years old and was personally directing the biggest business enterprise the world has ever seen. Because of these two facts and the further fact that for many years Judge Gary had

confined his public addresses to the annual meetings of the Iron and Steel Institute, the delegation (headed by Arthur Williams, vice-president, commercial relations, of the New York Edison Co., and president of the American Museum of Safety), which persuaded him to accept the chairmanship of the Safety Week campaign did so with the understanding that he would not be expected to make more than one speech during the week, that on the opening day of the campaign.

Well, to cut the story short, the Judge so warmed up to his subject in that first speech, he was so impressed with needless waste of human life through accidents still going on 20 years after the start of the safety movement, that he made, not one speech during the week, but more than a dozen. He spoke twice a day in widely separated parts of greater New York, and, if I am correctly informed, made three addresses on one day. Incidentally, the dollars and cents value of safety was not even mentioned in this great conference to help put public safety on the map.

Judge Gary Spoke on Accident Prevention

We have heard it repeatedly stated that the Steel Corporation has spent millions of dollars for safety and has made millions of dollars upon this investment. The late Judge Gary had repeatedly made public utterances concerning the corporation's interest in safety as a good business proposition, wholly aside from its humanitarian aspects, but the most significant statement concerning both the economic and humanitarian value of this great work that I have ever seen comes also from the pen of Judge Gary; in fact, from his last published statement. I quote from the current issue of "Coal Age," in which Judge Gary said:

"During the last fifteen years we have spent upward of \$170,000,000 for safety, sanitation and employee welfare activities. These expenditures have been fully justified. They have been more than recovered in dollars and cents. But of far more importance than the recovery of the expenditures, the happiness and gratification resulting to our many thousands of employees and their families, as well as to the management, through good health and safety of life and limb, have been beyond computation, beyond any measure in dollars and cents."

It is time we stopped thinking of chief executives, chief engineers, and other high supervisory officials primarily as cold-blooded men who are influenced in their business decisions only by logic, statistics, or financial considerations. Of course, it would be just as bad to go to the other extreme and assume that they are sentimentalists and can through mere "sob stuff" be made as vitally interested in safety as in the business or profession to which they have devoted their lives. But is there not a middle ground?

There can be no doubt that most executives appreciate their personal responsibility for the welfare of the men and women making up their organizations. I believe it means much more to an executive to hear that John Smith has lost an arm or an eye than it does to hear that the company has lost a sum of money through such injury. And I am sure it means much more to any general manager to be told that "we didn't kill or seriously injure a single employee" than to hear that so many thousands of dollars have been saved in compensation costs or insurance premiums.

There is another, and important, reason for using something, other than the dollar and cents technique in trying to interest executives, not already so interested, in safety (if there be any such). I refer to the fact that it is impossible to measure the value of human life in terms of dollars. Suppose, for instance,

a certain young employee of the General Electric Company, who was later to be known the world over as "that wizard Steinmetz," had been killed in a shop accident. Could any of you tell the General Electric Company or the electrical industry as a whole what the accident cost the company and the country? Or, if you think you are good at figures, estimate the dollars and cents cost of an accident that would have taken Thomas Edison from us 40 years ago, or even now.

It may be true that there are not many potential Edisons or Steinmetzes among the men who are killed or permanently incapacitated through industrial accidents—and yet who knows?—but it is nevertheless impossible to measure accurately the real cost of such accidents, even when the victim is the most unpromising common laborer. First of all, to his own mother, wife, children and brothers or sisters, he is as dear as the man in the most exalted position. But wholly aside from that and aside from the cost of accidents in terms of compensation, which is too frequently referred to as the total cost, there are incidental costs which it has been difficult to measure accurately, and which probably greatly exceed all the figures that have thus far been used to estimate the loss to industry, to the workmen themselves, and to the nation, resulting from preventable accidents.

Some of the Incidental Costs of Accidents

Here is a list of the incidental costs of accidents recently compiled by one of the leading insurance companies in the country:

- 1—Lost time of injured person
- 2—Lost time of other employees
 - a—out of curiosity,
 - b—out of sympathy,
 - c—assisting injured,
 - d—through shattered nerves.
- 3—Time lost by foreman—
 - a—assisting injured employees,
 - b—investigating cause of accident,
 - c—arranging for injured persons to be done by others,
 - d—selecting, training, breaking in new employees,
 - e—giving information for state reports or attending hearings before the industrial commission.
- 4—Time spent on case by first aid and hospital staff
- 5—Injury to machinery or spoilage of material
- 6—Interference with production
- 7—Cost of continuing wages in full when injured employee returns to work after recovery, even though his work may be only 50 to 75 per cent of normal value.
- 8—Loss of profit on injured employee's productivity.

The person who prepared this list adds as a ninth item the question: "What would you count the cost if you lost one or two of YOUR fingers?"

It should of course be borne in mind that this is only a partial list of the incidental costs; that it does not include compensation costs, or the cost of medical staffs and hospitals. There seems no doubt that if it were possible to gauge accurately these incidental costs it would be found that they are greater than the compensation costs of accidents which are now often erroneously referred to as the total cost.

The remarks thus far made would seem to be devoted in large measure to "How *not* to sell the safety idea to executives and operating officials," and

perhaps an apology is due those in attendance at this meeting, in view of the title of my subject, for having stressed this point. The speaker believes, however, that when it is recognized that executives are interested in, and influenced by, considerations other than financial, the most desirable method of getting executives interested in safety, and keeping them interested, will be developed by a study of the particular man and the situation within the particular property. There is no one best way of selling the safety idea to executives, because executives, no more than other human beings (thank Heaven!), are not yet standardized.

There seem to be, however, certain considerations which should appeal to operating officials and other executives of public utility companies. The person interested in converting an executive in this industry to a firmer belief in the value of thorough-going safety work might do well to take these special considerations into account.

A Sense of Obligation Among Public Utility Men

First among these is the sense of obligation for the safety and welfare of the public which utility men probably possess to a greater degree than executives of other industries, because life and health are directly dependent upon their services. The continuity of service—whether it be gas, electricity, water, telephone or transportation—is the first consideration of every official and every conscientious employee of a public utility, simply because it is recognized that a break in the service may result in death or injury, as well as inconvenience to some in the community. It is not necessary to dwell on this because it is in the blood of all public utility men: and if it is true, as it certainly is true, that "a public utility is a business affected with a public interest," it is equally true that the first and foremost argument in favor of the utmost safety precautions in a utility is the PUBLIC INTEREST IN THE SAFETY OF THE UTILITY WORKMEN. The community is not protected against a break in the service or against accidents to the public unless the employees of the utility are working under the safest conditions, and with a spirit that can be engendered in the employees only if the company is saturated with this spirit of safety from the top down.

Let me give you an example of this sense of obligation to the public. In the company which I have the honor to represent, and, in fact, in the entire group of companies affiliated under the parentage of the Consolidated Gas Company of New York, every employee, both male and female, from the office boy to the president of the company, some 33,000 in number, has been instructed in and examined for proficiency in the prone pressure method of resuscitation. This work is being intensively carried on, not because the office workers or sales force or the executives are in any particular danger of electric shock or gas asphyxiation, but because it is believed that by having every employee in our companies instructed in this method of resuscitation, we are reducing throughout the community the chances of accidents and death to the public at large. We have a large number of cases annually where lives are saved to the general public from accidents entirely apart from the operations of our own business, such as drowning, etc.

The second special consideration upon which we might seek the interest of the utility man (not already sincerely interested in safety)—and again, I say, if there be any such—is the fact that our industries are *not inherently hazardous*. This is another way of saying that most accidents in our field are preventable. There was a time, not so long ago, when the steel industry was listed as extra-hazardous by insurance companies and others because it was

thought that many of the fatalities in this industry were unavoidable, that they were legitimate risks of the trade, inherent to the industry, but now men have revised their opinions and the steel industry is no longer classed as an extra-hazardous industry.

As a matter of fact, there are now comparatively few really inherent or unavoidable hazards, and it is the writer's belief that those executives in our field of endeavor who are not now as interested in safety work as they should be, are laboring under the impression that "accidents are going to happen anyway, and you cannot prevent them." Concentrate on convincing such an one that "It can be done" rather than on how much money he will save if it is done.

Finally, having impressed the executive with the fact that his interest in the safety of the community and his interest in good public relations should presuppose the most thoroughgoing safety work on his properties; having impressed on him—with the substantial evidence available—the fact that ACCIDENTS IN THIS INDUSTRY CAN BE LARGEY PREVENTED, go back to my original premise that the executive is also a human being and show him his opportunity, not to save money, but to save men, fathers, brothers and sons.

Try to Understand What Safety Really Means

In a recent editorial in the *New York Telegram*, commenting on the report of the New York State Department of Labor, and following the statement that "measured in accidents to workers, the high cost of industry appears to be climbing," the editorial continues:

"One trouble with reports like this is that we learn of these injuries and deaths in figures, and figures are cold and dryly statistical. If we could go into the hospitals and homes and see broken heads, stubs of arms and legs, sightless eyes, saddened wives, widows and orphans, and the hopelessness of humanity in stricken homes, we could understand better what the figures mean. Try to connect the figures with American homes when you read the statement of facts and figures in the report. * * * Those of us who have two arms, two legs, two eyes and a full complement of fingers and thumbs might well pause a moment to think something of this part of the high cost of comfort."

This comment on the part of the public press brings out the point that I am trying to make, and throughout these scattered remarks the human rather than the economic side of safety has been stressed. From the economic side, the accomplishment has been great, but there is evidence to show that there is still much to be done, and it is not impracticable to estimate that this further decrease in the economic loss could be made a billion and a half dollars annually in both public and industrial accidents, a figure which would represent not only a tremendous economic gain, but, what is far more important, saving in happiness and lessening of hardship in American homes and families. It is this last humane saving that should be the inspiration of all who are interested and to all actively engaged in this safety movement, which after all is one of both brain and heart.

CHAIRMAN OPP: Mr. Smith is the past president, not only of the local section of the Metropolitan National Electric Light Association, but also past president of the National Electric Light Association itself, so it has been indeed a very happy combination in which we worked. We certainly do appreciate very much the happy cooperation of the National Electric Light Association, and particularly are grateful to Mr. Smith for coming over from New York to give us this splendid paper on which Mr. S. C. Mumford, Treasurer and Chairman of the Safety Committee of the Detroit Edison Company, is going to open the discussion.

Discussion of Mr. Smith's Paper

S. C. Mumford, Safety Director, Detroit Edison Company, Detroit, Mich.

Executives, like the Gaul of Cæsar's time, may be divided into three parts:

1. Those who are vitally interested in the safety of the employees serving under them, and who insist that everything humanly possible be done to prevent the occurrence, or reoccurrence of accidents.
2. Those who are interested, but not very well informed, and with the attitude of "let George do it."
3. Those who have little, if any, interest in any safety program, and only do what the law requires.

In his refreshing talk Mr. Smith refers principally to executives of large utility or industrial corporations. I agree with him that all of them are men of heart as well as brains, but they do differ in their degree of interest and activity. The question is, in motor language: How can they all be brought to "hit on all cylinders."

Those who have immediate charge of the safety program should keep the executive informed by comparative charts or records, in more or less detail, showing all lost time accidents; primary causes; carelessness of employees, or fellow-employees; defects in equipment; lack of safeguards, et al. Also lost time, cost to the company (direct or indirect), and cost to the employees. This should be supplemented by periodical reports showing the nature of the injuries suffered by the men, whether fatal, or to head, arms, legs, or body, in other words present the "butcher's bill." Likewise the percentage of decrease in efficiency of those who continue to work for the company or other employers down to those totally disabled. This should arouse or maintain the interest of any human being.

The executive should keep his finger on the pulse of the safety movement by periodical meetings with his accident prevention committee superintendents, and principal foremen, both operating and construction. Such displays of interest and cooperation would have effect far beyond any sporadic efforts on his part, at occasional specially staged safety drives.

Executives of small companies are not yet enlisted as they should be for safety. Splendid as the record of the National Safety Council has been, the work of bringing the lesser organizations into the local councils has only begun. Such executives must be shown very clearly that it is a matter of dollars and cents. Analyses of the true costs, direct and indirect, may gradually be supplied him by industrious locals, to convert him to spend money (often his own, as he is usually the largest stockholder) for accident prevention, and to spend some of his own time in directing the work himself. Of course, the local council may help impress him by writing him to send his foreman to foremen's meetings, where the safety idea is contagious. Later the "old man" himself may be brought into the fold.

CHAIRMAN OFF: We will have just a word in addition from Mr. John Price Jackson of the New York Edison Company, New York City.

MR. JACKSON: I am very glad to have the opportunity of congratulating the chairman of the Executive Committee in picking out Mr. Smith to bring us the message from the executives. Mr. Smith, in addition to being one of the former presidents of the National Electric Light Association and following up the subject of safety generally, is manager of one of the dozen largest electric light and power companies in the United States, and chairman of the board of another one nearly as large, and he holds many important positions of other kinds. He is I presume, a man who, in New York City, and all over the country, would be selected as a typical executive.

We all feel the difficulty of dealing with the executive, but I think the message

he brought us today is one which could go down as a slogan and as one of the best messages that could be received by this great group; namely, that after all, the chief executive is just an ordinary human being; secondly that the chief executive is interested in his nation, his community and in his own employees as a humanitarian matter first and foremost; and thirdly that he is also a good sound man who must make ends meet in order that he may meet his payroll and other expenses. I believe, Mr. Chairman, you have gotten a very fine message today.

I tried to make a resume of what I believe is Mr. Smith's talk. I believe you made a great killing, if I may use that word, in obtaining a man of Mr. Smith's standing, to give us a message so clearly and to the point.

If we are going to get our executives to lead in this safety movement we must feel that we have to deal with them as human beings, and also as successful and sensible business men.

CHAIRMAN OPP: Mr. Smith, I want to thank you for the Executive Committee for presenting the paper, and you, Mr. Mumford, and you, Mr. Jackson, for your comments in addition to the paper.

The next item on the program is a very important one. We are going, now, to receive the report of the Nominating Committee for the officers for the ensuing year. The Nominating Committee is made up of Messrs. Charles B. Scott, H. B. Harmer, and H. M. Webber.

Mr. Scott will make that report.

CHARLES B. SCOTT: Your Nominating Committee begs leave to submit the following nominations for officers of this section for the ensuing year.

Report of the Nominating Committee

Chairman, Carl J. Rutland, Texas Power & Light Co., Dallas, Texas.

Vice-Chairman (Electric Interests), W. R. Loyd, Alabama Power Co., Birmingham, Ala.

Vice-Chairman (Gas Interests), Ivan L. Scott, Wisconsin Power & Light Co., Madison, Wis.

Vice-Chairman (Telephone & Telegraph Interests), H. L. Meade, Ohio Bell Telephone Co., Cleveland, Ohio.

Secretary, C. B. Boulet, Wisconsin Public Service Co., Milwaukee, Wis.

Submitted by the Nominating Committee:

MR. SCOTT: I move that the officers designated be selected.

(The motion was seconded and carried.)

CHAIRMAN OPP: The report stands approved. I thank you for your work, and you are now discharged.

We have a very unique delegate in attendance at this Congress. This unique personage is Miss Elizabeth Lee of Birmingham, Ala., a member of the National Accident Committee of the Electric Light Association, and a member of the Women's Committee of the National Electric Light Association. Miss Lee, we are happy to have you with us, and I trust you will participate in the rest of the discussions in these meetings.

I have here the number of delegates from each of the different states.

Attendance Record, Public Utilities Section

From Chicago—108.....	
From Illinois— 29—Total	137
From Indiana	11
From Michigan	12
From California	1

From Texas	7
From Missouri	6
From Ohio	15
From Kansas	3
From Pennsylvania	25
From Massachusetts	5
From New York	15
From Minnesota	5
From Wisconsin	8
From Connecticut	3
From Oklahoma	2
From Maryland	1
From Maine	1
From Colorado	1
From West Virginia	2
From Washington, D. C.	1
From Oregon	1
From Nebraska	2
From Georgia	3
From Kentucky	1
From Canada	6

Total from 24 States and Canada.....274

CHAIRMAN OPP: The next item on the program is going to be one of intense interest; one that I know is going to appeal to you very much. It is to be illustrated by a model. Speaking of models, we are to have one also on Thursday, a very unique exhibit. The model on Thursday is going to be a demonstration of the operation of an electrical system by an electric model. The model to day is one that ties in very closely with the work conducted by the National Electric Light Association Accident Prevention Committee, as the result of the questionnaire by Mr. Carl Rutland in connection with the unloading of poles from railroad cars. It will be given by Mr. W. H. Brown, Secretary General Safety Committee, Northern State Power Company, Minneapolis, Minn.

Rules for Unloading Poles

W. H. Brown, Secretary, General Safety Committee, Northern States Power Company, Minneapolis, Minn.

General:

The rules for unloading poles from cars herein provided, have been made in the interest of safety to all employees engaged in every phase of the handling of poles.

It is impracticable to include rules to meet all contingencies and employees in an emergency not provided for in these rules are expected to act under the instructions of the foreman.

Necessary time should be taken to determine where danger may exist.

When possible, unload the car in the same direction that the load leans.

It is absolutely necessary that these rules be understood before attempting to unload poles.

UNDER NO CIRCUMSTANCES ALLOW ANYONE ON TOP OF THE LOAD.

Preparing the Load:

Block car wheels forward and aft to prevent movement of the car in either direction on the railroad track. ("A" Figure 1-2 & 7.)

Wedge four tight fitting blocks between railroad ties and car beam opposite the unloading side. One should be placed near each end of car, the other two spaced proportionally in the center to evenly distribute load. ("B" Figure 3-4 & 5.)

When car leans opposite the unload side it is advisable to add two additional wood braces, one at each end of the load ("BB" Figure 4), when same are available.

Provide wood skids for rolling poles from the car to ground or storage skidways. ("C" Figure 1-7 & 8.)

These are made using short poles or car stakes placed against the car, one end

Photo. P. S. #21 - (2055)

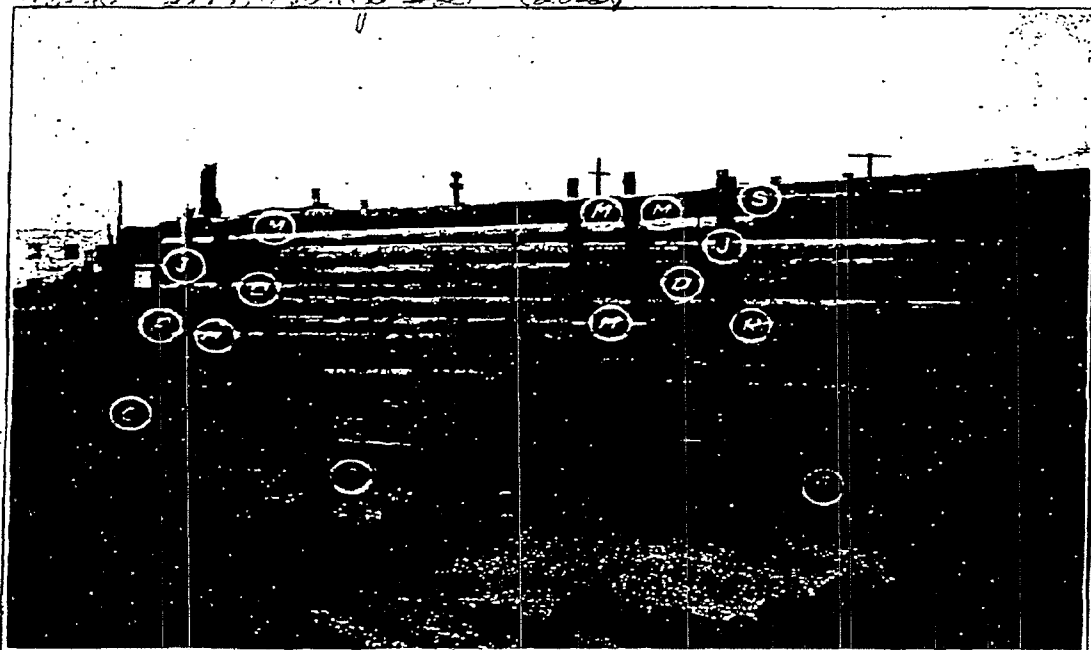


Figure 1. Illustrating the wooden skids.

level with the car deck, the other one on the ground. These skids to be reinforced by wedging cross timbers at intervals so that they are perfectly rigid.

Place stranded wire cables ("D" Figure 1) (not hemp cord) (approximately $\frac{3}{4}$ "), near each end of the load and fasten securely to the car truck chassis on the side to be unloaded. ("E" Figure 2.)

It is preferable to use a chain with hook on this end of the wire cable.

In case of a double load of poles, three cables should be used, the additional one being placed in the center. However, should only two cables be available, the car can be unloaded safely by placing the cables closer together being sure to catch both top and butts of poles.

Pass the cables "D" over the load near the inside stakes to the opposite side of the car; take out all the slack and wrap twice around the car truck chassis ("F" Figures 3 & 5), then twice around the bumper at the end of the car. ("G" Figure 5.)

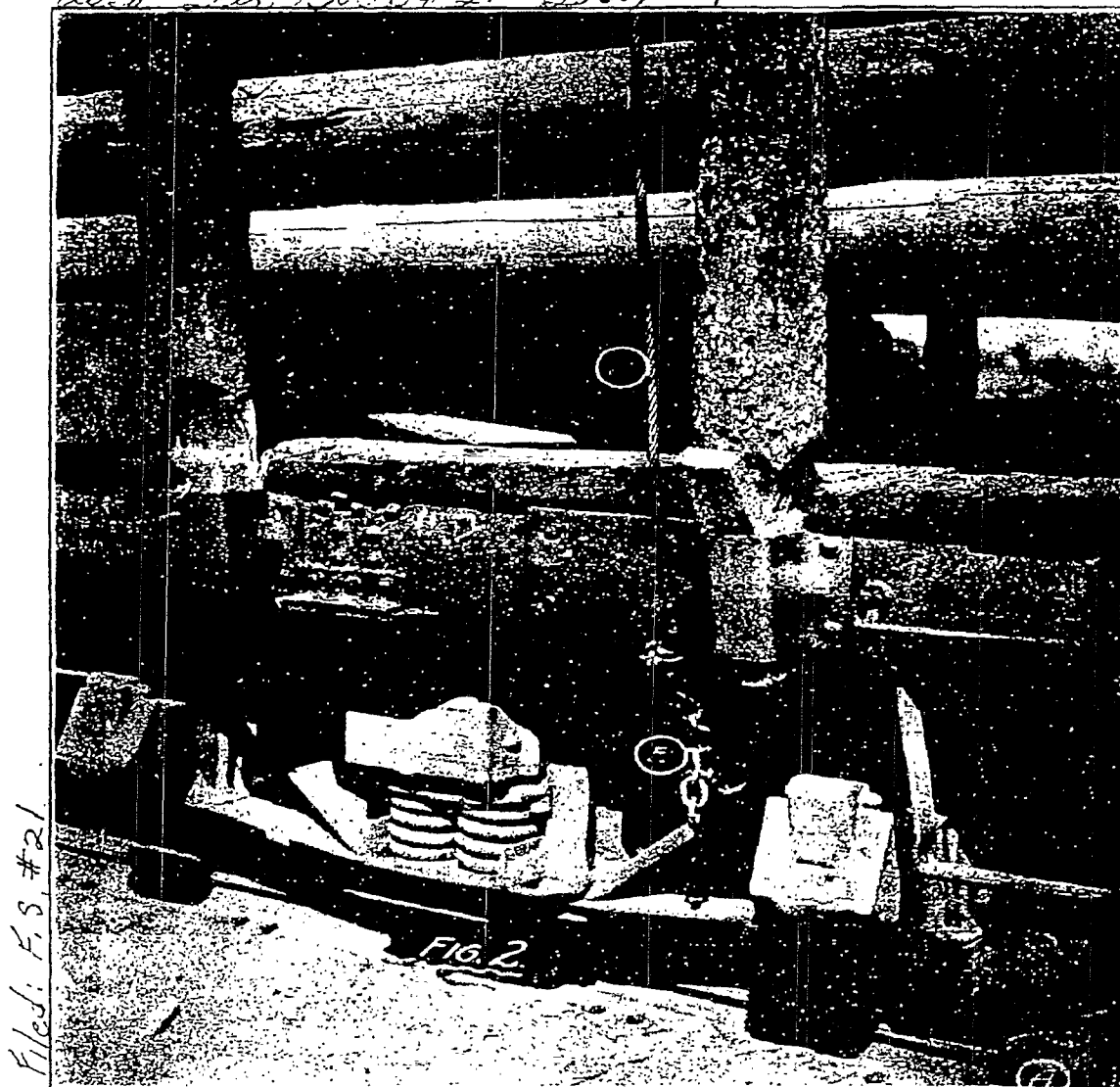
Use in Pulling Hoist #21-12032 ✓

Figure 2. Block the car wheels fore and aft.

One man should hold the end of each cable until ready to pay-out the load, standing opposite to the side from which the load is to be released, and clear of the end of the load.

In case of a carload of poles where length requires a tender car as Figure 3 be sure man does not stand too close to load ("H" Figure 4) but far enough back to be entirely safe.

Secure a rope hand line at the top of stakes "J" to be used in an emergency should the stakes not break readily when the load is released.

If special wire cutters provided for unloading poles (Figure 6) are not available then an ordinary pair of bolt or wire cutters can be used ("K" Figure 5) fastening one handle securely in place on the stake attaching a hand line ("L" 5) to the other handle so that the top wire can be cut from safety when required.

Cut binding wires "M" and remove all inner stakes on the unloading side of car, leaving the two end stakes "J." (Figure 7.)



Figure 3. Secure the cables around the car truck.

Should an end stake be broken or frail leave the next nearest one.

Cut end stakes "J" about one-half way through on the unloading side of the car. ("N" Figure 7.)

Cut to be made just above stake holder and as close to car deck as possible.

Cut binding wires "R" on unloading side stakes "J."

Use special wire cutters provided, standing at a safe distance.

Sometimes poles are loaded having two intermediate wires between; in this case cut both of these wires at this time.

DO NOT CUT TOP BINDING WIRE "S."

UNDER NO CIRCUMSTANCES ALLOW WORKMEN ON TOP OF THE LOAD.

Releasing the Load:

Have special wire cutters provided in readiness to cut top binding wires "S" on

stakes "J" on the opposite side of unloading.

If special wire cutters (Figure 6) are not available and it is necessary to use ordinary wire or bolt cutters these should have been placed in position before cutting binding wires as instructed above.

Foreman shall inspect all conditions and be sure all men are clear.

Cut wire "S" on stakes "J" at both ends of car simultaneously.

Men should stand clear of the end of load and both wires "S" should be cut at the same time.

Work: Pull in Skid #21 - (2008) ✓

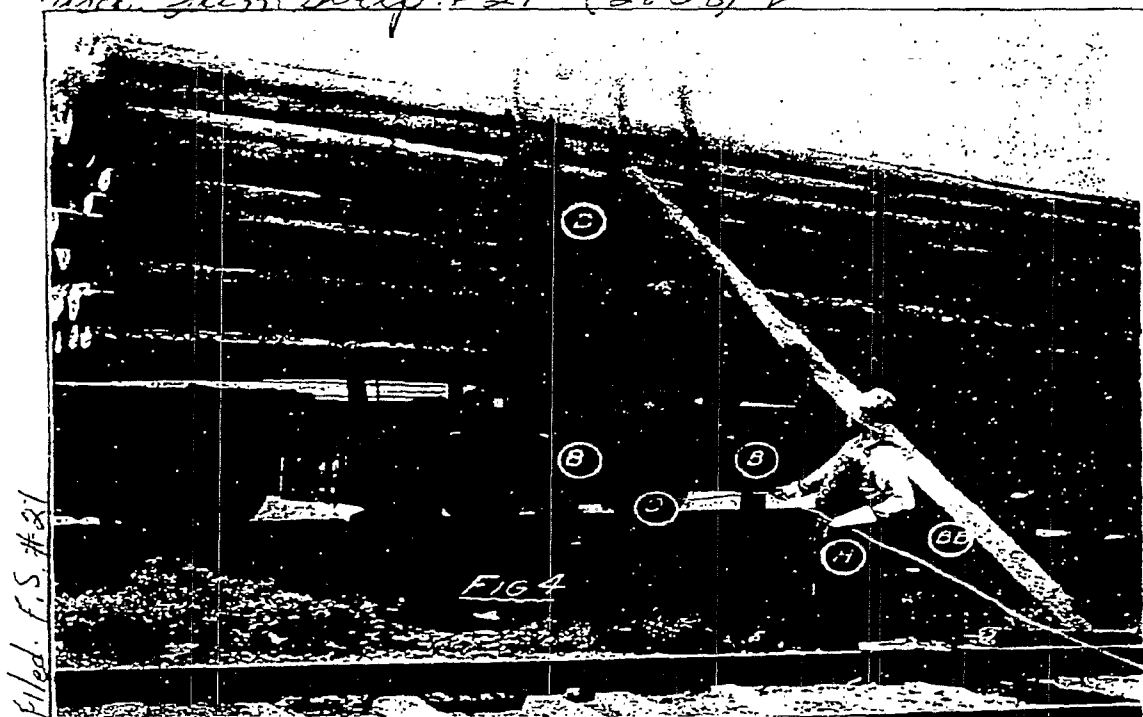


Figure 4. Add additional wood braces.

After the binding wires "S" are cut, the load will drop easily into the cable loops and the poles will remain parallel (Figure 8). Workmen holding ends of cables will then pay-out or slack off the load until the poles reach the skids. (Figure 9.)

When poles reach the skids (Figure 9), the cables are loosened and the poles rolled away.

Handling Poles:

Never apply pikes or cant hooks on the ground line portion of a Butt Treated pole. Part of the value of the treating application is lost if the ground line of the treated butt is injured or punctured.

Never apply pikes or cant hooks into the top of poles. Splitting of poles is likely to result, also holes are made allowing rain and moisture to get into the pole, causing decay.

Poles to be stored should always be placed on skids to prevent rotting.

Given: February 1911 #21-(2060) ✓

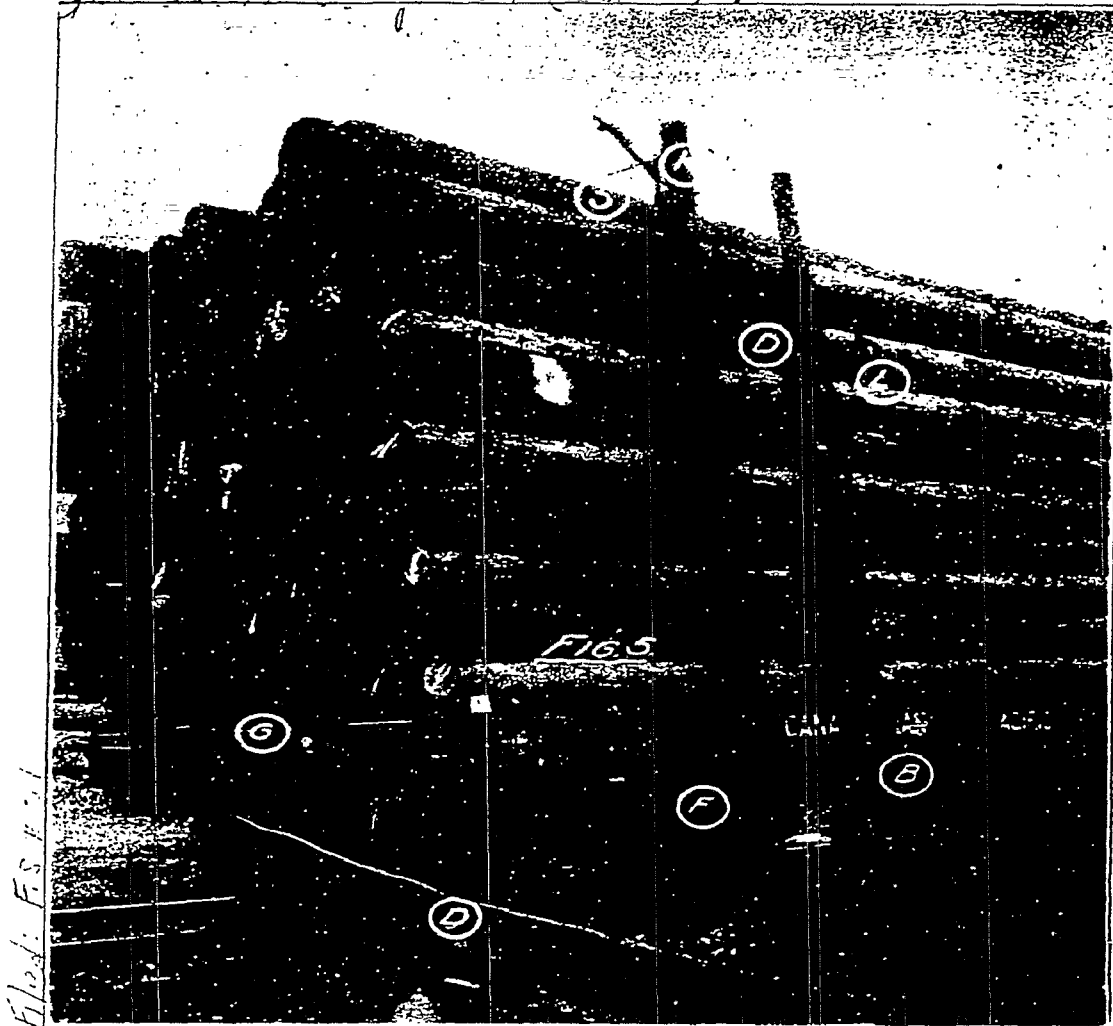


Figure 5. Be sure the man does not stand close to load.

MR. BROWN: We have these rules printed to show our employees who unload the poles what they should do, together with actual photographs of a carload of poles showing how they should handle them.

The first thing we attempt to do when a car comes in is to have the car securely blocked with blocks; we slip them in in this way (indicating.)

If we are going to unload on this side, we wedge the car on the other side, so as to make the car lean this way.

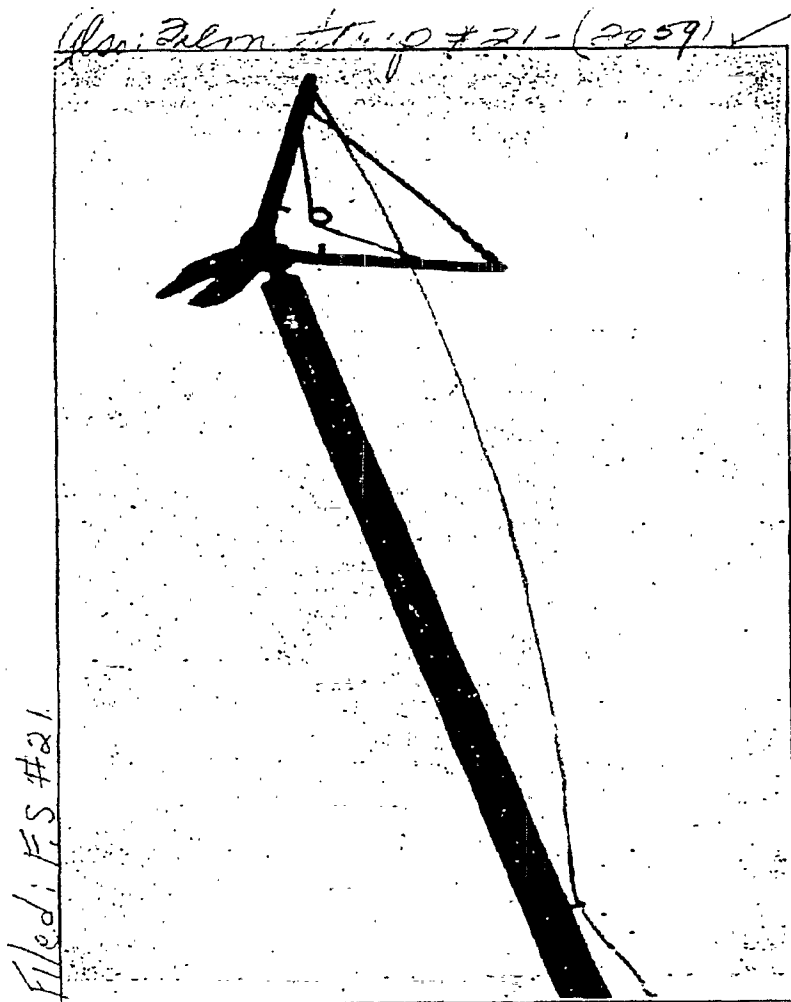


Figure 6. A special wire cutter.

There are usually five wedges, and they are driven in in this way, and that leans the car that way (indicating.)

Then the next thing we do is to bind the load; we use a cable for this purpose; I have on the end here a small chain, this chain is thrown around the truck of the frame of the car and brought over the poles and then taken twice around the frame of the car to this side, and then pulled tight; the man holding this must stand away from where he would be struck by a pole should it happen to go the wrong way. If you want additional snubbing, which we do at times, you come around the bumper here.

Next are your stakes; if you are in the country where you do not have stakes, as you have in your pole yard, it is necessary to remove some of your stakes. The

stakes can be put in there (indicating), with another stake put in the mud, but I am going to unload this model as we would unload it in the yard.

These are your stakes. The next thing is the removing of the stakes—of course they are chopped off. Now we cut these stakes. And on that point I want to say that we do not allow any one man to cut the stakes, we have a long bow-handled cutter by which they can be cut from the ground. We frequently find that the stakes do not break when cut so we have a hand line with which the man can pull the stakes out in case they do not fall when cut, and the man will not be near enough, when the poles do go, to get hurt.

Next we cut the line wires. Then the next step is the cutting of the binding wires which the men are not permitted to do, but that is done by a man at this

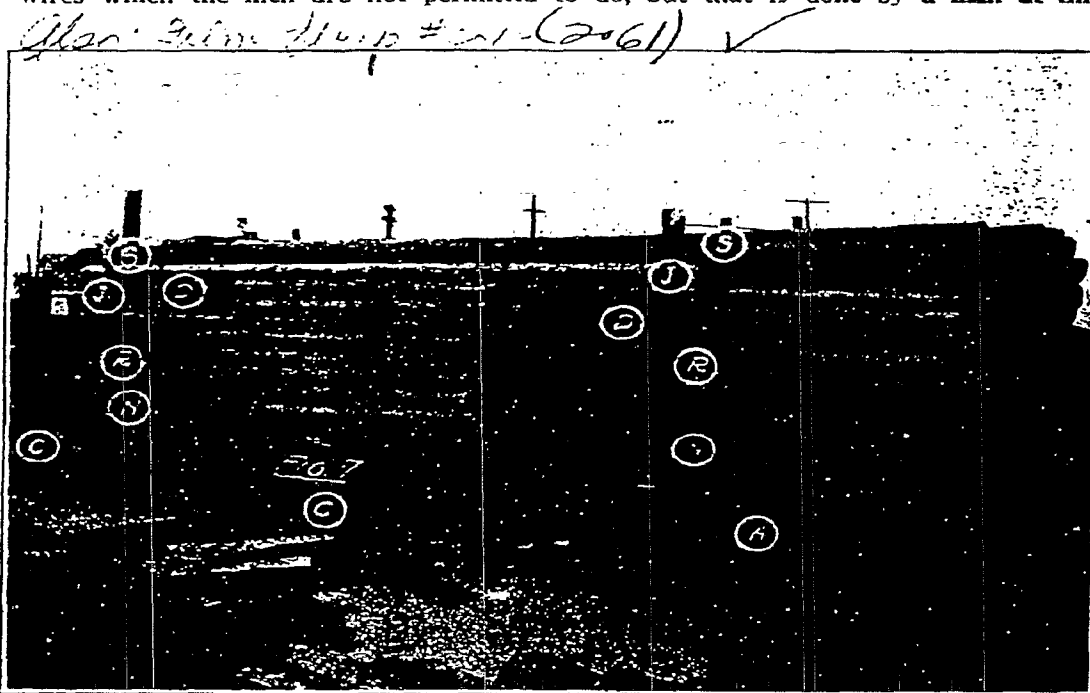


Figure 7. Cut end stakes about one-half way through.

distance, with a cutter long enough to reach it. This should be done by two men cutting simultaneously so that it breaks evenly.

And then your poles unload like this (illustrating).

I want to say also this, that the *Safety Service Magazine* has published in detail an article on the unloading of poles. Mrs. Thompson, editor of our magazine, will be glad to furnish you with copies.

CHAIRMAN OPP: That is very splendid indeed. We are going to have some discussion from Mr. Carl Rutland with reference to the questionnaire that he circulated some time ago.

C. J. RUTLAND (Safety Engineer, Texas Power & Light Co., Dallas, Texas): It seems there were several companies in the particular geographical section of the country in which I am located which had had quite a few fatalities from

unloading poles. A good many companies have special provisions made in their pole yards, but there are a good many companies which are building high power transmission lines and have to unload poles where they do not have trained employees to unload them. Every once in a while some fellow was killed by getting on the top of the car, or on the side of the car when the last stay wires were cut, or attempting to pull the tie stakes before they were fixed.

We thought it would be a good idea if, at this meeting, a standard rule was adopted, and we found that there are a good many companies which have standardized that feature. I was particularly surprised at the good work that has prevailed with the power and light companies through the United States, at least those which answered these questions with reference to fatalities in unloading poles.

Gloss: Pullman Straps #21-2662 ✓

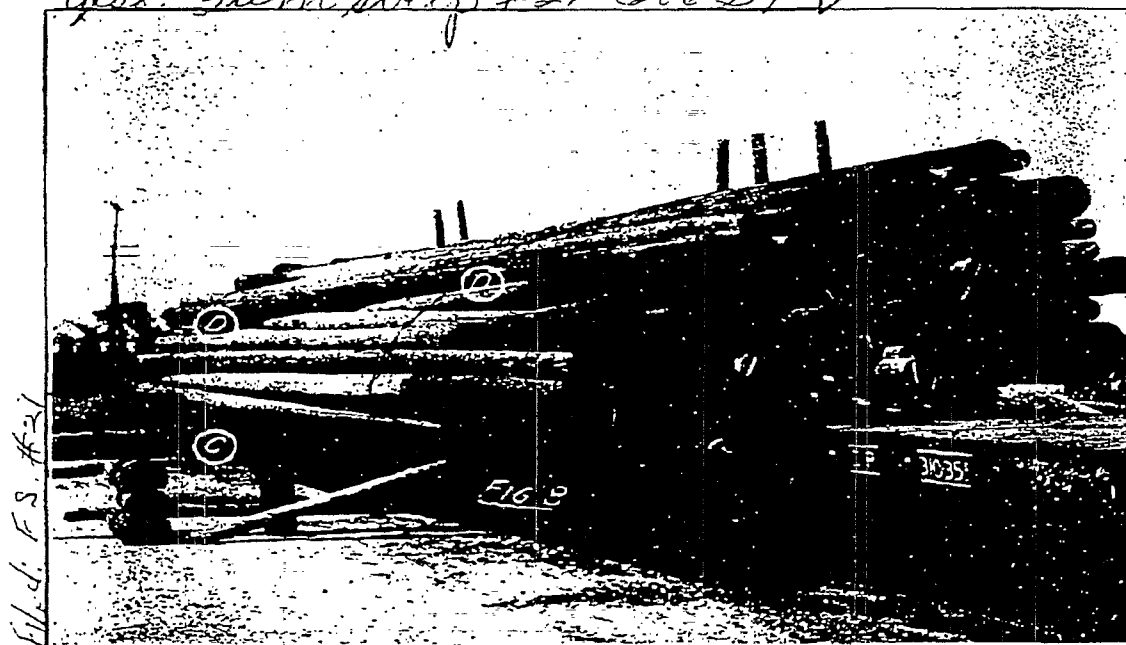


Figure 8. The loops will remain parallel.

There were 168 companies reported and of those 168 there were eight which had fatalities; and the same number did not have any rules at all in effect. There were 55 companies which had rules in effect, and of the remaining number, 103 did not have any method at all of unloading poles, and out of those 103 companies eight men had been killed over a period of 12 months.

If any of you here are experiencing any trouble in that respect, or do not have any rules in your own company, but feel that you should have, I suggest that you communicate with Mr. Brown and have him give you what information he can; and if you want to make any change in your local conditions, of course you are perfectly welcome to do so.

CHAIRMAN OPP: We are certainly indebted to Mr. Brown for the preparation of such a splendid model, and giving such a splendid exhibition.

Photo taken from Trip #21 (2063) ✓



Figure 9. As the poles reach the skids the cables are loosened.

Incidentally we are very much pleased to have Mrs. Thompson here; unfortunately she has gone from the room. By the way, we want to comment on the paper of which she is the editor. It has been commented on in many places as being one of the "prettiest plant magazines" in the country.

ADJOURNMENT

Wednesday, September 28, 1927

The second session was called to order at nine thirty o'clock by the chairman, Mr. George Opp.

CHAIRMAN OPP: I want to call your attention to the poster display at the rear of the room. It incorporates an idea that we have had in mind for some time, an idea that is to be elaborated on for next year's demonstration and exhibit: it includes rules, codes, home made posters, safe practices, pamphlets, and other things of that nature that will be of interest to each delegate, so be sure to view the exhibit before you leave.

I might make an announcement at this time relative to the new film slide service developed through the National Safety Council by reason of the inspiration that came out of the Public Utilities Section due to considerable effort on the part of Mr. B. B. McCulloch. The service is available now. There is quite a large supply of film slides, all arrangements have been made whereby we can secure the use of the slides and films at nominal cost. The films may be purchased through the National Safety Council at reduced prices.

We have doubtless heard and read a lot about mental causes of accidents. We have had the opportunity to read some of the reports on fatigue, and the effect of conditions within the body upon the causation of accidents. We wanted to get the full picture so we put the whole thing into one subject, and we have an opportunity this morning to hear a man who is going to paint for us that picture.

It is my privilege now to introduce to you Dr. Hart E. Fisher, Chief Surgeon of the Chicago Rapid Transit Company of Chicago, Illinois.

The Mental and Physical Causes of Accidents

**Hart E. Fisher, M.D., Chief Surgeon Chicago Rapid Transit Company,
Chicago, Ill.**

After viewing an accident outside your own industry, have you ever stopped long enough to analyze the cause of it? Did you fail at a solution, and did you stop to think how such an accident could be prevented in the future?

Permit me to describe just how the average man (not the safety man) would go about analyzing an accident and seeking a method of eliminating a repetition.

Take the case of a speeding automobile accident case, a small child on the parkway and in apparent safety. The child is about six years of age and all its waking hours are taken up with getting everything possible out of its play-time. It knows nothing of being safe or being in danger. It is true, possibly, that the child's parents have threatened it with punishment for going beyond the curb line. The street is forbidden ground. Possibly some effort has been made to explain the dangers of the street. If so, then the child is fortunate.

To continue—the child is at play and the ball bounces out into the street. Having been warned when given the ball not to lose it, he darts out after it, crosses the deadline of safety and heedless of all danger, runs directly into the path of an automobile driven by a man who does not see the child until it is too late to stop. The scream of the youngster is drowned out by the screeching of the brakes, and then in the dead silence, the little form is picked up, crushed and lifeless. The police arrest the driver, who explains that the accident could not have been avoided. This is verified by witnesses and the Coroner's inquest

finds the driver "Not Guilty," and he is freed. An article appears in the newspapers, and another child's life is added to the grand total.

This happens so often, and we become so accustomed to it, that we take it for granted that such things have to happen in a large city. Friends, we are wrong. There is a cause for that accident and it can be remedied, just as surely as you are sitting there in your chair. You smile and ask, "How?" By safety slogans, campaigns, buttons, speeches, etc.? Yes. Partly so, and with the aid of laws passed by our legislators and other law-making bodies. However, the real solution and remedy is one of the things that the average man knows very little about—the physical and mental causes of accidents, which I have been advocating for the past ten years.

After participating in various safety campaigns, I very soon found out that accidents still occurred, no matter what rules, laws, etc. were made, and despite all safety appliances furnished to protect the workman at his daily task. Please do not think that I am belittling the wonderful work so far accomplished by the Safety, or the Spirit of Caution, Movement under the guidance of the National Safety Council and its local branches. I am sincere in my belief in the immeasurable good they have accomplished, and I know that they have overcome almost insurmountable obstacles to gain the tremendous advantage they now have in accident prevention. But, gentlemen, these accidents still occur and are occurring and will occur in the future, regardless of all they do. Why? Because in the past we have been remedying the cause by eliminating all hazardous machinery, applying safeguards, substituting safe for unsafe practices and endeavoring to educate the workman in the spirit of caution through various media such as above outlined. Then when man-failure occurs and an accident happens, perhaps with a distressing injury to the worker or to his fellow workman, it is agreed after analysis that the man was careless and he was not exerting 50 per cent of caution.

There May Be Another Word About "Carelessness"

Very often the employee is told that he has been careless when he knows in his heart that this was not the case. I wish to say here that we should hesitate quite a while before pronouncing a workman careless. If he knows that he has not been careless, he will rightfully resent the implication that he was an unsafe workman and did not live up to the rules of caution.

So far, I have talked a great deal and said, perhaps, very little which is instructive, but before I am through, I hope you will agree that some of the statements I make fit in with little occurrences in your own life, and when I close I trust you will be able to see what caused the automobile driver to maim and kill the child in the street. You will also, I hope, see a real remedy for these accidents which are occurring despite all that we can do.

My intention is to take the mental and physical makeup of the man and dissect him, if you please, to learn just what physical and mental defects are productive of accidents. How is this to be determined?

Through a branch of the safety work, the industrial physician and surgeon cooperates with all those agencies toward the one goal—the elimination of all accidents that produce misery, suffering, death, and economic loss to the commonwealth. The physician's first step is close cooperation with the employment agent, as safety in any industry has its beginning in the employment department, and the employing man is the first safety man or engineer. Safety, or the spirit of caution, should be uppermost in his mind in the selection of applicants for employment. He should choose men best suited for the particular class of work to be done—large, robust men when muscular effort is required.

small men whose task requires working in and about machinery, and quiet mannered men for work requiring close application. In other words, choose the man after careful study of the physical requirements of the job. It is essential that the worker in America speak, read and write the English language, in order to understand orders and directions when spoken by the foreman, or in the form of rules or safety slogans.

It is money well spent, and dividends are large in return to that industry which makes an effort to educate illiterate employees and to nationalize those taking this work. To be a literate, American citizen is a big boost for a safe man.

Judging by personal appearances, the clean, neat man is often a cautious man at his work and will be careful. The slovenly (I dislike the word) man will very often prove to be the same at his workbench, and because of the disorder is very liable to have an accident. The nervous, excitable man is often the direct cause of injury to himself or others because of his quick, impulsive way of doing things. This type of man may be a foreman and by his actions cause his men to do things quickly or in haste, which leads either to the hospital or the grave. The loud, boisterous fellow is apt to repeat his false front in his work, and in order to prove that he is a superman, will take risks which a more even-tempered man will not do.

One factor of safety, often overlooked, is the employing of a man who is constantly changing from one position to another. He does not remain at any one place long enough to learn the safe and unsafe practices. Men who remain at one position only a short time do not readily assimilate the spirit of caution, and, as a rule, do not care to cooperate with anything that seems to be of benefit either to themselves or their employer. Inquiry amongst previous employers will often prevent taking into the service a man who is a hazard. The prospective employee may be all right, judging by external appearances only, but be mentally and physically unfit for the work he is to do. The only way to determine this is by a proper physical examination under a set standard of requirements for the particular class of work he is to do. If the applicant is unfit for one position, he may be assigned to work where he will be less of a hazard and his defects fit in safely.

The industrial physician who is to determine these various qualities must be trained in his particular industry. He must know the tools, machinery, classes of work, environment of the workmen and just what is required mentally and physically of the man starting to work. Many employees are examined by physicians who have not the slightest idea of what the work will require of that man.

Physical illness and defects are causes of accidents. Accidents due to physical illness are prevented by the examination of new employees and by frequent re-examination of all employees in a medical survey.

Defective Vision As a Cause of Accidents

Defective vision, undetected, is a direct cause in a great number of accidents that are otherwise attributed to carelessness on the part of the injured employee. A person with defective vision, either near or far range, is a poor judge of distance and slow at accommodating. For that reason he does not see the source of danger as readily as the man with perfect vision. Poor vision is a constant hazard near moving machinery. Very often when one is working at a machine, it is necessary to concentrate the vision on a certain movement and when the eyesight is defective, the eyestrain is often productive of accidents. Frequently, when a man is told that he has defective vision,

he replies that he can see as well as you or I. That may be a fact as far as his opinion is concerned, but nevertheless he is under a constant strain and it is only a question of time before the sight becomes more impaired.

Sometimes an injury, which might be trifling to a normal eye, will result disastrously to an eye that has defective vision. Stereoscopic, or double vision, is very often the direct cause of accidents. Astigmatism, with accompanying fogging of vision, both partial or complete, in one or both eyes, for a certain period of time, will occur just when normal sight is most needed, and then we have another accident to analyze.

The remedy for defective vision is properly fitted glasses to relieve the nervous strain and correct the error of refraction. However, glasses, in themselves, are often a source of danger. They may be left at home, lost or broken and the employee who goes to his work without them runs the risk of having an accident because he is not accustomed to working without glasses. Very often lenses fog from the cold or perspiration, partly obscuring the vision, and the man gets hurt. Even soiled or smeared lenses are cause of injury. One of the greatest risks is that of the glasses being broken and a piece of glass injuring the eye, even though the object which struck the glass could not have struck the eye itself. Colored or tinted glasses are taboo, especially in train service, where they may cause a change in the man's ability to distinguish signals. It is needless to say that any man who is color blind has no place in railroad or marine work, if he is to handle the public safely and operate trains or train signals competently.

The colors that are most often confused by color blind people are unfortunately, the very ones that designate train signals, red—danger; green—clear. Let me stop here long enough to tell you how some color blind men work, apparently in safety. They watch the switch points when they see a signal color or the signal arm, and if two lights are used, they know which is the red and which is green, by the way it is lighted, top—red and bottom—green, or vice versa.

Defective Hearing As a Cause of Accident

Defective hearing is insidious in its onset, and comes on gradually until the deaf man finally has an accident because he did not understand orders properly, or in his effort to hear, he became confused and an accident resulted. Some people who believe they are becoming deaf, find that they hear perfectly after removal of impacted ear wax. Deaf people are prone to become irritable due to their defect and act impulsively, thereby causing an accident. Some deaf people operate trains with apparent safety, by watching the hammer of the signal bell, looking out to see that all is clear before starting, etc. In litigation, the placing of an employee who is deaf on the witness stand makes a very unfavorable impression on the jury. Permit me to state here that there are a great many people with defective sight, color blindness and deafness, driving automobiles, who are the cause of accidents.

Defective Hearts As a Cause of Accidents

A man with a defective heart may have a sudden weak spell, and during this spell, meet with an accident. The lifting of heavy objects by a person with a defective heart has often resulted in death. A man may have a stroke of apoplexy, epileptic convulsion, fainting attack, coma from Bright's disease or diabetes, and by reason of same be severely injured. A man with high blood pressure may have a sudden attack of dizziness following heavy or strenuous work, and while in this state, meet with an accident to himself or

be the cause of injury to others. Electrical current, especially the lower voltages, is more often fatal in defective heart cases than where the heart is normal. Many cases of heart failure have been mistaken for electrical shock because the man was found in a dangerous place. People with defective hearts cannot stand extremes of heat and cold as well as those with normal hearts.

Very often an employee, who has had an accident remarks that he cannot remember what happened. He is correct in this, for he undoubtedly had a fainting spell or heart failure and cannot recall the details of his accident. These cases should be examined to determine if the heart is not the offender, rather than the employee's carelessness. Defective hearts are also the cause of absenteeism from work. Employees should be carefully examined for heart conditions after illnesses such as reumatism, infections and contagious diseases.

Rupture As a Cause of Accidents

This is my pet subject and I only wish I had sufficient time to go into it thoroughly, but I will only say at this time that an employee with hernia or rupture is very liable to be overcome by a sudden weak spell or pain in the groin or back, which is causative of injury. If you question a man who has dropped some object on his feet, or suddenly let loose of something with disastrous results, he will very often say that he had a pain or felt weak and let go. He should be examined for rupture. If these employees wear trusses, they are handicapped by the truss which often slips on exertion and is the cause of injury. All hernias in young or middle aged men should be operated, and when they are found in old men they should be placed on jobs where muscular effort is not necessary. Symptoms of hernia will detract a man's attention from his work. An unsupported hernia is liable to strangulate and cause the death of the patient. What is more "safety first" than the subject of hernia?

Varicose Veins As a Cause of Accidents

Varicose veins in the legs are often the cause of injury. The employee will not act quickly when danger is at hand because of the pain and ache of the varicose veins. Also, sudden pain in the legs may cause him to let go of his work, and his feet might be injured by dropping material upon them. Men with varicose veins who are on their feet constantly have their mind diverted because of the pain, and injury is in the offing. Trivial injuries become serious in presence of varicose veins.

I do not want to linger here too long, as I wish to get on to the subject of the mental causes of accidents before you are fatigued, but I must say a word regarding old age trying to do youth's work. How many poor old men have met death or injury because, through neglect of proper supervision, they were allowed to do work far too strenuous, or were placed at tasks requiring the quickness and ability of youth? Oh, for a more careful selection of workmen, with the human factor at the bottom of our hearts!

Employees must have the full use of legs, arms and fingers to protect themselves properly from injury. Stiff and crippled limbs are conducive to accidents. Many automobile railroad crossing accidents result from insufficient protection due to aged, crippled crossing attendants. In the old days, crossing flagmen even though they were aged and crippled, were able to do their work carefully with the slowly moving horse and buggy, but today, with the swiftly running automobile, it is necessary to have a youthful, alert and agile man to command respect by his physique, and protection by his ability to get out and onto the crossing quickly.

Mental Causes of Accidents

By mental causes of accidents I do not want you think I mean those who are mentally deranged or insane, but I want you to understand that every man is as different from his brothers in mental makeup as day is from night. What is perfectly normal and logical to one man may appear irregular and abnormal to another. It is with these various states of mind that I want to spend the next few minutes, and I will try to be as brief as possible.

The worried, troubled or agitated state of mind is the cause of innumerable accidents in industry today. Worry over financial matters, grief over family illness or death, anger or strife in the home or at work, hatred, malice or envy of one's fellowmen, are all conducive to accidents. When a man is angry and in a temper, he acts impulsively and in a fearless attitude, taking chances and doing things that he would never think of doing in a peaceful frame of mind.

Diversion of an employee's mind while at work may be accomplished by various factors, such as confusion following distracting disturbances, work becoming so familiar that an accident results from over-confidence, and repetition of work palling on the worker so that interest is lost. When interest is lost, look out for an accident. If the work at hand calls for constant repetition, the man assigned to that task should not be of a nervous or temperamental makeup. There is the fixed mind which minimizes all rules, work, or anything coming from the employer, such as the radical, who is this type. Also, the old employee who has been in the habit of doing a thing his way and will not be told how to do it in a better or safer manner.

Mental ignorance on the part of the worker causes him to fail to understand properly or assimilate what his employer intends to convey to him as safe practice. What is unsafe to one man does not appear so to another. As stated above, understanding of the English language is a safeguard to a great many accidents. If it is necessary to have foreign labor, men who do not understand English, then place all those speaking the same tongue in one gang, with a foreman who speaks and understands their language. Misunderstanding of spoken orders causes many injuries to the unfortunate worker.

Very often the worker is ignorant of hazards about his work because these hazards have not been explained to him, and if so, once telling is no guarantee that the worker understands. Then there is the state of mind in which the worker has no sense of rhythm and for that reason does not know by the sound of his machine when danger is at hand. This is best explained by an example: An engineer places his hand on the journal box of a revolving drive shaft to ascertain if the bearings are heated. With a perfect sense of rhythm, he does it automatically, but if a man lacking this sense of rhythm is placed on the job, he will put his hand on the shaft at the wrong time of revolution and thereby receive an injury.

Some people have lack of balance and are unable to ascend to high places without becoming dizzy and falling. This is due to the semi-circular canals in the ears. If these are defective and the employee mounts a ladder, he will become dizzy and fall. Was he careless? This sense of balance is necessary to aviators.

Mental Limitations

In this class of men you will find the accident repeaters, or the man who does not learn from previous accidents. His mind does not allow him to detect danger. There is the case of the man who lost a finger and in demonstrating to his friends how the accident occurred put another finger into the machinery and repeated the accident. These men fail to make use of safety appliances.

The opposite to this class is the man who can foresee dangerous practices and imagine or portray accidents before they really occur. In other words, he is able to foresee what the other fellow may do that will cause an accident. This is the cause of a great many automobile accidents; the inability of the motorist to do the thinking for the other fellow. You never know what he is going to do.

Routine fatigue of the mind is one of the greatest factors in accidents. I do not mean fatigue from labor, but fatigue of the mental facilities on account of the routine nature of the work. A man listening to the constant click-click of the wheels passing over the fish plates is soon lulled into a drowsy state of mind and his faculties become clouded. Although apparently in full possession of his senses, he fails to apply his brakes in time and an accident occurs.

There are many other forms of mental illness which are causes of accidents, but I will hasten and in concluding mention some other things which are productive of accidents. Poor ventilation or working in a temperature which is too warm, will dull the mental sense and produce drowsiness. The shop which is too cold will numb the hands, feet and body of the worker and dull the mind. Poorly illuminated working quarters will encourage accidents, as will also the glare from the interior of a shop too brightly lighted. The man who overeats or stuffs himself is very liable to run into an accident because he becomes drowsy following a heavy meal. Likewise, the man who does not eat or eats too little becomes weak. Calls of nature have been the cause of accidents, as the man who puts off attending the nature's calls when she bids him has his mind diverted and often, in his haste to finish his work before he goes, an accident occurs and injury results.

There are Nearly a Dozen Remedies

Now, to return to the mental side for just a moment to explain how fear will cause accidents. Fear of the foreman who is a driver of men will cause the ignorant or fearful foreigner to do things quickly, with accident resulting. Fear of failure to please in the work by a new employee often causes injury, as well as fear of his own health or that of his family.

What can be done to remedy these things, over which there is seemingly no control? Think over these factors and see if they may not eliminate a great many accidents:

- (1) Do not select hazardous material for employees.
- (2) Do not take physically or mentally unfit people into the service. Be positive of what you are buying by a medical examination.
- (3) Fit the man into the position which his physical and mental limitations will permit him to handle with safety.
- (4) Overcome the ignorance of employees regarding the hazards of their work, by properly introducing them to their jobs and assuring yourself that they understand what you intend them to do.
- (5) Closer personal study and contact between foreman and their men.
- (6) Medical examination of employees to eliminate the hazards of physical defects and to forestall a trivial injury developing into a serious one.
- (7) Educate and Americanize foreign employees.
- (8) When a man does poor work or commits many errors, analyze the cause and forestall an accident.
- (9) Foremen should report illness or injury of any one of his men to proper authorities so neglect may not cause accident, injury or death. Get on intimate terms with your doctor.
- (10) Study the mental makeup of your employees and the requirements of

the job he is to take and see if his mental characteristics will permit of safe operation, if he has mental capacity to assimilate safety.

- (11) Watch your men for signs of grief, worry, anger, etc., and use your best judgment to allay same, as an accident will probably occur, if neglected, on account of a troubled mind being somewhere else when clear mental facilities are needed for work at hand.

In conclusion, I wish to ask if you have analyzed the automobile accident I spoke of at the beginning of this paper? If not, here is the only way of ascertaining the cause:

Was the driver mentally and physically able to drive his car with safety? Was his mind preoccupied with thoughts that distracted his attention from his driving? Did he have the mental limitations of being unable to foresee such an accident and to imagine such a chance? Was his mental capacity even normal and had he no sense of danger to anyone else? Did his eyes fail properly to give him position sense, or cause him to judge distance incorrectly? Did he fail to react to bring his car to a stop when he felt the danger stimulus? Were his eyes defective and did we not see the child until too late to stop?

I am sure that if a careful, painstaking inquiry had been made, the man would have been found to have a diverting mental factor which made him obvious to all accidents, or he lacked normal physical sense. He is at large to repeat his offense.

I want to ask that we make a united effort to aid a mentally and physically handicapped brother worker to protect himself and save him to the commonwealth as a careful citizen and worker and that these unfortunate be mentally and physically examined before placement in industry.

Using Habit to Overcome the Difficulty

CHAIRMAN OPP: Thank you very much for the presentation of that paper. It is full of many good things to discuss, and we have the rare opportunity of having Dr. Fisher here to participate in whatever discussion there may be. He is ready to answer any question that you might want to put at this time.

WILLS MACLACHLAN (Consulting Engineer, Toronto, Canada): In connection with one feature of Dr. Fisher's paper, dealing with the mental angle of it, he raises the problem in connection with a man thinking of something else at the time of the accident; it might be someone sick at home, financial troubles and so forth.

Some of us have been wondering if we cannot use habit to get over that difficulty. When you get up in the morning you put on your left shoe first, and put it on every morning in the same way; you are not thinking of that, but you are thinking of something else. So, for instance, where linemen are climbing poles, and have to put on rubber gloves, if they put them on at a certain point all of the time it becomes a habit. Why can't we teach them to take off or put on the rubber gloves at the same point all of the time? If we did that, they would soon be doing it mechanically and there would be no danger from that point. When they are climbing up the poles they won't take off the rubber glove and put their bare hand on the primary when thinking of something else.

DR. FISHER: I would like to say that that is very well illustrated by the use of goggles. We have been working for the past three years to produce a goggle that the employee does not have to remember to put on.

Some of the companies are using goggles just such as the glasses I have on here, but a little bit larger, and adaptable to the employee's vision, though made of different glass. He puts these goggles on at home and leaves them on until he comes back home.

If a man is mentally upset, an ingrained habit will still control him in his daily duties.

There is one question that we have to contend with seriously—the fact of domestic trouble in an employee's home. You and I don't know what conditions are, and when the employee is unsettled at home it makes a very serious mental condition that we have to cope with. I know a man who lost his leg by reason of a fight with his wife that morning. Away from home he began to think about it, and began to think that he was abused and run down and all those things; and by the time he got to the job his mind was so taken up with the fact that he was abused that he walked past one train over a shortcut which he had been forbidden to take, and he was hit by a switch engine which threw him to the ground and cut his leg off. He afterward said he was absolutely taken up mentally with the thought of the fight at home.

Then again we have discipline, that is repeating the same thing, going over it again and again, the same as they do in the army, so that man will act automatically because of that repeated drilling and repetition of orders. It becomes so ingrained in our minds, just as Mr. MacLachlan said.

Two Accidents in the Electrical Division

H. C. DENNIS (Westchester Lighting Company, Mount Vernon, New York, Assistant Chief Electrical Engineer): We had two serious accidents in our electrical division this summer, and both of them bore out what the doctor said.

The first one was a fatal accident to a lineman, who had been with the company a number of years and whose safety record was very good. Our investigation disclosed the fact that the wife was expecting her first child. In view of the circumstances of the accident, and his previous record, I think that that contributed very materially to a state of mind which dealt with the accident itself.

The second case was that of a construction man who had been with the company over five years, with an excellent record. He was selected to do some careful work because of his record for work, and in a moment of inexplicable mental fatigue, or something, the man touched a section of the structure which he knew was alive, and which he had no occasion to come close to and was hurt.

Investigation after the accident disclosed the fact that this man had been engaged in overtime work beyond a period where it was probably safe.

I think we can help that situation by tying it in a little better with the Employees Benefit Association which places at the disposal of the employee financial relief, as in the case of the expected child. The financial difficulties involved might be relieved by application to the employees association where loans could be made under very favorable terms.

In the second place, I think we have found a solution in limiting the overtime work where there is any liability of carrying the man beyond the point where his brain becomes fatigued.

C. E. McBRIDE (Safety Engineer, Northern Indiana Light & Power Company, Fort Wayne, Indiana): I would like to ask Dr. Fisher if it is possible for the thyroid gland to be found subnormal as well as over normal, and whether that same percentage from 40 to 90 per cent correction can be made under normal as well as over normal.

DR. FISHER: It is just like the opposite to your high current line, where you have too much secretion or over-function of the thyroid gland you have the opposite situation of hypothyroidism, or lack of necessary thyroid substance.

Anything that affects the thyroid gland one way or the other produces a certain amount of pathological changes both in the mind and in action.

Any person who has a lack of thyroid glands, or not enough thyroid secretion, hypothyroidism, that man's mentality is low, his reaction at times is lower, and also his coordination. If he is measured by the time it takes him to pick up something, the time he reacts to pick it up, or the time he reacts to let it go is below normal, and as a result he is sluggish; that is all produced by this thyroid substance, and he does not react normally.

It is a fact that you can put those cases under medication and at least improve them. That calls for close observation to detect those people, and you only get that through medical contact.

But if a lot of foremen would notice men doing something in a peculiar manner, or notice them making errors, acting peculiar, or notice certain changes in their usual occupation, then is when they should be reported to the medical officer, and if he is reported, it will enable them to avoid maybe some accidents in the near future.

You can all cite all kinds of experiences where these incipient accident-makers were detected by the foreman or some brother worker by some peculiar speech or certain remarks that the man makes that shows the mental slant that the man's mind is taking; and that constitutes about 50 per cent of our working force. Fifty per cent possibly average normal intelligence; then there is about 20 per cent a little below grade, and then it dwindles down to 30 per cent which really needs mental re-education.

CHAIRMAN OPP: This has been a very instructive discussion, and we have enjoyed every bit of it. We will now have to pass on to the next item on our program, the next paper to be offered is by E. S. Beaumont, supervisor of safety and fire prevention, The Peoples Gas, Light & Coke Company, Chicago, Illinois.

Safe Practices in Manufacture and Distribution of Gas

E. S. Beaumont, Supervisor of Safety and Fire Prevention, The Peoples Gas, Light and Coke Company, Chicago, Ill.

Safe practice in the manufacture and distribution of gas covers quite a little territory. I am going to assume, of course, that what you are particularly interested in is accidents peculiar to the gas industry and not those accidents which are general to every industry.

I am fortunate that a number of the members of the distribution department are present today, and they will be able to bolster up this talk with the actual circumstances and experiences with which they are more familiar than I am.

The most dangerous possibilities in our business for injury are fire and explosion, also burns and asphyxiation.

Probably the easiest way to consider them would be to start in from the time the fuel is brought into the plant and follow it through to the delivery of the gas to the consumer.

In our actual experience statistics show that about four to six per cent of the accidents are actually due, or caused by fire, explosion or asphyxiation through gas. Although there is that low percentage, that does not by any means indicate the importance of those hazards. In fact we might follow some of our college methods, and have a formula on it, but the accidents are inversely in proportion to the hazards.

Accidents, when they do occur from fire or explosion, of course are particularly serious. Asphyxiation is more likely to involve a small number of people. Of course, death by asphyxiation is probably more serious than the loss of property by fire or explosion.

The first contact is with the fuel. The storage of large amounts of coal affords the opportunity of spontaneous combustion in the coal pile. That does occur from time to time, and the principal consideration, of course, is the loss due to the fuel destroyed. I need not go into the methods of preventing that, because you are all familiar with the methods of storing coal, and the methods of prevention. The handling of coal by conveyors involves another hazard, that of dust. Where a great amount of dust is allowed to collect, and there is a possibility of explosion from dust collections, of course the important thing is to eliminate the collection of dust as far as possible, and also to insure that there is no danger of explosion by eliminating sparks or open flames in the vicinity.

The handling of oil concerns us mainly as a housekeeping measure, that is, we should take care of the unloading and storing of the oil in such a way as not to permit of loss through leaks, or the collection of vessels around the plant which may become ignited by any open flame, or handling of any hot ashes, clinkers or such things.

Methods in the Boiler Room

Of course, the proper handling of oil storage tanks is of considerable importance.

Then we go into the boiler room, our consideration there is the same as any boiler room in general. I think what we should emphasize as of particular importance, equally true in any boiler room, the necessity for watching out for protecting the steam lines or blow-off lines when men are doing any work in the boiler room. As obvious as that precaution is, a number of accidents, and very serious ones, have been caused through neglect of just that point.

Of course, the proper handling of the ashes is important to prevent the ignition of any material, wood material, particularly that which is used in disposing of the ashes.

In the generator house one of our most common accidents (that is the most common in the number of accidents) is the handling of the valve handles. That, of course, is a general hazard, and needs, I think, more perhaps, close inspection and observation: but they do seem to get careless, and they get mashed fingers and broken bones that do not seem to be necessary at all.

In the charging machines, ordinary precautions should be taken, of course. First we must be careful to see that the charging doors are opened properly: the gas maker must be in complete charge, and certain that the conditions are proper for the door to be open. The door, of course, is first opened a crack before being swung clear back. There have been a number of burns received in that operation simply because of the lack of proper method in doing the work.

The staggered operation of machines, where there is a number of machines on the line, is important, of course, in keeping pressure controlled properly so that the sills will not be blown and the gas backed out of the line into the plant. Quick action valves between the watch boxes and the sill pit are desirable, in case the pressure does get away from the plant operators, so a shut-down can be quickly made and prevent the gas backing up in the plant.

It is important to have the gas maker follow the proper sequence of his valve operation to make sure that he is the type of man that will follow through right along. In most cases it becomes, as suggested by Dr. Fisher's talk, a matter of habit to do the thing in proper order.

And another thing, the inspection of the valves is important because it is the seating of the valves that insures that the gas line is on.

Explosion ports—of course you are all familiar with them; they are in common use.

The proper control of the oil line is important to make sure that the oil line is closed before any of the charging or clinkering operations are undertaken.

In the clinkering the hazard is first the handling of the doors, which requires teamwork and supervision by the straw boss; and then, of course, the hazard of the very hot clinkers, and the punching of the same when water is thrown on the hot ash and there is steam developed. This is simply a matter of precaution by the man in charge of that operation for the safety of the workmen.

It is important to mention the necessity for locating or projecting the gas or steam lines to the machine when the gas machine is down, for the same reason as in the case of the boiler operation, the blocking off of the heat valves so that they might not be operated and bring disaster to anyone inside.

In the rechecking machine, or moving the checker from the machine, I might mention the desirability of having a chute, or a closed chute for disposing of the brick from the operating machine to the floor.

In spite of the fact that that work has been done for a number of years with an open chute, and nothing happened, still it is better to have a closed chute.

In getting into the machine, it is desirable also to see that the arch is in good condition so that the workmen may not be injured by anything falling from the archway while doing their work, that of cleaning the sills.

It is also important to see that the wash box and line is purged with steam so there is no remaining gas to cause trouble.

Thorough Inspection While Machine is Down

While the machine is down on the floor, that is the time for inspecting all of the valves and the other instruments on the steam and oil lines.

In cleaning the shaving scrubbers, or renewing material there, it is desirable to make certain the line is shut off and then open the top so that the draft is upwards and not back towards the workmen.

It is also important that there be no smoking or open flames around when that work is being done.

Then in starting up after the filling of your scrubber, the desirability of opening up the outlets first is apparent.

The purifying house is probably one of the most dangerous parts of the plant, and obviously every precaution should be taken there to make certain there is no possibility of a spark or open flame; and it is important to see that the seals in the water seal box are kept at the proper level. A safety seal which would break at lower pressure than the regular seal installed, would give you a safety factor there.

Outside control of the water valve should be supplied so it is unnecessary for the man to get into the purifying house and refill the seals. When they do go into the purifying house, after going into the box it should be apparent that the man going in should be observed, and if possible connected by rope to men on the outside to make certain that the house is clear of gas that might overcome him.

In pumping the purifying box you are all familiar, of course, with the necessity for quick action there. It is extremely desirable to get the box empty the same day you start, and not leave it overnight because of the possibility of spontaneous combustion. It is desirable to keep close watch of the workmen there to make sure that they are not being overcome by the effects of gas.

The operation of holders is comparatively simple ordinarily. Of course it is important to remember the necessity for purging and taking safety precautions in purging a new holder, getting all of the air out of it, and getting on it a screen

outlet so there is no possibility of the gas igniting the escaping mixture and flashing back to the holder itself. Holder release alarms are common for giving information in the engine room, by a tell tale light, so that the engineer can make certain as to the height of the holder, and see that it is within the safety limits.

In main work, possibly one of the first things I think of would be the proper barricading of the ditches for the protection of the public, and then the proper bracing of the ditches, making certain that the ditch was barricaded properly for the protection of the workmen.

Then the question of proper spacing of the workmen comes in, and it is surprising how frequently men are injured by working too closely and not working together.

The testing of the mains when laid is common knowledge to you all. Testing with the air for leaks, and if leaks are found, finding them through the usual method.

The purging of the mains in a somewhat similar process to purging the holders, making certain you have vents expanding well up in the air with screens protecting them from any possible flash back from sparks that might be in the neighborhood or passing.

Making Use of the Gas Mask

Similarly testing accessible gas by the old book method, or chemical analysis, to make certain when the gas has reached the proper gravity.

In tapping the mains the workmen should be protected by using a shut-down, or where that is not possible by wearing a mask, if there is any appreciable pressure on the line at all. The masks, of course, should be kept in good condition, and always available for that sort of thing, and where the supervisory force feel, as they do in some cases, that a mask may not be necessary because the pressure is so slight, the precaution should be taken to see that the workman is watched and protected against any effect of possible escaping gas.

The question of bonding and cut outs is of particular importance in the larger cities where there is always an electrolysis condition, and some current in the mains. A bonding, of course, will give protection against the possibility of sparks when making cut outs.

Obviously gas will not light from a cigar or cigarette, still the smoker is apt to light his cigar or cigarette at the psychological moment; so it is desirable always to keep smokers away.

The old method of testing leaks was to use a line and a piece of tallow candle, light it, stick it up there and see what happened. There are, however, other methods of which you are aware, and we use the soap solution now.

In your street work the particular hazard is the possibility of striking electric lines, high voltage lines in the larger cities, when excavating for main trenches, or digging for leaks, or anything of that sort. There are several precautions. First off, we do not feel that insulated tools, the wearing of boots, and that sort of thing, is of any great value because of the rapid deterioration in the equipment, and also because of the false sense of security it gives the workman. He is liable to strike the hot stuff just when his equipment is not right, and feeling he is protected he is taking more of a chance than he would otherwise. The only method that we have ever taken for protecting ourselves against that sort of thing is first, the insurance; and having our foremen thoroughly aware of the hazards there, and that they inspect the streets and manholes adjacent to where the work is being done to get a good idea of where the electric lines are lying, as compared to the gas lines to be repaired or taken care of.

In important jobs there is a possibility of course, of getting in touch with the electric company, and getting more specific information, although sometimes it is

impossible to get it any more specific than we can locate it through the street manholes ourselves.

One of the biggest hazards, perhaps, of our street work is the traffic. We have to work, in general, during the day time when the streets are the very busiest, with traffic passing on all sides, and unfortunately the people engaged in the traffic frequently have very little consideration for the workman; they feel he is an intruder on the street, and just making it difficult for them, and deserves no sympathy at all. Obviously the men have to keep strictly on the alert to avoid traffic accidents. I know that we have more fatalities through our street mains being involved in traffic than we have through gas.

The importance of keeping traps clear is apparent to everyone. Clearing the mains and street pumps, that is also obvious.

You are all familiar, no doubt, with the safety tee used for tapping lines; it is the tee in which the rubber stopper is inserted, so that after the tapping is made and the tee put in the main no gas goes through until the service is completed by removing the rubber plug and replacing it with the metal cap.

Then in the meter changing work, it is important, of course, to see there that nothing is done to the gas line, no changes are made unless the fitter can get into the premises concerned, and notify the owner and inspect the pipe and equipment to make sure there is no leak or appliance left on while the change is being made; and repeat that inspection after the change is made, to make sure that the line is purged out and everything connected up tight, and no gas turned on before being lighted.

Good Housekeeping Is the Essential Need

The consideration of fire, explosion and asphyxiation in the production and distribution of gas is boiled down largely to a matter of good housekeeping, and good practice. If we can get that instilled in the minds of the workmen, to have good workmanlike housekeeping jobs, particularly where it is highly essential, then we are pretty well protected right there. Supervision, of course, is the main thing. Close supervision by those in charge to see that every precaution is taken. The "No Smoking" precaution, and the use of no open flames or light of any kind, is the really important rule of our work; to make sure that that is strictly followed out to the letter in any of the places where gas is likely to collect and ignite.

The methods of prevention, of course, are the important thing; however, it is desirable to be prepared for emergencies, and obviously our plant and equipment must be protected with the best fire equipment available. The water lines in the plant available at the proper location, and the hand extinguishers located wherever necessary. Not only should the equipment be there, but the man must know how to use it.

I rather blush in mentioning one incident that I found, where a fire extinguisher had been used, and an inexperienced workman, apparently in attempting to do the job up quickly, had taken the fire extinguisher charge and put it in, not even unwrapping it, and then filled it up with water, and put it back in its case.

Now, as to gas masks, I believe most companies are sold on the gas masks which furnish air pressure; that is preferable to any other kind of mask.

Further along the line of being prepared for emergencies, I feel that first aid work in our company has been very helpful in reducing the number of accidents and loss of time through accidents, helpful directly and indirectly in that it has provided a better contact, closer contact of the men in the plant with the safety division; it has secured their cooperation in a much larger measure than we would have if we had not had some provisions such as this. Of course, every employee

must be skilled in the particular job that he is doing, and be ready for all emergencies. I might be pardoned in saying that our employees have always shown themselves to be quick in cases of emergencies; and for such actions, five of them are to be presented with the McCarter Medal in rescuing other employees.

I think that covers the main points in brief. We have, of course, a committee organization; also the large organization which receive suggestions from the employees themselves on better methods and better practices. I think even that is helpful in getting cooperation and help from the employees and understanding from them of what we are trying to do.

I will be glad to have you ask any questions about specific phases of the production and operation. I know there are men here who are a lot more able to answer them than I am so I will call on them if you will ask your questions.

CHAIRMAN OPP: Thank you, Mr. Beaumont, for the presentation of the subject. any questions you wish to ask while Mr. Beaumont is here with his corps of experts? He has his corps ready to send into the fray if he is unable to answer your question.

There Is Always a Reason For a Mistake

C. W. BENNETT (Northern Indiana Public Service Company, Lafayette, Indiana): Two months ago there was a poster came out in the National Safety Council, and later it was printed on the back of the magazine regarding the use of hose in drenching coke from the retort.

Down where I come from that caused quite a discussion among the workmen; we had always used the bucket method. They had not had a fatality down there or an accident of any kind for ten years, but the first day that we changed over to the hose a man was seriously hurt by reason of the fact that the coke is brought back here by the bucket method where the man is waiting to pour the water from the bucket over the coke. But with the hose method he draws it back here and the man with the hose sprayed it and the resulting steam enfolded the man with the coke, and as a result he was badly burned about the legs and laid up. Now, in pulling this retort, the rake is about 20 feet long; in using a bucket the men did not throw or drench the material until the man was back even with him. On this same question the man that has the hose was way up there like that and he was burned around both legs pretty seriously.

Now, the stokers down there will not use the new method as advocated, and have gone back to the old method, and I would like to hear a discussion pro and con so as to get your ideas on this matter.

W. H. BROWN (Secretary, General Safety Committee, Northern States Power Co., Minneapolis, Minn.): I believe the hose method is not adaptable to the small plant for drenching coke. I believe the old method of drenching coke is by far the safer proposition.

When the man is back with the rake he throws water on the coal, when the man gets back to the retort with his rake the steam has arisen from the hot coke. Personally I would not use a hose method for drenching coke on the floor where you have about a three-quarters depth vent; absolutely I would not use the hose method.

MR. BENNETT: I would like to hear both sides of this, if there is any. I wonder who submitted the information for that bulletin?

CHAIRMAN OPP: We cannot go into minute detail at this session, but it holds out a word of warning to the Poster Committee to be on their guard in every respect to make sure that information is not released until it has been fully tested either by the committee itself, or referred to someone who will finally decide its merit.

MR. BENNETT: Here is the point: They look up to the National Safety Council

for final authority, and when they publish a poster and bring it out in the book on the back of the safety bulletin, and the men try to live up to it, and then a man is hurt it looks pretty bad.

CHAIRMAN OPP: Your point is well taken, and it is up to the committee to make mighty certain that that sort of thing is not released until fully tried and tested.

Our program this year represents, as I indicated yesterday, the work of all members of your official family. Last year we constituted for the first time, a Committee on Fire Prevention and Protection, particularly with reference to work to be done in the public utilities. The first chairman of that committee was Mr. H. B. Harmer, and it was through the efforts of Mr. Harmer that the subject was sold to the National Safety Council for their general session next Friday morning.

Of course, having fostered this idea, we could not very well pass it up without making use of it ourselves. We have that feature this morning, and I am going to turn over the conduct of this branch of the meeting to Mr. H. B. Harmer.

(Whereupon Mr. H. B. Harmer, Safety Engineer, Philadelphia Electric Company, Philadelphia, Pa., took the chair as Chairman of the meeting.)

CHAIRMAN HARMER: I don't know, sometimes you get biased on things, that is, things you are doing over and over again, so that you get over-saturated, or something of that character.

I don't know of anything you men are doing that appeals to me that we ought to stress more than the absolute destruction that happens after a fire. Of course everyone of us is primarily and particularly interested in the preservation of life; there is no question about it, the whole convention is for that one purpose. I find in our human accidents we mostly have a chance of bringing back the injured person to almost the original condition. In other words, we save him for future use. But in fire, the thing that is burned is absolutely destroyed, and there is nothing that brings it back.

I am glad to think that our particular Section has the opportunity of having with us a man that is an authority, connected with an association that is nationally known and recognized, dealing with that demon called fire destruction, and it makes me feel that we have in our Section, the Public Utilities Section, something just a little bit different from the other fellows; and it certainly is with a great degree of pleasure and satisfaction that I wish to introduce to you our speaker, Mr. Smith.

Fire Prevention for Public Utility Companies

E. J. Smith, Engineer, Gas and Oils, Underwriters' Laboratories, Chicago, Ill.

The public utility company of today supplying light, power, heat, transportation, or communication is prepared to furnish its particular commodity upon demand, irrespective of the time of day or of the volume required. Successful accomplishment has been such that the present day citizen, of our large municipalities at least, is favored with public utilities so reliably that we all fail to appreciate the constant care and attention; the readiness to meet any emergency, and the vast engineering intelligence necessary to produce this modern marvel.

Fire prevention in all of its phases, studied intensely as it has been for the past forty years, undoubtedly has aided in securing the present large measure of reliability and safety provided in our modern public utilities. Improvements in electrical equipment; improvements in gas generating equipment; improvements in building construction, and, in fact, improvements along so many lines that to list them would require a volume in itself, have all had their effect, even though they have not in all cases been developed as fire prevention measures.

The wonderful work done by the National Fire Protection Association, which includes in its membership the various associations of public utility, organizations, and related trade organizations as well as individuals directly interested in public utilities, has most certainly accomplished results that may encourage us to go forward in the effort to still further reduce the cost of our national fire loss. To prove there is need for continued effort in this direction it is only necessary to bring to your attention the fact that the committee on statistics of the actuarial bureau of the National Bureau of Fire Underwriters, in their report for 1926, estimates the fire loss of the United States at \$560,348,642. This is a per capita loss of \$4.79 for the nation as a whole, a tax on the individual that if directly applied, would soon bring to our consciences a fuller realization of what our fire loss actually means. Some of our public utility companies have set an example in accomplishment which, if applied to the country as a whole, would soon reduce our fire loss considerably. May the day soon come when we will build with fire prevention and fire protection in mind.

Good Examples of Fire Prevention

The field covered by the term "public utilities" is such a broad one that, coupled with the term "fire prevention", it is difficult, within a limited space of time, to do more than touch on items of even the greatest importance. Realizing, however, that by referring to such examples of fire resistive construction and meticulous housekeeping as are exhibited by some of our telephone companies, we may safely say—Go thou and do likewise; build with the possibility of fire in mind. Use standard materials, the values of which have been shown by test; assemble these materials in a manner to isolate any possible fire and prevent its spread to adjacent property; enforce good housekeeping rules, and provide and maintain adequate fire extinguishing equipment.

At the present time we are provided with a vast fund of knowledge regarding fire resistive construction. Carefully prepared building codes are available, and the National Board of Fire Underwriters, together with the National Fire Protection Association, can furnish unlimited suggested regulations on the do's and don'ts of fire prevention. You of course are familiar with the National Electrical Code—that set of specifications has become the watch-word of the electrical industry. Similarly, we have regulations covering most common and special hazards, and likewise regulations covering various methods of combatting fires, including first-aid appliances and more elaborate systems designed to aid and assist our public fire departments, upon whom we depend for a service no less reliable nor less instantly available than the ever ready light and heat at the turn of a switch or valve. All of these regulations can be easily procured by anyone needing them. More use should be made of them in our daily life and every public utility company should see that its employees are familiar with the rules applying to the particular class of work which is a part of their daily task.

Undoubtedly the most spectacular part of fire prevention is that relating to fire extinguishment. None will deny the urge to follow the fire engine, clanging its way in response to the call of an alarm that may have been turned in from a point miles away. Spectacular as it may be, fire extinguishment is based on cold chemical facts, which properly and promptly applied, may often result in the fire department's return to its quarters satisfied with having been ready, though actually not required to put out the blaze. First aid fire appliances of all types, automatic sprinkler systems, automatic and manual fire alarms, and many special appliances, all aid in the prompt control of fire which is ever ready to change its position of servant to that of master.

The value of water in fire extinguishment is, of course, not to be denied. No one would care to propose its elimination from the scheme of things. On the other hand, we all recognize that it has its disadvantages, and give ear to other means for the quick control of fire in its incipency to avoid the necessity of throwing volumes of water to fall upon the burned as well as upon the unburned. Hand chemical extinguishers, as well as chemical engines utilizing water solutions of bicarbonate of soda, coupled with sulphuric acid, were the first steps in the way of fire protection tending toward the reduction of water necessary to combat fires successfully in their incipency.

The cooling effect of water or of solutions largely composed of water, was for many years the sole means for attacking fire, and it was not until less than a quarter of a century ago that the blanketing of fires really became recognized. The first step in this direction was the so-called carbon tetrachloride extinguisher. This type of apparatus was first brought out in the small one-quart size, now so commonly known and so generally used by public utility companies. This particular type of apparatus serves a most useful purpose as a first-aid appliance, and in special forms is of use under conditions which may be placed beyond that intended when we use the term "first aid." The foam extinguisher closely followed the carbon tetrachloride extinguisher and soon made a place for itself which makes us now wonder how we did without it before it took its place in the scheme of things. The next candidate for honors in fire control is the use of an inert gas such as carbon dioxide. This material properly handled may be expected to fill a need which is of prime importance to public utility companies who must constantly have in mind continuity of service with a minimum shut down period in emergencies. It would be unwise to predict the relative growth of any particular type of fire extinguishing equipment or to anticipate the use of new elements or new methods. On the other hand, there is so much to be learned and relearned in connection with the equipment now available that we may well lay predictions aside at this time.

The Best First Aid Appliance

Perhaps you may ask me what is the best first aid fire appliance or what extinguisher is most suitable for all purposes? My answer would be that each serves a useful purpose, but none is suitable for every service. If you anticipate fire in ordinary combustible materials, such as wood, rubbish and the like, you should select an extinguisher providing the quenching and cooling effect of water. If the building contains gasoline, greases or oils, select an extinguisher designed for its blanketing and smothering effect so highly essential for fire fighting in these materials. If electrical equipment is involved it is desirable to use an extinguishing medium which will eliminate the hazard to life that may be present where water or water solutions are used. Extinguishers using special carbon tetrachloride liquids peculiarly lend themselves to electrical fires, owing to the fact that these liquids are tested and shown to have a high resistance before being acceptable for use in connection with extinguishers of this type. If you will refer to the list of inspected fire protection appliances published by Underwriters' Laboratories, you will find a definite statement with regard to the classes of fires for which most types of extinguishers are adapted. In some cases you will find that an extinguisher is suitable for more than one class of fire. In the list mentioned the above three classes of fires are referred to as Class A, Class B, and Class C. Class A fires are defined as incipient fires on which the cooling and quenching effect of water is of first importance. Class B fires are incipient fires on which the blanketing or smothering effect are of first importance, and Class C fires are incipient fires involving electrical

equipment where the use of a non-conducting liquid is of utmost importance. It is mentioned before that some types of extinguishers are suitable for more than one class of fire. Examples of this are found in the case of foam extinguishers which are suitable for both Class A and Class B fires and of carbon tetrachloride extinguishers, suitable for both Class B and Class C fires.

Another item you will find in the list is a guide to indicate the number of extinguishers ordinarily used to protect any given area, this being based upon practices recommended in the regulations of the National Board of Fire Underwriters for the installation, maintenance and use of first aid fire appliances. In carrying out this scheme, the classification of the different extinguishers is given in the list and each extinguisher is marked with its classification. It is, of course, to be understood that these are minimum requirements and that where necessary more may be required in the vicinity of special processes. In selecting extinguishers care should be used to select the proper type of equipment and to locate it so as to limit the distance to be travelled when attacking a fire. No general rules can be devised to cover special conditions adequately. Each situation may present a problem in itself and a long range attempt to advise may not give the best results. A relatively recent development illustrating this fact is the introduction of carbon tetrachloride extinguishers having a capacity in excess of one or one and one-half quarts. Devices of these larger capacities have been found to serve a most useful purpose, especially in electrical power stations or for special industrial conditions where consideration has been given to the large quantity of liquid and where such devices are usually operated by men familiar with their use and efficient supervision prevails. On account of the large amount of carbon tetrachloride extinguisher liquid used, it is necessary to take precautions to protect operators and others from possible toxic effects from vapors, especially when using these devices in small rooms or confined spaces. This particular reference to toxic effects from vapors given off in the application of carbon tetrachloride extinguisher liquid may cause question as to the general use of such liquids. Frankly, if we could rebuild chemistry we might make fire fighting a most enjoyable profession. On the other hand, we must work with the tools given us and no substitute has yet been found for carbon tetrachloride. In fact the effects of carbon tetrachloride are probably no more annoying or toxic when the products of combustion which naturally accompany every fire. Undoubtedly many of the reported cases of discomfort attributed to the use of carbon tetrachloride extinguisher liquid are to smoke and other combustion products. Another special type of first aid appliance is the carbon dioxide hand fire extinguisher which is of special interest to those who have large switch boards to protect, such as in telephone exchanges and similar premises. This class of device is useful where the blanketing effect of the gas may be utilized and where the conditions are such as to permit close approach to the burning area.

Instruct Employees Thoroughly in Use of Appliances

The selection of the proper first aid fire appliance and its suitable location is but the first step in the fire fighting problem. Employees should be instructed in the use of the equipment and above all the equipment must be maintained in a condition ready for instant use. No device has yet been made, that will stand for years without care or attention and ready to function reliably. If actually undisturbed, most extinguishers will remain in an operative condition for so long a period that many people believe we are unduly conservative when we recommend an annual or more frequent inspection and test, or in some cases, the complete discharge, cleaning and recharge of the extinguisher. Un-

fortunately an extinguisher hanging on the wall cannot advertise the fact that it has been tampered with or that it has not been recharged nor examined since it was hung in place. The only sensible thing to do is to put the care of extinguishers in charge of one man and so place the responsibility on him that his pride in the performance of the fire equipment will assure its readiness when the emergency arises. The care of an extinguisher is not difficult and the simple rules to follow will not tax the intelligence of the ordinary employee having sufficient education to read and write. Condensed to its simplest terms his instruction should be to follow the directions given on each device and to use the recharges, furnished by the manufacturer, exactly as specified.

Perhaps some will say that extinguisher recharges furnished by this, that or another manufacturer are "just as good" and especially when price is a factor there is a definite tendency to select the lower priced material. This is true particularly in the case of carbon tetrachloride liquids which are so frequently purchased from other than the extinguisher manufacturer. Unfortunately on account of the use of the term carbon tetrachloride we find that many of the so-called extinguisher liquids are nothing but plain carbon tetrachloride, perhaps sold by their vendors in the mistaken belief that this material is the same as that furnished by the extinguisher manufacturer. All too often this plain carbon tetrachloride is not even relatively pure and free of ingredients harmful to the extinguisher mechanism. Many extinguishers have been ruined by a false sense of economy. Even a slight amount of water, such as often is found in poor grades of carbon tetrachloride, is sufficient to make all extinguishers of this type useless within a short time.

Reasons For Variation in Recharge Cost

Remember that the difference in cost of recharges may largely be traceable to the difference between the original ingredients used and the care exercised in proving, by careful tests, that the finished product conforms to the standard established for this class of liquid. It is likewise true that with other types of extinguishers it is not safe to obtain recharges from sources other than the manufacturer of the extinguisher with which the recharge is to be used. Of course, with the soda-acid extinguisher we all know that the chemicals are easily obtainable and that, practically speaking, the recharge for this type of extinguisher may readily be obtained from the drug store. Even so, it is well to place on the manufacturer a certain degree of responsibility which he will not have if recharges other than his own are employed. With foam extinguishers it is practically imperative that chemical recharges should not be interchanged indiscriminately, but as quite a number of foam devices have similar characteristics, interchange of recharges in such instances will cause no harm.

On the other hand, as there are instances of critical variations in characteristics, the safe rule to follow is to comply with the manufacturer's directions in all cases. This rule, important as it is, perhaps is more frequently challenged than any other. Nevertheless, remember that having built into his device the necessary characteristics, the reliable manufacturer, wishing to stand back of his device, can not properly be held to account if alterations or repairs are made without his knowledge and if chemicals other than those supplied or specified by him are used.

CHAIRMAN HARMER: We are indeed grateful to Mr. Smith for the subject that he presented, and one other thing that I think we ought to emphasize; that is the fact that Mr. Smith is an authority on this paramount subject. I think possibly there are many of us who do not know what the Underwriters' Laboratories up here in Chicago are. I think it is our duty to find out exactly the ramifications and extent

of that work so we will have that background to know primarily what we are trying to do in the prevention of fires. Tackling these things without the primary background sometimes leads us astray, or along the wrong line, and I feel if we knew exactly what the Laboratories are trying to do to give us a background, we would be able to get to some satisfactory solution.

In view of the fact that our time is so limited, there is only one other thing I would like to say just now, and that is that we, as public utility employees, ought to correlate. Our official reporter here makes a very good suggestion, he suggests that the paper just read by Mr. Smith be printed. We have already turned that suggestion over to the chairman of our Publication Committee, Mr. Keller, and I am going to pass it on to your chairman. I just want to draw to your attention the fact that our official reporter is an outside man to a certain degree, who comes in with us and comes right along with us, and helps develop our thought. I thought it was worth while mentioning that.

Mr. Opp, will you take the chair?

Classification of the Section Attendance

CHAIRMAN OPP: I have here an announcement of the classification of the entire attendance of our Section yesterday, executives 14, managers 6, claim adjusters 6, safety engineers 105, superintendents 46, foremen 40, employment men 23, insurance agents 5, and the National Electric Light Association representative, making a total of 295. It is always well to know just how we are situated, and what composes our audience, and that is the reason for this resumé of the attendance of yesterday. The attendance of today will be 298 and will be classified for presentation tomorrow.

By way of explanation to Mr. Bennett on the matter of the poster referred to this morning, I find from the chairman of the Poster Committee who did not happen to be in the room at the time, that he had sent out the posters to the vice-chairman on gas, and having had no response from him he took it for granted that the idea was O. K., and the poster was published. Hereafter we are going to see that there is an actual O. K. put through on these things, in order to avoid the possibility of printing something that will lead to a misunderstanding, and as in this instance, even harm.

I think it is a very good point for Mr. Bennett to raise, and we have gone to the bottom to find out how it occurred. We are all very much interested in the keynote struck yesterday relative to the question of safety in the employment manager's office. The idea of stopping the leak to make sure that the class of personnel that enters our plant or our line work or anything else, is of the type that is going to be safety-wise as they are working.

So, in keeping with that view, we are going to reproduce for you here, not by addresses, and not by word of mouth alone, but by real action, the matter that ties in very closely on this point, in the form of a playlet. This playlet has been presented on several previous occasions, and has been amplified to meet the needs of this particular occasion, and it gives me indeed great pleasure to introduce to you the next feature to be presented through the courtesy of Mr. C. P. Ryan.

C. P. RYAN (Northern Indiana Power Co., Indianapolis, Ind.): I might say that it was our idea in the territories where we operate, that if we ever got anywhere in the world it was due to the fact that our safety engineers would see to it themselves. Each year we held an all day foreman's meeting, and in two districts in Indiana, which brought in our foremen and managers from approximately 35 counties.

This subject has two special points, one of which is the fact that any employer

has the right to know the type of a man he is going to employ; he has a right to know his contact with the man. One thing I have in this little playlet is that this man who was a roamer, or a "boomer" lineman as you call them, never saw a real foreman until he came to this job. I think you who are employing men in any department of your work can, and have a right to, ask any questions of any prospective employee, providing you use tact and courtesy in doing it.

You should also remember that a man who is out of a job, and is in need of a job, will tell the best he knows about himself, the same as you and I; if I am out of a job I will put myself in the best light possible. That is what you would do, and that is what I would do.

I want to introduce you to the gentlemen who are construction foremen, constructing and maintaining electric lighting lines.

"An Application for Position as Lineman"

C. P. Ryan, Northern Indiana Power Co., Indianapolis, Ind., and Robert Myers and M. L. Fitzsimmons, Northern Indiana Power Co., Kokomo, Ind.

(Superintendent is seated at his desk when the applicant enters and remains standing.)

APPLICANT: Good morning. I was told that you are in the market for a first class lineman.

SUPT.: Well, yes. Take a seat. We could use a man of that class. What is your name, please?

APPLICANT: John Doe.

SUPT.: Your age?

APPLICANT: Thirty-four.

SUPT.: Where do you live?

APPLICANT: Well, my home is in St. Louis when I am there. I live with my sister. My father and mother have not maintained a home since I was twenty-one.

SUPT.: Have you a wife or children?

APPLICANT: Wife and one child.

SUPT.: Where do they reside?

APPLICANT: They stay with my wife's people in Peoria.

SUPT.: When did you see them last?

APPLICANT: About two years ago.

SUPT.: Are you divorced?

APPLICANT: No, sir.

SUPT.: How long have you done line work?

APPLICANT: Well, I think about twelve or thirteen years.

SUPT.: For whom did you first work?

APPLICANT: I think it was the Utopia Telephone Company.

SUPT.: How long did you work for them?

APPLICANT: Well, I think about three months.

SUPT.: What kind of work did you do for that company?

APPLICANT: Well, just line work.

SUPT.: Did you climb poles and do work at the top of poles?

APPLICANT: Yes.

SUPT.: Was your foreman on this job well versed in his business?

APPLICANT: Well, not very. He wouldn't take any advice from we linemen and there were several old-timers there. They didn't seem to be able to tell him anything.

SUPT.: Why did you leave there?

APPLICANT: Well, it wasn't much of a job and the wages were small and I didn't like the foreman very well.

SUPT.: Where did you next work?

APPLICANT: For the Walkerville Telephone Company.

SUPT.: How long?

APPLICANT: I guess about eight months.

SUPT.: Did you do practically the same kind of work there?

APPLICANT: Yes. Climbed poles and put on insulators and strung wire.

SUPT.: Was your foreman capable on this job?



APPLICANT: Yes, I think he was. That is, when he was around where we were working. He wasn't there very much.

SUPT.: Why did you leave there?

APPLICANT: Well, I just felt like there was a job somewhere else that would probably be better.

SUPT.: Were you dissatisfied with the foreman?

APPLICANT: No, I don't think I was. I guess I just wanted to roam.

SUPT.: Then where did you work?

APPLICANT: Well, I worked in a foundry two years.

SUPT.: Not at line work?

APPLICANT: No.

SUPT.: Whom did you do line work for next?

APPLICANT: The Gazelle Electric Company.

SUPT.: For how long?

APPLICANT: About eleven months, I think.

SUPT.: What were your experiences there?

APPLICANT: Well, I climbed poles, strung wire, changed transformers and other work that seemed to be necessary.

SUPT.: Tell me about the foreman on this job.

APPLICANT: Well, I worked under Bill Jones as a second-class lineman for about two months and one of the first-class linemen was injured and I was given his job.

SUPT.: What did the men do who were classed as second-class linemen?

APPLICANT: Well, they only let us work on dead stuff.

SUPT.: And what did you do when you became a first-class lineman?

APPLICANT: Well, I worked with two other first-class linemen and we worked on any kind of voltage and all alive.

SUPT.: What voltages did you handle on this job?

APPLICANT: 110, 220 and 2,300.

SUPT.: In what condition was their equipment?

APPLICANT: Well, it looked like bum construction to me.

SUPT.: Was Jones an experienced foreman?

APPLICANT: Well, I don't think he was as good as some I have seen. He talked a great deal and sometimes was rather insulting to us fellows.

SUPT.: Why did you leave there?

APPLICANT: Well, to be perfectly frank, they were not paying enough money and we all got other jobs.

SUPT.: Did you all quit at the same time?

APPLICANT: Well, yes; but we didn't strike.

SUPT.: How many quit at that time?

APPLICANT: Eleven.

SUPT.: How many went back to the job after the trouble was over?

APPLICANT: Why, I think six of the worst ones went back.

SUPT.: Where did you then go to work?

APPLICANT: Well, let's see. I think I worked on a railroad in a round house for a while.

SUPT.: How long?

APPLICANT: About three months, I guess.

SUPT.: Where did you then work?

APPLICANT: On a construction gang, building a hi-line from West Applegate to Podunk, about 32 miles.

SUPT.: What did you do on this job?

APPLICANT: I dug holes, set poles, put up wires and anything they told me to do.

SUPT.: How long did you work at this job?

APPLICANT: About three months.

SUPT.: Was the job done when you left?

APPLICANT: No, they had hardly got started. They had just begun to string wires.

SUPT.: What did you quit there for?

APPLICANT: I didn't like the superintendent, I guess, and I don't think he liked me any better than I did him and I thought I'd better leave.

SUPT.: What seemed to be the matter?

APPLICANT: Well, he expected me to do more than my share, I think.

SUPT.: Were you in good health at the time?

APPLICANT: Yes. I was able to do as much as anyone else and I believe I worked as hard as they did.

SUPT.: Was this foreman unfriendly to some of the others?

APPLICANT: Yes, I think maybe there were only two fellows in the gang that he showed any indications of liking.

SUPT.: Were they building this line on standard plans?

APPLICANT: Yes, I suppose so. Anyway, the boss was always looking over some blue pieces of paper he carried in his hip pocket.

SUPT.: Did that part of the pole line, which was constructed, look well-graded and straight?

APPLICANT: Yes, it didn't look so bad. We all took considerable pride in making it look that way.

SUPT.: There were no live voltages on this line?

APPLICANT: No, all dead stuff.

SUPT.: Where did you next work?

APPLICANT: At Evansville, on a maintenance gang.

SUPT.: How long?



APPLICANT: About five months, I think.

SUPT.: What work did you do in connection with this maintenance?

APPLICANT: Well, any work that was to be done.

SUPT.: Did you connect transformers?

APPLICANT: Yes.

SUPT.: What other work?

APPLICANT: Well, we unloaded poles, set poles, removed old poles and equipment and strung some new wire and anything that was to be done on those lighting lines.

SUPT.: How many men were there in the gang?

APPLICANT: Five linemen, four grunts and one truck driver.

SUPT.: Did you do such work as making taps to transformers from 2,300 volt primaries?

APPLICANT: Sure.

SUPT.: How did you determine where the primary terminals were for the proper voltages?

APPLICANT: Well, I had that matter explained to me by the boss and I got so I understood it pretty well; however, when I first started, I kinda used the touch system. If the flash was just so, we had the right connection. Another lineman showed me about that.

SUPT.: When connecting the secondaries, what method did you use?

APPLICANT: Well, after connecting, we could test if there was any doubt by going to a house and turning on a light.

SUPT.: You say you worked there about five months?

APPLICANT: Yes. I quit there two months ago and have been visiting my sister in St. Louis.

SUPT.: Why did you quit that job?

APPLICANT: Well, we worked long hours and they were continually calling us out of nights, but I wouldn't have cared for that. I really liked the work, whether it was night or day, but the boss was kinda grouchy even though we favored him.

SUPT.: How often did they call you out for night work?

APPLICANT: Oh, once or twice a week, I'd say.

SUPT.: Are you familiar with the standards for distribution lines?

APPLICANT: Sure. I have been working long enough. I ought to be.

SUPT.: Where should the primaries be located on the pole?

APPLICANT: Well, on the top, if nothing else is up there.

SUPT.: If other wires were there, how would you arrange for another set?

APPLICANT: Either put on a longer arm up there or an additional arm below.

SUPT.: You mean below the secondary?

APPLICANT: Yes, or move the secondary down some. I don't think, though, that from some of the construction I've seen that that method would be standard.

SUPT.: What clearances should be provided between wires on the same arm?

APPLICANT: Well, there is usually enough clearance between the pole pin wires to allow a man space to crawl through. It's kinda dangerous though to have these two wires too close together.

SUPT.: In the many places you have worked as a lineman, did you ever work under any rules?

APPLICANT: Yes, the foreman made the rules as we went along.

SUPT.: These were not printed rules in book form, were they?

APPLICANT: Well, now I believe I did apply for a job with a company that did have a sort of rule book and after I looked it over and talked to some of the fellows there, I didn't go to work.

SUPT.: Why?

APPLICANT: Well, it looked to me like it would be a big job to learn all those rules and I was afraid that before I could learn them, I would get into trouble by violating them.

SUPT.: What kind of rules were they?

APPLICANT: Well, a sort of conglomeration that said, "Don't do this" and "Don't do that" and there was something in there about protective devices that looked like it would be a lot of trouble to use them.

SUPT.: What did the fellows you mention say about these rules and devices?

APPLICANT: Oh, they said they were alright and that the rules were alright, but that the superintendent and boss didn't pay much attention to them and didn't object if we didn't use the devices.

SUPT.: What did you think of what they said about these things?

APPLICANT: Well, I have always felt that where there are rules, they ought to be obeyed. I know you couldn't run the railroads unless their employees obeyed the rules and I didn't think much of the offer of the job when I found out that they were not trying to do what they were expected to do.

SUPT.: Were you ever injured in doing line work?

APPLICANT: Yes. On that hi-line job I told you about. I "burned a pole" when my spur cut out just above a knot. I was laid up about a week with a bruised leg. I might have broken my neck.

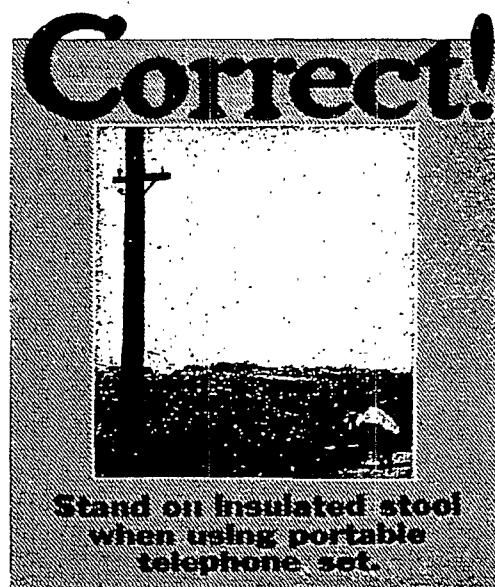
SUPT.: What were you doing at the time you fell?

APPLICANT: I was lifting one of the wires over the end of the arm.

SUPT.: Did you have a safety belt?

APPLICANT: Yes, but we very seldom used them on this work. We hooked one leg around the pole.

SUPT.: What caused your spur to cut out?



APPLICANT: One of the other linemen thought my spurs weren't long enough for those soft poles.

SUPT.: Did they say anything to you before you fell?

APPLICANT: No, but after I fell.

SUPT.: What did the foreman say after you fell?

APPLICANT: Oh, he cussed and said something about a safety belt. He had one on but didn't use it very often.

SUPT.: Did you get any other injuries?

APPLICANT: Yes. I got that burn on my hand there, (indicates burn) on the last job while I was making a connection to 2,300 volt wire after I had connected from cut out to transformer. I just forgot to pull the plug. Good thing I had my safety belt on then or I would have been knocked from the pole.

SUPT.: Aren't you afraid to handle 2,300 volts without rubber gloves?

APPLICANT: No; we old-timers ain't afraid of such voltages. Where it gets up to 4,400 or higher, I think I would want a pair.

SUPT.: Did you have a pair of gloves on when you got that burn on your hand?

APPLICANT: Yes, I had them on.

SUPT.: Rubber gloves?

APPLICANT: No, my cotton gloves.

SUPT.: Did you have any rubber gloves?

APPLICANT: Yes. I carried them in the bib of my overalls for hot wire work.

SUPT.: Don't you consider 2,300 volt connections hot wire work?

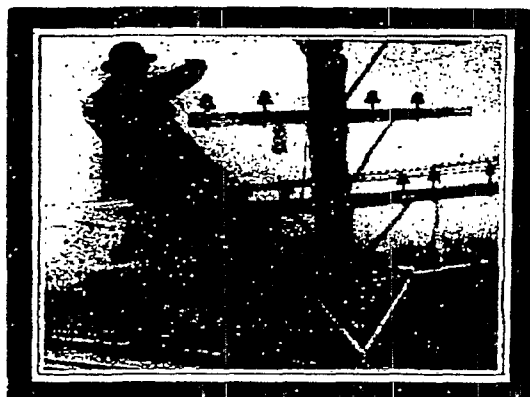
APPLICANT: Well, yes, I do now, and since that time I have made up my mind that a fellow ought to use rubber gloves when he has them, even though the voltages are less than 2,300.

SUPT.: Where did you get that idea?

APPLICANT: Well, I talked to a lineman over at Goshen not long ago and he said that all of their linemen would refuse to do any work at the top of a pole without these gloves.

BETTER NOT!

A chip of glass may cost you an eye



**Remove broken insulators carefully,
preferably with gloved hand.**

(All wires on this pole are telegraph and railway signal wires)

SUPT.: Were these all the injuries that you have received in line work?

APPLICANT: Yes, but I have seen other fellows injured.

SUPT.: Were any of them working directly with you?

APPLICANT: Yes. One.

SUPT.: Tell me about this one.

APPLICANT: Well, I was going up a pole with my pockets full of insulators and one of them slipped out and struck the lineman, that was following right behind me, on the head and he fell on the groundman who was working at the base of the pole, filling a bag of tools. Neither one was hurt very bad.

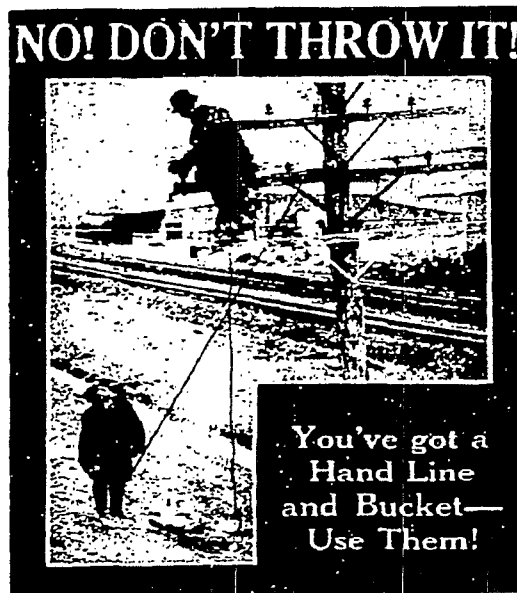
SUPT.: What did the foreman say about your methods in this case?

APPLICANT: Didn't say anything except laugh and say we were lucky dogs. I believe he did say that if I'd left the insulators on the ground, they could have come up in the tool bag just as well as me taking them up in my pockets.

SUPT.: Did he say anything about the other man following right behind you?

APPLICANT: Well, he said he had told all of the linemen not to do that, but I don't remember of him ever saying anything to me about it or I would have told the other fellow to stay down there until I got up.

SUPT.: You say you have had about thirteen years experience as a lineman?
APPLICANT: Oh, I expect about that.
SUPT.: What proportion of the time have you worked on live lines.
APPLICANT: Well, I think about six to eight years.
SUPT.: What degree of education did you receive before leaving school?
APPLICANT: I have only a common school education.
SUPT.: What is your impression of linemen who drink intoxicating liquors while working as such?
APPLICANT: I don't drink the stuff. Never did and won't work with any man who does.
SUPT.: What opportunities have you had to learn more about electricity?
APPLICANT: Well, of course, my principal learning as a lineman has been on how



to do line work. I never had a boss who of his own accord told me much about electricity. I'll have to admit that there is considerable mystery about it which I would be glad to know about, but a fellow naturally learns a little all the time.
SUPT.: Did you ever read about it?
APPLICANT: No, not much. I don't know that I have ever run across any reading matter concerning electricity that I could very well understand. The articles that I have read seemed to make the mystery worse.
SUPT.: Is it your impression that standards for construction and safely working on line work could be effectively followed out efficiently?
APPLICANT: Well, I expect they could. Of course, some of we old-timers are pretty much set in our ways, but I suppose where we were encouraged to get interested, I guess we could do it.
SUPT.: What would you think if a foreman would hand you a book of rules for the safety of employees and inform you that when you were thoroughly acquainted with its provisions, he would put you on as a second-class lineman?

APPLICANT: I don't know that I would care to work as a second-class lineman again after all my experience.

SUPT.: Did you ever meet our foreman of first-class linemen, Dick Smith?

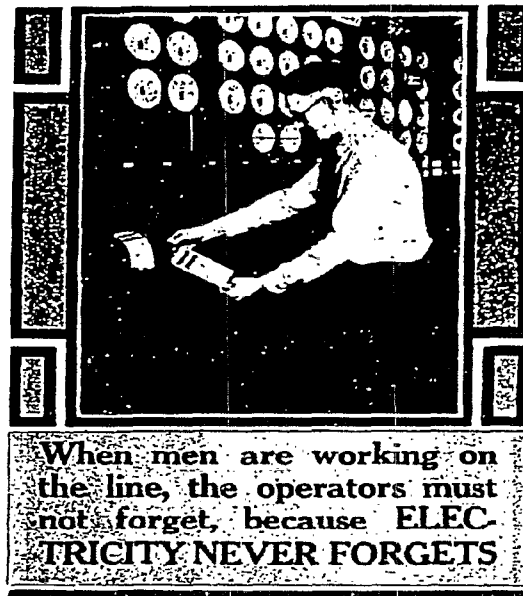
APPLICANT: Yes, he sent me here.

SUPT.: Did you see him and his men doing work?

APPLICANT: Yes, I was out there about all forenoon.

SUPT.: What was your impression of him?

APPLICANT: Well, he is a sort of quiet fellow. Not much to say and when he does say it, he seems sort of business-like. He seems to treat the fellows nice, but I'll bet he is the boss when it comes to a show down. I think he knows his business. There was no loafing on the job while I was there and none of



them seemed to be in a hurry and there was no kidding or playing around about it.

SUPT.: Did it seem to you that they were accomplishing something?

APPLICANT: Yes, they seemed to get a lot of work done regardless of a lot of rubber things they had scattered around on the wires.

SUPT.: Did you notice whether they wore rubber gloves or not?

APPLICANT: Yes, they all had rubber gloves on with a leather glove over them and one of the fellows showed me his glove and showed me how it would hold air and he told me that they never done work at the top of a pole without them on.

SUPT.: Did their methods impress you favorably?

APPLICANT: Well, yes, I guess I never saw a crew work in that manner before.

SUPT.: What do you think of the working conditions here from what you have observed elsewhere?

APPLICANT: I think they are probably about the same as elsewhere so far as the men are concerned. Of course, I don't know anything about that particular thing much, but I think you have a better foreman than I have ever worked for.

SUPT.: If you were employed here in some capacity, do you think you could comply with the rules of the company and the instructions of the foreman?

APPLICANT: Yes, I think I could if you would put me under that foreman. I have a lot of respect for these quiet fellows that don't say much.

SUPT.: Why?

APPLICANT: Well, it rather indicates that they are thinkers. Too much gab never done anything.

SUPT.: If you would have to work as a second-class lineman for a few days until you had proven yourself capable, would you still desire to make application?

APPLICANT: Well, I don't know. That is a serious matter with me; however, I think I could afford to do that and do the best I could to make good.

SUPT.: You might look over the rules in this book, (*Hands him a book of rules*) especially sections No. 10, 20, 21 and 24 and see me in the morning. I would like to know your impression of the matter.

APPLICANT: Alright. Thank you.

(Returns next morning)

SUPT.: Good morning, Mr. Doe. Well, did you study those sections I referred to?

APPLICANT: I read them over, that is, three of them and then one of your linemen invited me to a movie with him and I ain't had a fair chance to study what they mean yet, but I think that can be done while I am working.

SUPT.: I am impressed somewhat with your frankness. You should realize that it is necessary for me to question applicants for such positions closely, and your frankness is a mark in your favor; however, I feel that you should give these rules of ours some little thought and study this forenoon and you should understand that we seek to employ only such men as are physically able to do our work and mentally capable to do such work in an efficient manner, which will include the prevention of any injury or damage because of such work.

You may take this blank, on which I have authorized a physical examination, over to Dr. Garr and report back here to me at 1:00 p. m. and I will advise you whether we can employ you as a lineman.

ADJOURNMENT

Thursday, September 29, 1927

The third session was called to order at nine-thirty o'clock by the chairman, George Opp.

CHAIRMAN OPP: The first subject on the program this morning will be presented by Mr. J. C. Sanderson, of Sargent & Lundy, Chicago.

Construction Contractors' Accidents on Public Utility Properties

J. C. Sanderson, Sargent & Lundy, Engineers, Chicago, Ill.

The politicians have taught us to shout "safe and sane," but neither they nor we have done much about it. We counsel caution, then praise daring men who have won by taking a chance. We insist on speed and economy and hope for carefulness. This is true not only of contractors but all of us; they are neither better nor worse than we.

The responsibility of unnecessary accidents is not with the individual alone nor any one group. The owner must take some responsibility for his insistence on undue speed; the accident insurance companies for being financially interested in the undertaking without a representative on the job; the contractor for not properly organizing his preventive measures; and the individual for his carelessness.

Speed in construction has become recognized as economically necessary. The interest charge for idle investment during construction is a very large item on most construction jobs. The rapid development of industry makes speed imperative to meet the ever increasing demands of the consumers.

Most utility companies are not only growing very rapidly, but the consumers are requiring a higher grade of service and greater reliability. With this demand for extended service and greater reliability is the ever present cry for lower rates. This condition can be met only by speed and efficiency.

As far as the writer knows, the accident insurance companies have not taken the interest in accident insurance that their financial obligations would indicate they should. Accident insurance may be a contributory cause of unnecessary accidents. The contractor may assume that with ordinary care and adequate insurance he has gone as far as he needs to go to promote safety. If he has an unusual number of accidents the insurance company increases the premium rate. Thus we establish the so-called "vicious" circle and the owner pays.

Protective Measures Should Qualify for Insurance

The accident insurance companies should require certain protective measures before insurance is granted. They should from their records be able to convince the contractors that intensive accident prevention is economical. At the end of each contract the insurance companies should send to the contractor a tabulation of all accidents with the causes and recommendations for prevention. The names and previous record of the foremen under whom the injured men worked should be given. There should be a system worked out to reward foreman with exceptional records. It would be profitable for both the insurance companies and the contractors if the foremen's interests in accident prevention could be quickened. It will be through the efforts of the

foremen that the greatest reduction in the number of accidents will be accomplished.

The contractor's responsibility is first and he should be required to employ intensive safety measures. It is not difficult to demonstrate that the jobs which are best organized for safety are also best organized for speed and economy.

In theory, all large contractors are strong for safety measures; in practice their safety rules are not strictly enforced. The principles covered in the following obvious rules suggested by the writer are included in the theoretical safety measures of most large contractors. Some of these rules are honored more in the breach than in the observance.

Safety Rules For the Contractor

1. The master mechanic is to make a careful daily inspection of all equipment on the job and render daily reports on its condition. Equipment that is in any way defective must not be operated.

2. All derricks must have extension levers so the operator will have unrestricted vision.

3. All rubbish must be cleaned from the work and piled outside the area of activity as fast as it accumulates.

This rule is usually indifferently carried out. If contractors would make a careful cost analysis they would find that by maintaining a rubbish crew they could reduce the total costs, speed up the job and reduce accidents. Men working on piles of rubbish, waste lumber, etc., are not efficient. A littered job makes men careless and indifferent and the number of accidents materially increases.

4. There should be established definite and comfortable lanes of travel over the job. These traffic lanes should be out of range of derricks or other moving equipment. The rubbish crew should maintain them.

5. There must be proper stairs, ladders and handrails where needed. These should be maintained by the master mechanic. Any injury to stair, ladders or handrails should be repaired at once.

6. All scaffolds, planked areas, etc., to be passed on by the master mechanic.

7. More care should be taken in hiring men. The physically and mentally unfit, careless and dissipated, should be rigidly excluded.

Contributory negligence of others is responsible for from 5 per cent to 10 per cent of the accidents on a job.

How Sixty Per Cent of Accidents Occur

The individual is a much more difficult problem. The mental attitude of the men accounts for about 60 per cent of all accidents. This 60 per cent may be divided as follows:

Poor judgment—30 per cent.

Contributory negligence of others—10 per cent.

Haste—10 per cent.

Inattention—10 per cent.

Correcting the mental faults of a notoriously careless people is necessarily a slow process. Posting danger signs has been suggested as a corrective measure. Their value is somewhat problemetical. As an illustration, some work was being done on a roof near a transmission tower. A handrail was erected between the tower and the roof and several danger signals posted. As a further precaution each man as he came on the roof was instructed to

keep away from the tower. On the third day a man climbed over the handrail and passed the danger signs to fasten a guy line on the tower. He was knocked to the ground by a 4,000-volt current. Fortunately he was not killed. The accident was recorded as thoughtlessness.

Such incidents could be recounted indefinitely, but it does not lead to a solution. Any material improvement must come through intelligent and experienced foremen. Each foreman should be charged with the protection and training of the men under him. The foreman should be held in some measure to blame for all accidents to his men. There should be a bonus system or some form of special recognition for foremen that have their men well trained. Handling materials accounts for about 40 per cent of the accidents. This percentage could be materially reduced by teaching the men the proper way to handle materials and then insisting on the proper method being used.

Lack of skill in handling tools accounts for 6 per cent of the accidents. We have no proper trade schools nor an intelligent apprentice system.

Lack of Skill and Haste Cause Their Quotas

Haste is accredited with 10 per cent of the accidents. As a matter of fact it is a contributory cause in nearly all accidents. An American contractor constructing a job in London applied American methods for speed with English workmen. The result was an unusual number of accidents. The job was called the "Slaughterhouse" by the workmen. The English workmen were not accustomed to working fast nor moving fast and the results were disastrous.

In this country we are keeping the speed of our operations ahead of the abilities of our men. We must use more efficient and more intensive training methods or slow down our operations to the safe speed of the men. It is hardly possible to slow down operations, therefore the only solution is to train the men. We must quicken their understanding, increase their interest in their work, and increase their skill in their trades.

It is useless to hope for great improvement in a short time. Material improvement will come only by formulating a comprehensive set of rules for taking care of equipment and laying out the work; and, more important, a systematic method of training foremen in safe methods of handling their work and they in turn teaching these methods to the men under them.

Contractors Association Taking Steps to Train Foremen

CHAIRMAN OPP: The meeting is open for discussion.

O. R. BENJAMIN (Detroit Edison Co., Detroit): Is there any method of training foremen?

MR. SANDERSON: No, but the Contractors Association is taking steps to do this.

G. F. STECKERT (Consumers Power Co., Jackson, Mich.): Do the contractors keep a record of when accidents occur, and so forth?

The only company I know of which does that is the L. E. Myers Company.

G. F. BENTLEY (Detroit Gas Co., Detroit): There are a number of accidents occurring during construction around plants due to falls. Are there any rules regarding the use of scaffolds, ladders, etc., prepared?

MR. SANDERSON: I do not know of such rules.

CHAIRMAN OPP: I would suggest that Mr. Bentley or anyone else desiring such rules communicate with Mr. W. Dean Keefer of the National Safety Council.

W. L. BRUCE (Westchester Lighting Co., Mt. Vernon, N. Y.): Isn't there some

way to encourage contractors to notify the utility company when they are going to do any work near the utility company's line?

MR. SANDERSON: I would say that this should be taken up, before the work is begun, with the architect.

R. B. INMAN (U. G. I. Contracting Co., Philadelphia): A code has been prepared in Pennsylvania on ladders and scaffolds which if followed will do much to eliminate that type of accident.

CHAIRMAN OPP: The next subject will be presented by Mr. Walter Wagner, of the Philadelphia Electric Company, Philadelphia.

Prevention of High Voltage Hazards on Customers' Premises

Walter Wagner, Philadelphia Electric Company, Philadelphia, Pa.

Although the United States leads in the efficiency of production because of the amount of power controlled by the industrial worker, I am firmly convinced that our leadership in the industrial world will be maintained only by the use of an increasingly greater amount of power under the control of the individual employee. Other countries, our competitors in commerce, are sensing this need, and in order to retain our advantage, more power will be used, with, if practicable, greater increase of safety and continuity of service.

To enlarge the fields of power application, our commercial departments are in an era where greater specialization in sales efforts are needed to secure the business, and a higher character of service required to stimulate a growth in its demand. Industries, particularly those having private plants now making use of by-products of plant energy, and those using electric baking ovens and electric furnaces, are typical of this group. The narrowing margin of profit from the sales of energy and the consequent necessity of low first costs and operating expenses require the absolute minimum of installation, operation and maintenance costs, compatible with the safeguarding of men, and service continuity.

The engineers of our industry are developing distribution systems of higher and higher voltages to the customer, and high tension interconnections between large utilities are making for more economical and satisfactory service. The manufacturer, through intensive specialization, is giving us equipment and machines approaching the ultimate in efficiency and continuity of service.

The Engineer Must Be in the Vanguard

The safety engineers, cognizant of this trend of the new industrial economic developments, must not be satisfied only to follow these changes, but must be in the vanguard, for it is only through their wise direction that the closely related, highest practicable, degrees of continuity of service and safety can be obtained and maintained. No expenditures must be made that cannot be concretely justified by the proper balance between the values of safety and continuity of service, and the cost of construction, maintenance and operation. Conversely, no unnecessary hazard either to life, limb, or service, can be tolerated through laxity or ignorance on the part of ourselves or those in our departments for whom we are responsible.

I have mentioned continuity of service as a responsibility of the safety engineer. Obviously, where interruptions directly create hazards to persons or property, we participate in the construction and operating plans for their prevention. If conditions in other customers' premises supplied from the same service might cause an

veloped, and operating companies have had to take the initiative. One company uses the terms "open" and "closed" for their markings, but recently an interruption to service was prolonged because a new man, an old steam engineer, thought that the word "open," as applied to the case of a steam valve, meant the flow of energy, and "closed" an interruption of the flow. One can readily appreciate the possible accident hazards which might occur under this misinterpretation of the markings. What do you believe should be the proper marking? I understand that manufacturers quite generally use the terms "off" and "on."

The method of grounding, consistent with the larger use and greater importance of power supply, is, in general, to have multiple grounds separated and connected by sweating to the common substantial copper bus at different points. Even lightning arrester grounds are now being connected to the common grounding network at larger substations in order to reduce the ground resistance to the minimum, but, because of the likelihood of great rises of potential during lightning discharge drainage, such practice is not recommended excepting where it is certain grounding conditions will not give rise to such hazards.

Construction

During the construction period, lack of insistence upon the removal of all but the minimum possible amount of combustible material has caused serious fires. It has been found advisable, at times, to require an extra extinguisher during construction periods.

The proper safeguarding of high tension receiving lines and equipment during periods of temporary construction may be very difficult, as indicated by the following quoted experience:

"In the case of a vault which was finished and made ready for service, the owner had some twenty electricians working in his section of the vault where the 4,150 volt circuit was switched from his bus to the various parts of his plant. He wished to get this newspaper plant running on partial service. This necessitated livening his bus at a time when there were no doors provided to keep unauthorized persons out of his vault, and while the electricians were as thick as flies doing a rush job in the vault. The wiring was open, copper rod between the bus and switch extended down to within three and one-half feet of the floor and no policing was contemplated. Although the hazards and possible consequences were of no legal concern of ours, we felt that we should render a service to the consumer by not only cautioning him, as he was not much concerned about the danger, but we even went further and insisted that proper precaution be taken before we turned on our service. After reaching the proper people in the owner's organization, we succeeded in getting a realization of the hazards and they agreed to delay the rendering of our service until hazards were corrected. This agreement was not reached until such a condition arose and was only precipitated by our refusal to render service, which seemed to impress the owner with the gravity of the situation."

What is your opinion of this method of procedure? If this company had been fortunate enough to be in a territory where the regulatory body had adopted and was enforcing electrical safety rules requiring the customer to properly protect himself, the responsibilities and efforts of the safety engineer would certainly be lessened, and I would urge that we who do not enjoy this advantage should keep everlastingly at it, locally, for the adoption of the National Electrical Safety Code rules by the regulatory bodies having jurisdiction.

Maintenance and Operation

Obviously, from the operating standpoint, our responsibilities actively begin with the introduction of current. Personal contacts with the prospective operator of the

substation, and the installation in the substation of glass covered or varnished surface single line circuit diagrams and operating rules, greatly facilitate the work. First aid prone-pressure resuscitation must be discussed, and, if practicable, a lesson given to the men in the presence of the employer. With the employers interested in this and other safety measures a labor turnover is less likely to lead to a loss of these instructions.

I believe that safety engineers are now generally making use of every employee visitor to the customer's substation—the meter reader, the meter tester, and the maintenance man, to advise of any unsafe service conditions which may come to their attention. Such advice, supplementing our own investigations during periodic visits and the receipt of periodic engineering information concerning the maintained integrity of grounds or other changes in conditions affecting the safety of operation, make for the greatest practicable degree of safety.

High Grade Padlocks Supplied

One company experienced great difficulty in maintaining the proper padlocking of customers' substations with the standard company padlock. A high grade brass padlock was supplied, and it was found that these were dropped, mislaid or otherwise lost by customers' employees, leaving the interior of the substation accessible to everyone. This company is now using the same lock with a short steel chain fastened by the manufacturer to the body of the lock, and the chain is permanently fastened to the door or gate protected. Unless an actual theft of lock exists, or the loss of a key in an emergency requires its destruction, it is expected that very few unlocked doors or disconnecting switch compartments will be found hereafter.

In testing equipment to determine whether it is alive, no maintenance work should be allowed until a double check on the dead circuit is made, and two men are concerned with this checking. The use of a Neon gas-filled tube at the end of a switch hook has been extensively used, but the necessity of opening a compartment for accessibility to a known live part, in checking the integrity of the tube, is an unnecessary hazard. One company is now installing Ford coils by which this tube can be safely lighted before and after the test of the supposed dead section, thus making certain that the tube has been operative during the test.

For the higher voltages, a metal switch hook terminal with condenser has been used to advantage. Slides of this and the preceding device will be shown.

Rules and Regulations

In order to serve best, it is of course necessary to be an authority on all safety rules required by those having jurisdiction in the territory served, and to know the trend of developments in related activities. Intimate contact, even if necessarily by correspondence, with the proper representatives of the city and state regulatory bodies is absolutely necessary. One of our problems in some instances is to ascertain the extent of jurisdiction of these organizations, and within these limits, cooperate actively in order to prevent the possibility of the introduction of drastic rules or adverse interpretations of existing provisions, and make every effort to secure the adoption of the new national standards.

Experience has shown that, in general, engineers of these regulatory bodies sincerely appreciate the practical cooperation which we can offer, and realize that only through joint effort can the greatest benefit accrue.

Many state regulatory bodies and others are waiting for the formal approval of the revision of the National Electrical Safety Code, revised under the auspices of the American Engineering Standards Committee. As you may know, this revision has covered a period of some four years of active work by representatives of all interests concerned, and I feel certain that very shortly the unanimous approval of

the revision will permit the American Engineering Standards Committee to promulgate this as a National American Standard. From my active participation, it is my impression that in so far as customers' high tension installations are concerned, there has been no serious difference of opinion in the revision of the rules. Many have been changed to meet the more modern practice, and I would strongly urge that each of you who have not already done so secure copies of these rules which have been printed by the Bureau of Standards. Make a careful study of the old rules and the revision, and if and when your experience would justify another change, send such statement, with supporting evidence, to the Headquarters of the National Safety Council for consideration in the next revision of the safety code.

Handbooks Issued by Bureau of Standards

Handbooks for each part issued by the Bureau of Standards are as follows:

Handbook No. 6—Safety Rules for the Installation and Maintenance of Electrical Supply Stations.

Handbook No. 7—Safety Rules for the Installation and Maintenance of Electrical Utilization Equipment.

Handbook No. 8—Safety Rules for the Operation of Electrical Equipment and Lines.

Handbook No. 9—Safety Rules for Radio Installations.

Of the above, Handbook No. 6 and Handbook No. 8 are directly concerned with the subject of this paper. Again I would recommend that in the absence of other rules or in the face of existing local rules, that you urge the adoption of these revised national rules.

The benefit of our experience in the application of these rules will serve to make more certain through our cooperative effort, that, throughout the whole country, our costs of construction, maintenance and operation, shall be consistently related to the proper degree of safety and continuity of service. We can meet the representatives of regulatory bodies on a common ground, and mutually make more certain of the adequacy of the present rules and of proposed revisions.

In closing, I wish to thank Messrs. Beardsley and Harmer and others for their valuable suggestions, and the manufacturers for illustrative material. May I congratulate the safety engineers of the industry upon the splendid results of their accident prevention efforts in the past? In the face of great increases in the voltages, in the quantities of energy used, and in the complexities of service—you have, throughout the country, successfully prevented a corresponding increase in accidents through your alertness and active cooperation with all parties concerned. There is still much to do, but the obstacles can be removed when once recognized and understood for you have both the will and the courage to meet them, and I trust that the discussion following the presentation of this paper will contribute materially to the progress of our work.

Safety Equipment For the Customer

CHAIRMAN OPP: The meeting is open to discussion on this subject.

A. A. RALL (Kansas City Power & Light Co., Kansas City, Mo.): What kind of equipment do you supply the customers with from the safety angle?

MR. WAGNER: It depends upon the nature of the subscriber.

MR. RALL: We will say it is a primary customer.

MR. WAGNER: It depends on the extent of the switching equipment and the disconnecting facilities accessible to the customer. A switch hook, rubber gloves and a tilting stool may be all that is required. But in general, the equipment shown

on the slide is the amount of equipment which we require the customer to have when the service is installed.

CHAIRMAN OPP: Are there any further questions you wish to put to Mr. Wagner at this time? I think it is a wonderful opportunity.

R. B. INMAN (U. G. I. Contracting Co., Philadelphia): With reference to the rubber gloves, I would like to ask Mr. Wagner what he considers is a frequent enough interval of inspection of the rubber gloves.

Periods For Careful Inspection

MR. WAGNER: That again depends on circumstances. If the temperature and humidity conditions are such as to require frequent inspection, possibly the customer should be expected to look them over once a week. I would say that normally they should be inspected about once a month.

W. L. GRANGER (Superintendent Overhead Lines Dept., Detroit Edison Co., Detroit): Does your company own the entire equipment on the customer's premises, or any part of it?

MR. WAGNER: In general, the customer owns the equipment. The customer, of course, owns the safety equipment.

MR. GRANGER: Do any of your employees operate any of the equipment on the customer's premises or do they leave that entirely to the customer's employees?

MR. WAGNER: We have some places where the customer operates the equipment entirely. I would say in most cases the customer's employees operate the equipment, but in many instances they operate it under instructions for the operator to get in touch with the load dispatcher for the proper switching methods.

L. A. ZIMA (Safety Engineer, Brooklyn Edison Co., Brooklyn, N. Y.): In regard to the inspection and testing of rubber gloves, we have frequently had calls from customers requesting the company to give this service, and while we do not feel that we want to assume the responsibility we also recognize the fact that it is frequently quite difficult for the customer to get this service. Electrical testing laboratories are generally available in some of the larger cities, but in the small cities, how can we take care of the frequent inspection there?

MR. WAGNER: It has been about 20 years since I operated in a small town. It would seem to me that the principles still hold good in so far as the relation of the company to the customer is concerned, and possibly in those cases the customer would be handicapped to the extent of having to have an additional pair of gloves. As a matter of fact, I believe in all cases he should have an additional pair of gloves, and the time interval required to send a pair to a reputable laboratory to be tested and returned should not be long.

CHAIRMAN OPP: Gentlemen, if there are no further comments on this particular subject, we are advised that our Resolutions Committee appointed yesterday is ready to make a report at this time. Mr. McCulloch, as chairman of that committee, will make his report to you now.

Section Wires to Absent Members

MR. MCCULLOCH: I am sure many of us have missed some of our former leaders who have been very active in this section the past year. The recommendation of the committee that was appointed yesterday is that the following telegram or a similar telegram be sent to these men:

Harry Lucas, Secretary,
Philadelphia Electric Co.,
Philadelphia, Pa.

H. W. Moses,
Edison Electric Illuminating Co.,
Boston, Mass.

C. Howard Stewart,
Laclede Gas & Light Co.,
St. Louis, Mo.

Charles E. Morrison,
Utilities Mutual Insurance Co.,
New York City.

Merman Spoehrer,
United Light & Power Co.,
St. Louis, Mo.

"Three hundred and fifty members of the Public Utilities Section attending greatest Safety Congress ever held send heartiest greetings and best wishes. We sincerely hope you will be with us next year.

"George Opp, Chairman."

(Upon motion regularly made and seconded it was voted the telegrams be sent to the men named.)

CHAIRMAN OPP: Mr. Harmer, have you anything to add at this time?

Resolutions Are Offered

H. B. HARMER (Philadelphia Electric Co., Philadelphia): I tried to get in touch with Mr. McCulloch this morning relative to this resolution. I have a resolution that I would like to offer:

RESOLVED, That it is the sense of the section that we extend the thanks of the section to the splendid cooperation we have had from the National Head-quarter's staff.

I have another one, Mr. Chairman:

RESOLVED, That it is the sense of this meeting that we extend to the new Stevens Hotel management our appreciation for the splendid reception our delegates have received at their hands.

(Upon motion regularly made and seconded it was voted the resolutions be adopted and transmitted.)

CHAIRMAN OPP: Is there anything else along that line you wish to inject at this time? If not, let me read with deep pleasure the response to a night letter that went out to a man whom we had hoped to have here at the Congress, particularly by reason of his having been selected as your new vice-chairman in charge of electrical interests. That response reads like this:

"Will be glad to accept the vice-chairmanship. Will do everything I can to promote this work. Thanks for your congratulations. Did not stay away from Chicago because I wanted to dodge anything, but because of circumstances arising here at the last minute. (Signed) W. R. Lovd"

So there is the acceptance of your vice-chairman. Your official family is now complete. I understand from the new chairman that a meeting will be held at noon today to complete the organization of the work and to establish policies for the coming year. We have accomplished something this year which has not been done before. We are getting started before we stop. You know when it comes to accelerating after you have once completely stopped it means a considerable loss of time. This year we keep right on moving and we have the prospect of a real busy year. We are going to be working all of the time and not just work up to a peak in

advance of the Congress and have a happy Congress here and then go back and forget all about it for six months. You are going to be actively in touch with us and we with you all the year through, and if you wish to contribute anything make sure it comes to the attention of the officers by writing either to the chairman or secretary of this section or direct to the National officers. They will appreciate anything you might do in the way of contributing an idea or a suggestion.

We are asked to give consideration to this resolution which apparently originated in the Union Oil Company of California by George F. Prussing, who is Chairman-Elect of the Petroleum Section.

Action Deferred on Congress City

(Chairman Opp read a resolution to the effect that all future meetings of the National Safety Council be held in Chicago.)

CHAIRMAN OPP: What is your pleasure on a resolution of that nature, originating in another section, with the desire of continuing the Congress year after year in the headquarters city?

H. B. HARMER (Philadelphia Electric Co., Philadelphia): I think that is a debatable question and I don't think we can get a real, genuine consensus of opinion from the delegates this morning. It is one of those things on which we all have our individual opinion. I think possibly it would be a mistake if at this moment we took any definite action. I therefore recommend that we lay this on the table.

(The motion was seconded.)

MR. McLACHLAN: I would like to move an amendment, that it be handed over to the Secretary of this section for action.

(The amendment was accepted by both the maker and the seconder of the motion.)

G. M. GLIDEN (Ohio Public Service, Cleveland): I suggest the Executive Committee send letters to all the members of the section and get their action over their letter head on the suggestion.

(The amendment was seconded and accepted.)

CHAIRMAN OPP: We now have the motion with two amendment, all very good.

(The motion was carried.)

CHAIRMAN OPP: We are now going to pass on to the next subject on the program which is "The Affects of Attitude and Aptitude on Accident Prevention." Here is a new angle, gentlemen. We are injecting something a little different from what we have attempted in any previous program, and I am sure you are going to be interested in this new slant.

Mr. C. Y. Davis, Plant Employment Supervisor of the Illinois Bell Telephone Company, Chicago, will present this paper at this time.

The Affects of Attitude and Aptitude on Accident Prevention

C. Y. Davis, Plant Employment Supervisor, Illinois Bell Telephone Company, Chicago, Ill.

The discussion of any phase of accident prevention before a body of men primarily interested in the prevention of human suffering and the elimination of human waste is always an interesting assignment. However, it is a difficult one because the field has been so thoroughly covered that new ideas on the subject are scarce. On the other hand, it should be a rather simple task because one finds such sympathetic minds and attentive ears to whom old ideas in new form may be presented.

The thoughts which follow are not those of one who might be considered as a

professional safety engineer fully competent to discuss this important subject, but rather are the development of the accumulated observations and experiences of many workers in the telephone field.

Conditions Surrounding Telephone Men's Work

So that our minds may meet in the discussion of this important activity, it will be necessary, of course, because of its bearing on accident prevention work, that we keep in mind certain conditions which surround the work of telephone plant employees.

In general, the function of a telephone plant department is to construct, install and maintain the physical plant essential to the giving of telephone service. Moreover, the manner in which the physical work is performed has considerable bearing on the company's relations with the body politic.

Aside from the clerical and miscellaneous office forces, there are employed, in the plant department of the Illinois Bell Telephone Company, more than 5,000 field workmen.

In this field force occur the major portion of our accidents; therefore, it is toward their work that our principal accident prevention activities are directed.

These men usually work alone or in very small groups, and are seldom under the continuous visual supervision of a job foreman. Besides, they are scattered throughout the length and breadth of our territory, work in homes, offices, factories and along country roads, as well as in and under city streets and alleys.

The degree of success which each attains in working safely without injury to himself and others is, therefore, to a great degree dependent upon his individual conduct, his aptitude and ability in performing his assigned task, and upon his mental attitude toward his job and its safe performance. In short, he must be not only a doer, but also a thinker, and capable of adapting himself to situations as he finds them.

Although these conditions probably apply in most public utilities, they must be borne in mind in connection with accident prevention work in such organizations.

Tangible Versus Intangible Factors

In discussing accident prevention at a meeting of this kind, one is tempted to talk about what has been done in the way of providing safe tools and materials; in providing physical safeguards; in giving employees instructions in first aid treatment, etc.; and to quote statistical evidence of progress in prevention of injury to employees. Though all these and similar items are highly important, such history and statistics indicate that regardless of how carefully tools and material are designed, and regardless of the number of mechanical appliances furnished to safeguard employees from injury, the fact remains that we still have accidents—true, probably not as many as there would be without such precautions, but probably far more than is necessary. In the past, most of our attention has, of course, been focused on the tangible items referred to, but inasmuch as accidents still occur, does it not follow that there must be at least one other less tangible factor which should receive even closer attention, namely the human element.

It is impossible, of course, to list all of the known or probable causes of accidents which result in personal injury, but there is no gainsaying the fact that most accidents are largely attributable to the carelessness or ignorance on the part of the person injured or others. It is true that some injuries are caused by faulty tools and equipment, and some by occupational hazards, etc., but notwithstanding that fact a large majority involve the elements of carelessness or ignorance.

Webster defines an accident as an event that takes place without one's foresight or expectation, and whenever we think of accident prevention, we usually think of carelessness, ignorance, and foresight. Carelessness, ignorance and foresight are

the result of mental processes or the lack of them, as distinguished from the physical factors that contribute to accidents. Do not the facts in connection with fatal or otherwise serious injuries frequently indicate that the injured person was a skilled workman, expert in the technical requirements of his job, and working under reasonably safe conditions, but through carelessness, ignorance or lack of foresight by him or others, the unforeseen happened? Does this not emphasize the desirability of giving even greater attention to the mental qualities of employees?

It would be presumptuous on my part to undertake anything approaching a full discussion of the relation of all the mental qualities or processes to accident prevention; therefore, let us confine our thoughts to only two of these factors, namely, "attitude" and "aptitude."

Proper Attitude an Important Factor

What effect or influence does attitude have on the prevention of accidents? Attitude of whom? Attitude toward what? Let us assume that we mean the attitude of all those involved in our operations, namely the management; the foreman, and the workman; and that we mean the attitude of each of these toward the fulfillment of his obligation to our customers, to our employees, to the owners of the business. Do these affect or are they affected by accident prevention? Such accidents as cause personal injury frequently interfere with the establishment and maintenance of telephone service, cause pain and suffering to workmen, and increase operating costs. Consequently, such accidents affect all three of the essential members of the industrial family, customers, employees and owners. Is it worth while then to attempt to develop within our own ranks a proper attitude toward the prevention of accidents?

Attitude is defined as a position assumed to serve a purpose, or a bearing indicating action, feeling, or mood. What we are dealing with is mental attitude; in other words, the position or bearing assumed toward the success of the business, the comfort and happiness of others, the development of the mind and body, and our contribution to the social order of the community. In other words, how do we feel? What do we think about these things?

Relation of Attitude to Accident Prevention

If the management thinks of accident prevention or safety in its plant operations as a matter of general propaganda only, and is insincere in its talk about these questions to the extent that it expects the foreman to wink at short cuts to production, involving extra hazard; or

If the foreman thinks of accident prevention as a temporary stunt of the management in which he must go along with just enough to get by until the newness has worn off; if he is not personally sold on the desirability of accident prevention, but merely conforms to a prescribed policy with mental reservations; if he thinks that the responsibility for accident prevention is general, and senses no definite responsibility on his part for leadership, training, and directing his men to avoid personal injuries; or

If the workman feels that the management and foreman are interested in the prevention of accidents only so that the work may be done at a lower cost; if he feels that the observance of certain specified practices are not based on reason, but are only to satisfy the whim of some specialist;

If any of these conditions prevail generally throughout an organization, it is reasonably certain that accident prevention in that organization will fall far short of its full possibilities.

On the other hand: If the management is conscious of the real value of and thoroughly in earnest regarding accident prevention, and is willing to bear its share

of whatever cost may result from an active and continuous accident prevention or safety movement; and

If the foreman feels that the management is sincere and recognizes that the training and supervision of his workmen in safe and efficient methods is his individual responsibility and that the occurrence of an accident resulting in personal injury, caused by any employee under his direction, is a direct reflection upon his ability as a foreman; and

If the workman has a personal interest in not only doing a good job, but doing it safely, and realizes that the absence of accidents on his part is just as much an element towards the establishment of a good record, and his eligibility to promotion, etc., as is the turning out of a full day's work;

If these conditions prevail generally throughout an organization, accident prevention in such an organization will most nearly approach the full measure of its possibilities.

The question may be asked as to which factor has the greatest effect or influence on the prevention of accidents in an organization such as ours, the attitude of the management, the attitude of the foreman, or the attitude of the workman. The answer appears obvious—all are necessary, but it is quite unlikely that a proper attitude on the part of either the foreman or the workman can be secured unless the management itself has a proper attitude, because the attitude of the management is reflected throughout the supervisory organization down to the job foreman, and the attitude of the job foreman is certainly reflected in the attitude of his men.

Full Understanding of Management's Attitude Is Important

Often, the attitude of the management, although entirely proper, is not fully understood, or is even misunderstood, by the foreman, but happily the management in all industry seems to be lending its best efforts to the end that any factor contributing to a misunderstanding as to how it feels toward accident prevention is removed. As a result of this, the foreman of today has a new and broader conception of his job. Through frequent conferences, he is becoming more and more conversant with the management's attitude and policies regarding the various phases of its business, and particularly with regard to its relations with employees. In our industry there is a tendency towards small groups of workmen under one foreman. This makes it possible for a foreman to be more nearly a part of his working force. He is in a position to know his men thoroughly, and he should be their teacher, adviser, leader, and personal friend. He is in the best possible position to influence their mental attitude toward safety, toward production, and toward service to our subscribers in its fullest measure.

Development of Proper Attitude

It is my belief that the development of the proper attitude on the part of the workmen in these things depends first on his general attitude towards his job.

If he is dissatisfied with his wages, or working conditions; if he thinks there is no opportunity for self-development or for promotion; if his mind is disturbed over these or similar questions; he will not have a proper attitude towards accident prevention or anything else connected with his job.

On the other hand, if his mind is not disturbed with general dissatisfaction, or personal grievances, his attitude is probably right.

Right Attitude a By-Product of Interest

A closely related and important factor in the development of proper attitude is that of interest. Is the workman interested in his job? Is he interested in his

own advancement? Is he interested in the fulfillment of the company's service obligations, etc.? Very often, mere presence on the payroll is mistaken to be sufficient indication of interest, and most workmen if asked these questions would assert that they are interested in all these things. There is probably only one sure way, however, to determine if the employee is actually interested, and that is through his individual acts. For example, what does he do aside from what he is required to do? In what way has he demonstrated his interest? Attitude and interest seem to be so closely related that we can probably safely say that where an employee demonstrates his interest in his present job and future advancement, by actual performance, rather than by mere assertions, he will have a constructive and proper attitude toward production, accident prevention, and his entire working relations.

Workmen Should Be Selected for Their Specific Aptitude

What do we mean by aptitude? Aptitude of whom? Aptitude for what? Aptitude is defined as the natural or acquired capacity for a particular purpose. We are thinking about the aptitude of the workman on his regular daily job and its relation to his efficiency. We say that a person is apt if he is especially fitted or qualified, and quick to learn. Because of the rapid development and constant changes in telephone work, it is necessary that workmen be more than skillful; they should be apt, quick to learn. The selection of new employees with regard to their aptitude is, therefore, one of our most important functions. A workman may be skillful; however, if he is not apt, if he is not quick to learn, and his skill is only the result of long and tedious training, it will be difficult for him to acquire skill under changed working conditions. Where men are working individually or in small groups, it is necessary that they be individually able to quickly meet changed conditions; especially in this true where unexpected hazards are encountered.

Testing for Aptitude

Our local practice, in which you may be interested, is, when additions are made to our working force, to insure, in so far as possible, that only new employees who are mentally alert, and who can meet changed conditions quickly, are taken into the organization. Effort is made, by simple means, to test not only the applicant's knowledge and skill qualifications, but also his aptitude for our work. This includes his ability to absorb, memorize, and apply instructions, his mental alertness and ability to reason, all of which are demonstrable.

These preemployment tests, as well as other subsequent qualification tests given in connection with our regular occupational training, were developed jointly by the line supervisory force and the plant school. All tests and class room training are handled by the plant school, but only at the request of and with the full concurrence of the regular line organization.

Preliminary Training

Applicants successfully passing the preemployment test, if acceptable from a health and personality standpoint to the department head requiring help, are employed by him. However, before being actually placed in the working organization, the new employee is given a preliminary training course, usually lasting six days, on the particular class of work to which he is to be assigned. The purpose of this course is to provide the preliminary education and information necessary to starting the job and to enable the new employee to come into production in the shortest time possible. This course also provides an opportunity for further observation and checking up on the new employee's potential ability and aptitude, and those showing insufficient ability and aptitude are dropped at this time.

Likewise, throughout his subsequent service, the employee is under observation, periodical reports being rendered concerning his progress and general aptitude for the work to which he has been assigned.

Specific Instruction in Safe Working Methods

So that the new employee may not be entirely ignorant of safety practices, as he progresses through his preliminary training course, he receives instruction from time to time in regard to accident prevention on the particular type of work being studied. For instance, in the splicing of wire, he is cautioned against improper use of cutters, and in the danger of personal injury through careless handling of tools and material.

On the last day of the preliminary training class, the students are given a lecture on accident prevention. This reviews the instruction received at various intervals throughout the course and includes, for example, such items as:

Safe use of ladders, drills, goggles, and other tools.

Safe method of climbing poles.

Unsafe conditions, that may be encountered in the field, are cited, and ways of overcoming them suggested.

Method of reporting unsafe conditions, etc.

In addition, a bulletin showing the correct method of climbing poles is given to each student involved in this type of work. All students are given a copy of a pamphlet on Foresight and an associated questionnaire. This pamphlet is in narrative form, and is intended to induce individual thought on actual working and safety practices. Further, central office workmen are given a list of safety precautions citing specific conditions encountered in their work that will require careful handling.

Occupational Training

An employee who successfully passes the preliminary training class and who is put to work receives a copy of the occupational qualifications for the particular line of work in which he is employed. These occupational qualifications set forth the mechanical and knowledge requirements which he will be required to meet if he expects to progress in position and salary, and include specific items on accident prevention.

At this time, he is enrolled in an occupational training course and receives questionnaires from time to time covering the subjects with which he needs to be familiar to do his job effectively. Every occupational training questionnaire includes several questions on accident prevention. By this method the subject of accident prevention is kept continually in front of the employee not as something special and aside from his job, but as part of it. As these men are brought into class the questions on accident prevention which they have answered are reviewed and discussed by the entire class, a procedure which we find is particularly helpful.

Qualification Tests

Qualification tests for advancement are given to field employees, and these always include a set of questions concerning accident prevention. The employees are graded on these questions and the answers discussed with them at the end of the test.

Special classes are conducted from time to time on various subjects and new practices, and very often these subjects concern items which involve the discussion of and instruction on safe methods. Classes recently held on the use of fire extinguishers, including the carbon dioxide extinguishers, are a case in point.

Percentage of Those Selected to the Total Number Tested

Reverting to the preemployment tests and the preliminary training course, you may be interested in some figures showing the number of applicants tested and the percentage eliminated during the five month period from January 1 to May 31, 1927:

For two classes of work, namely subscribers' station installation and subscribers' station repairs, 318 applicants were sent to us by the general employment office to take our preemployment test. Of the 318, 192 failed to pass the test; four could not pass the health examination, 14 were dropped at the end of the preliminary training course as being unadapted to our work, and only 109, or a little more than 34 per cent, displayed special aptitude and actually went into production. It is of further interest to note that those applicants who took the preemployment test represented only approximately 25 per cent of the total applicants who presented themselves to the general employment office. The other 75 per cent were eliminated by that office on the basis of their general standards plus their understanding of our specifications for the positions to be filled.

Result of the Elimination Processes

These eliminative processes are designed for the express purpose of securing as capable and as apt employees as is possible under the circumstances and in keeping with the positions to be filled. It is recognized that these tests are not infallible, but needless to say, such care in the selection of employees tends not only toward a better production record, but is also a considerable factor in the consistent reduction of lost time accidents that we have experienced.

In conclusion, can we not agree that the development of a proper attitude and the securing of employees with specific aptitude for the work involved is of prime importance and has a direct bearing, not only on job production, but also on accident prevention, and all other related activities. Finally, lest I have inadvertently conveyed the impression of any belief on our part that we have wholly solved our problem of accident prevention, or even approached a solution, let me definitely correct that impression. We are merely conscious of an objective, and are earnestly seeking the most effective means of its attainment.

CHAIRMAN OPP: We will not have discussion on this paper. Shoot your questions promptly because we are trying to keep to the schedule under difficulties.

J. F. MCCURDY (N. E. G. & L. Co., Boston): I would like to ask Mr. Davis, is it a fact that at the present stage of mechanical and physical perfection in plant and material, that that fact may be eliminated and the mental processes of the employee be dealt with practically as a whole?

MR. DAVIS: Certainly not. The statement was introduced merely to emphasize the importance of the human element. I believe it was Mr. Scott who first emphasized that thing. Only for the purpose of emphasis, from the standpoint of attitude and aptitude was that statement made and it wasn't meant to convey the thought that it could be ignored at all.

CHAIRMAN OPP: Is there any further discussion? If not, we will go right on then to the next topic.

A Medal For Work in Resuscitation

There is one item that we have delayed making mention of in regard to a suggestion which originated in this section last year, which was the idea of a medal to be awarded for cases of successful resuscitation not covered at present by either the McCarter Medal for the American Gas Association, or the Insull Medal for the National Electric Light Association. As vice-chairman of the Special Committee on Medals for the National Safety Council I wish to report progress to the extent of the adoption of a design and the preparation of rules to cover the award of such a medal. Within the coming year we will doubtless have an official announcement relative to the administration of this new medal. The idea originated in the Public Utility Section so you may consider it your own baby.

The attendance today, indicated by the cards already turned in, which is not com-

plete because I see some more cards need to be collected, totals 297 from 22 states and Canada.

It is only proper that you should get better acquainted with your new chairman. I know of no one in the public utility field who has taken a keener interest in accident prevention than your new chairman. No one during the past year has worked harder, more zealously, more painstakingly than has our new chairman. With keen pleasure I present Mr. Carl J. Rutland, Safety Engineer of the Texas Power & Light Company, Dallas, as your next chairman.

The Humane Attitude Toward Safety Work

CHAIRMAN-ELECT RUTLAND: Retiring Chairman, Officers, Members of the Public Utility Section: I don't know of anything that has given me greater pleasure than to be associated with a bunch of men who have as their purpose the conservation of human life. I heard Charley Scott say once that when he started in safety work he thought that he would like to make a good record. He had reviewed the past records of his company as far as fatalities were concerned and as far as accident costs were concerned, and he wanted to better that record. When he started in safety work he had that for his goal.

I didn't think until two years ago just what my purpose in safety work was until he made that statement. Then he said this: "I have attended the funerals of a lot of men in our organizations. I have been deeply impressed with the tragedy that results after an accident occurs. My viewpoint of safety has been changed entirely from that of an economic one to that of a humane one."

Sincerely to you, gentlemen, my thought, my study, and my interest in safety work is purely that of a humane one. I know that you gentlemen, having possibly looked into the humane side of this question by attending the funerals of some of the employees of your own company and seeing the tragedy that exists in the home after the accident occurs, appreciate that your viewpoint of safety is turning, and that is the only successful viewpoint in bringing safety to a happy end.

I feel that we will have a successful year.

It appears to me that you have put me on a pyramid, and I am thankful and you should be consoled that that pyramid has a heluva strong foundation, and I refer to the officers who are going to serve with me this year.

The story is told of a certain dignified English gentleman who had received a questionnaire on which he was to fill out nine questions. One of the questions was: "Where did your father die and how did he die?" This embarrassed the dignified English gentlemen very much because it happened that his father had been publicly hanged. He deliberated on the question and finally wrote these words:

"He was attending a public function when the platform gave way."

How Things Are Actually Done

I don't believe the platform is going to give way with the officers we will have this year.

A good many of you have come here for the purpose of seeing how things are actually done. In the presentation of the next paper I believe you are going to get a concrete idea that may be helpful to you in your own organization. There is nothing that makes for greater safety than that of building up a safety organization on a dignified plane in the company in which it is working and giving it all the prestige that it needs. I think the paper that is going to be presented by Mr. H. F. Webb, General Safety Director of the West Penn System, Pittsburgh, will give a great many of you a new slant on prestige in your safety organization in your own company.

Organizing for Accident Prevention in Public Utilities

H. F. Webb, General Safety Director, West Penn System, Pittsburgh, Pa.

The establishment of a safety organization in a public utility presents numerous problems which are foreign to practically all other types of industry. This is especially true of the utility operating in a number of scattered communities rather than in one large city. Where other industries house their employees under one roof or in a group of buildings, constituting a single unit, the utility has men at numerous locations, i.e., steam plants, hydro plants, substations, water works, and gas plants, often situated miles apart. In addition it has line, construction, and gas crews scattered in every direction and probably never at the same location on two successive days.

Should the company operate a street or interurban railway the problem is increased, for here employees, each operating individually, are seldom, except on special prearranged occasions, found in one group. The lack of concentration of employees at one location, which must necessarily go with public utility operation, raised barriers to organized safety work which require study and continued effort to overcome.

General Organization

Safety activities to be effective should be conducted in an organized manner, thus indicating a definite policy on the part of the company.

Director of Safety

In a large organization it is highly desirable to place this special line of work under the direct supervision of an appointed general director of safety who is responsible for executing the safety policy of the company. This would allow for the centralization of accident prevention work in one department and constitute a clearing house for suggestions and proposals and secure the adoption of safety standards. It would also promulgate information on safety, methods, and accidents, and if necessary, assist in their investigation; maintain injury and accident records and prepare tabulations and statements from them. Supply literature for posting on safety bulletin boards; conduct safety inspections; engage and train men for the safety work. The functions of the accident prevention department are wholly advisory—it has no executive authority over the operating departments or other branches of the companies.

Safety Engineer

On large subsidiary properties it has been found advisable to place a trained resident safety engineer. It is the duty of such engineer to keep in close touch with the officials regarding matters pertaining to safety; make a study of local accident statistics; furnish reports to the officials and supervisors; visit and inspect the various shops, plants, and properties; call attention to unsafe conditions; recommend proper safeguards; consider employees' suggestions; follow up orders for safety work; issue bulletins and other safety material for the instruction of employees; attend and speak at all safety service meetings and at safety committee meetings, when possible, and generally supervise the local safety activities.

This engineer, obviously, in such advisory capacity must gain the respect and active support of the officers, supervisors, and men. He will attain the best results through advice or recommendations approved by the proper authority.

Accident Records

As is true of any business undertaking, the keeping of records in organized safety work is important. These should include record of accidents and their investigation, together with details as to cause, time lost, and cost; minutes of safety meetings; records of inspections, and recommendations together with action taken in each case.

In connection with the record of accidents, it is essential that strenuous effort be made to have every accident, no matter how slight, reported. It is only through a complete record of all accidents that conditions existing on the property can be known and proper remedies for their correction instituted.

Executive Safety Committee

This committee composed of the keymen—superintendents, engineers, etc.—forms a necessary adjunct to the safety program. The executive safety committee serves as the local clearing house for the accident prevention work. In this committee, problems relative to specific hazards are discussed; lost time accidents analyzed, and safety suggestions examined and approved. Minutes of these meetings should be kept by a competent secretary and all unfinished business followed up in an orderly way.

The executive safety committee should have a regular day for meeting and should confer once a month or more often, if the occasion arises. Report of the meeting should be given to the general director of safety in order that suggestions and solutions to problems may be made available for other locations.

Mechanical Safeguarding

Mechanical safeguarding not only prevents some accidents, but is also a strong indication of the company's safety policy and determination to safeguard the lives and limbs of its employees. It proves the company's sincerity in the work in which it is asking its employees to cooperate. The safety inspector should be fully qualified to recommend and supervise the fabrication erection of mechanical safeguards in accordance with universally accepted standards.

First Aid Instruction

Knowledge of first aid among employees is highly essential. It has been found that, when employees are instructed in first aid, they become more interested in the prevention of accidents and thus cooperate more actively in the safety movement. The safety inspector should be fully qualified as a first aid instructor, as it is his duty to stimulate employee interest in this important phase of accident prevention work as well as conduct individual and group instruction.

Advertising Safety

A continuous educational campaign is essential to secure cooperation. Advertising forms one of the most effective means for arousing interest in any subject. Safety may be sold to the employees of any company by means of a definite, well-organized, advertising plan. A safety advertising campaign has been conducted continually throughout the West Penn System properties and has, no doubt, been partly responsible for keeping safety uppermost in the minds of its workers. This advertising propaganda, which is supplied at regular intervals by the accident prevention department, consists of accident prevention, health, and safe practice bulletins; posters; blotters, and many other novel ideas created to arouse and maintain employee interest.

Safety Competitions and Awards

Friendly competition is one of the greatest incentives to production and can well be utilized in safety work. A safety contest, if properly conducted, is always good. The competitive spirit engendered between groups encourages every effort to prevent accidents and keeps the idea of working safely constantly in the minds of the men. Individual awards for special "No Lost Time Accident Records" made by a department are beneficial. A bronze button, a watch fob, or any slight recognition is appreciated by the men and repays a thousand fold in good-will.

Results

The results of organized accident prevention work in a public utility are well defined and are directly in line with the aims of every executive. The elimination of accidents, in itself, is a humanitarian project and fully justifies any expenditure of time and money that may be made. This, however, although the primary, is but one of the results.

Improved morale, a finer *esprit de corps*, fewer service interruptions, better public relations, and an all around higher efficiency are the by-products of the safety movement. Producing these results, the accident prevention department may feel itself an integral part of the company, binding, as it does, all departments and divisions, employees and management into a coordinate whole, with one primary object—*SERVICE*.

CHAIRMAN-ELECT RUTLAND: Thank you for your courtesy in making your address brief and in presenting it as you did. I hope some of you have shotguns to fill this full of holes or will offer suggestions which will be helpful. Is there anybody who has any discussion?

JOHN PRICE JACKSON (New York Edison Co., N. Y.): The presentation to my mind was most excellent, and we all agree with it so fully that we have nothing to say but commendation.

There is one element which time probably prevented the speaker from bringing out, and that is the presentation of statistics to the Central Safety Committee and for various departmental committees. We have found in the work with which I am connected that tabulation in a simple chart showing the monthly accidents or accident frequencies in the several department compared with the month before and year before, was very helpful in the Central Safety Committee meeting because it enabled a bird's-eye view of the situation throughout the whole country.

A Chart For Each Foreman or Group

Another thing which we found helpful was a chart which was made up for each foreman or group in every department showing the number of accidents for which he is discredited. We find that when the foreman sees a long, black line up there against him, as compared with a short line of another foreman, it wakes him up—much more so than the figure 48 as against the figure 1.

I bring that as a thought in the getting up of statistics.

CHAIRMAN-ELECT RUTLAND: Thank you, Mr. Jackson, that is a good thought.

O. R. BENJAMIN (Assistant Construction Engineer, Detroit Edison Co., Detroit): In regard to Mr. Jackson's discussion, we have made it a practice on one of our jobs to post the name of each foreman and his accidents for a month at the time-clock so that all the men on the job can see what is going on and who the foremen are that have the accidents. Each foreman wants to keep his name off of that list.

CHAIRMAN-ELECT RUTLAND: There is a psychological effect there.

A. A. RALL (Kansas City Power & Light Co., Kansas City, Mo.): I would like

to ask one question as far as the Public Utility Section is concerned. The outline which the gentleman gave this morning was an outline of the safety organization for a public utility company. Is there such an outline in graph form for this section?

CHAIRMAN-ELECT RUTLAND: No, sir, there is not.

MR. RALL: I think we should have one. It would be a nice thing for us to go by. It gives all the various duties of each one. I worked one out for our company. Due to the fact that I had so many calls for it, I was wondering if the Public Utility Section had ever thought of making a graph or a skeleton of just what the safety organization should contain.

Part of the N. E. L. A. Serial Report

CHAIRMAN-ELECT RUTLAND: Thank you for the suggestion. Incidentally, the Accident Prevention Committee of the National Electric Light Association this year had as part of its serial report how to set up a safety organization. I think if you will write to headquarters of the National Electric Light Association at 29 West Thirty-Ninth Street, New York City, and ask for a copy, it may be helpful in further perfecting your organization.

We must close this part of the discussion. Before closing my part I want to say this for Mr. Opp:

During the past hour I have taken up a burden (I say a burden and it is one which I appreciate) which has been carried on by a man I have learned to love. I don't know of a man who has worked harder to make a year successful than he has. He has abided by every suggestion he has made. They have been practical ones and I know they have been made after a long night of study. Incidentally his wife told me that many times during the past year he has worked hard all night on these questions and difficult problems.

But I am glad to say this: He is still going to be associated with us as ~~councilor~~, and better still, you heard his name read last night as one of the Executive Committeemen of the National Safety Council as a whole. We ought to feel mighty proud that he has attained this recognition. I think we should give him a rising vote of thanks before I turn the Chair back to him.

(The members arose and applauded.)

Hard Work for the Section a Source of Pleasure

CHAIRMAN OPP: Our New Chairman, Gentlemen: I haven't prepared any swan song. I feel pretty much as does Past President King. I am stepping down, but not out; and I am willing to continue in the interest of the Public Utility Section. If there is anything I can do as an individual on top of my official capacity as councilor feel perfectly free to call on me for that.

It has been a source of pleasure; in fact, it has been about the happiest year of my life to be associated, as chairman, in the work of the Public Utility Section. The many pleasant contacts created by personal letters in the past year between certain ones of you and me; the actual personal contacts in the field in connection with Executive Committee meetings and the six or seven regional meetings that I had the pleasure to attend and participate in, have been a source of inspiration that you can't weigh by any method yet known to science. It is one of those intangible things that make you want to do all within your power. If our new chairman can just get the inspiration that comes from this personal contact I am sure at the end of next year he will be coming here with "alibis," too, on the night work, for it is a keen pleasure to be engaged in such work as this and to get the happy response that comes from each and every one of you.

I can't say anything else but thank you. I am not saying good-bye. I don't know what I would do if the whole thing were unloaded. I would probably collapse for it has been the biggest job I have ever had and I want to continue just as actively as I have in the past.

Now, we will have to hurry on to the real program, but before we do let me refer to this card which has come to my attention within the past week. It is so well worded that I can't pass it by.

Words by Roosevelt and W. S. Smith

"The test of a man's worth to his community is the service he renders to it."—Words by Roosevelt. The rest written by W. S. Smith of Milwaukee:

"Before me lies a picture of the signing of the Declaration of Independence, just ordinary men, doing what seemed to be their ordinary duty.

"There is nothing in the picture to indicate the immediate jeopardy in which their act placed them; nothing to show belief that their's was a deathless deed, or that foreshadowed the love and veneration in which they would be held by succeeding generations.

"This picture brings to mind thousands of men whose duty today is to save the priceless gift for millions of their fellowmen—the precious gift of life.

"I speak of safety men—men whose lives are consecrated to saving and protecting other men from the hazards of occupation—safety men, who, by word of mouth, by their writings, their public addresses, daily are inculcating in the minds of millions the desire to work safely, for their own benefit and for the welfare of those who work with them.

"Bludgeons of discouragement and adverse circumstances have not caused these men to falter or to surrender their ideals. They have been inspired and sustained by a never-failing hope that ultimately success would be theirs. Economic values interest these men; but it is spiritual values (not mechanics and dynamics, but humanics, if you please) that grip them.

"They are the essence of cooperation—these men. Filled with that spirit, they erect great bulwarks against the ever threatening tides of accidents. They are the heralds of a new day, whose dawn will show a minimum waste of life and limb.

"No monument is needed for these men—no marble shaft to pierce the blue of heaven. Greater is their living memorial: the millions of lives saved—the countless homes kept happy."

A Source of Inspiration for Safety Men

That is a token of inspiration for the safety man of today, and if we can just get that picture within ourselves there is no question but that we will all appreciate very keenly the job that we have to fill.

We have worked up to a real climax. We have endeavored in our program to give you something new at each and every turn. Now we are going to have "Making Light of the Mystery." Fortunately there has been made available for this occasion, through the very kind courtesy of the Commonwealth Edison Company, a model which as far as models are concerned is a "world beater." It is something which is of the keenest interest to all of us, and its very presentation here is going to make a mighty fine concluding picture for us to take home with us.

It is with pleasure that I make the comment that this model was designed by the Commonwealth Edison Company for presentation before local clubs, schools, and similar audiences to give the public a real picture of the processes of production, distribution and utilization of electricity.

We have the keen pleasure of having here to explain the model, to set its little

nerve force in operation, to show us just how it works all the way through, none other than Mr. H. E. Wulfig, Engineer of the Commonwealth Edison Company.

(In connection with this talk, a large working model (*Figure 1*), was used, this model being 24 feet long and representing the cross-section of a generating station, substation, a factory and a home, with incidental scenery in colors. Its purpose was to tell the story of the production and use of electricity from the coal mine to the home. Various parts of the model were put in operation as the story progressed. The talk was further illustrated by some 70 slides, many colored, which were shown on the screen in the center of the model. On account of the large number of slides and the many operations of the model, it is not considered advisable to report this talk in full, and a description of the talk is given instead.)

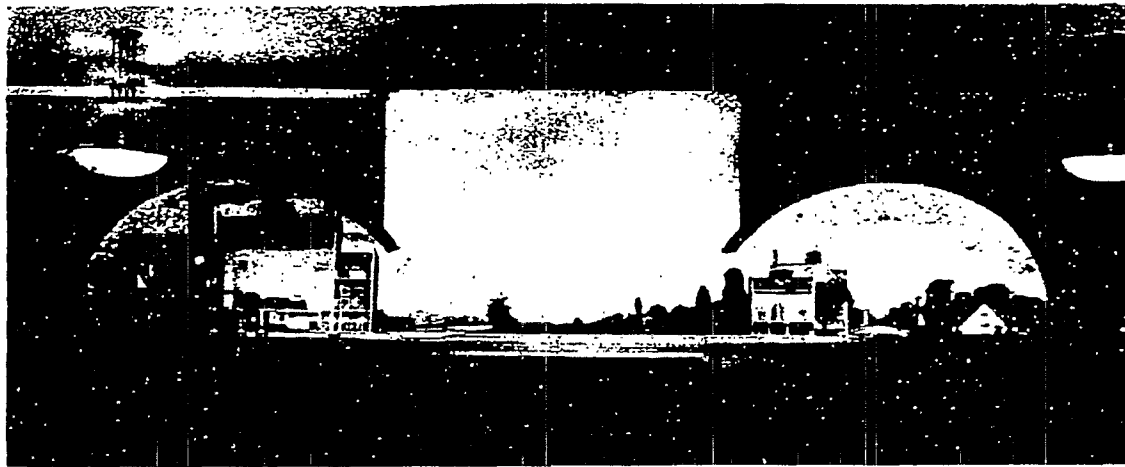


Figure 1. The working model.

Making Light of the Mystery

H. E. Wulfig, Engineer, Commonwealth Edison Company, Chicago, Ill.

You might think from the title of my talk that I am a sleight-of-hand artist about to explain some of the tricks of the trade. The fact is, I am going to talk about the most common thing in every day life—electricity.

We are inclined to think of electricity as a mysterious force because we cannot sense it by ordinary means. We fear things that we do not understand. If you could take a quantity of electricity and bring it up here and set it before you, it would hold no mystery to you.

The fact is, electricity is very common. We have it everywhere. It is in everything that we do. The food we eat, the very air we breathe contains electricity.

When I went to school I was told that the atom was the indivisible element of all matter and that beyond that we could go no further. But last night President Max Mason told us that scientists had discovered that the atom is divisible, and that the element in which the atom is divisible is the electron, the common factor for all things; and that the electron is then the element of matter and also the element of this electrical force.

Electricity as it appears in matter is not dangerous. Electricity as it is made in the power house is not dangerous, if properly controlled. In fact, electricity is a wonderful aid in your safety movement, in the conservation of human energy. It not only restores man to health when used by medical science, but to a greater degree it conserves man's energy. In former times man used to do work by the exertion of muscular power, that of his own and that of the beast, and with it was the attendant risk of life. Now electric power does the work for him with less risk and greater safety. Man now directs the force instead of exerting it.

We think of electricity as produced in a power house, as being dangerous, and you might say that to some extent it is dangerous when not properly controlled. But electric power has enabled man to produce thirty times as much as he used to with really less risk than when he worked with his hands and with hand tools.

Electric power as produced in a power house is very useful. Let us consider then



Figure 2. A coal car dumper.

how it is made, how it is controlled, and how it is finally used by our customers.

Electricity is not new. It was probably first known by our stone-age ancestors when they got courage enough to get out of their caves and view the jagged lightning in the sky. Later someone discovered that if amber was rubbed briskly it would attract small particles. That was a manifestation of electrical force. Franklin discovered that lightning and electricity are the same. But it remained for that wonderful, grand old man, Thomas Edison, to invent the electric light. Less than 50 years ago electricity began to be a servant of man, a servant that never gets tired, sick, never sleeps; it is always ready to do your work, and when not in use it retires back of the button.

Most of us know that electricity is produced in the power house, but do you realize the greatest power house of all time is the sun? The sun, through its transmission lines, the light and heat rays, has been sending to this earth electrons which have been accumulating here and are now being used by us.

Millions of years ago this Mississippi Valley of ours was covered by a dense forest. For years and millions of years the vegetation grew up and fell down until this Mississippi Valley was covered by a thick layer of decayed vegetable matter. Later earthquakes: then glaciers came down until it was finally buried under tons of earth and we now find it in the southern Mississippi Valley as coal in which are concentrated the electrons, which we call kilowatts, put there millions of years ago through the transmission lines of the sun.

The first series of slides illustrate the creation of coal from the forest to the coal at the mine, and the mining of the coal by hand, and then by the use of electric power coal is elevated to the surface of the earth, automatically dumped into conveyors, and then into sizing screens, and from there into the car, practically without the aid of human hands. The carloads of coal are shown being



Figure 3. View in the boiler room.

dumped in a huge car dumper at the rate of about one carload per minute into the hopper at the generating station. (Figure 2.) At this point the model was put into operation and the coal conveyor was started in the model, demonstrating how the coal is taken from the cars to the hopper on top of the boiler.

A series of slides then followed, showing the boiler room, chain grates, and attention was called to the fact that in a modern boiler room (Figure 3) the handling of the coal, from the time it arrives until it is burned and dumped as ash into cars, is all done automatically by the electric power, of which the coal is the raw material.

Figure 4 illustrates how enormous piles of coal are carried in storage as emergency reserve in case of failure of transportation systems, and the handling of coal in these enormous piles by electric machinery was explained.

At this point the chain grate on the model started to operate, and fire appeared to burn in the firebox, and later the steam appeared in the boiler tubes and in the pipes, connecting the boiler to the miniature turbine.

Slides were then shown illustrating the operation of the turbine, and an explanation was made of how the steam actuates the turbine wheel which drives the generator producing the electricity. The use of enormous quantities of condensing water to increase the efficiency of the turbine was explained, with the slides showing how the water is brought in to the generating station for condensing purposes. At this point the model was operated and water appeared to flow from the canal through colored glass tubes into a miniature condenser under the turbine.

A powerhouse (*Figure 5*) was described in general, with views of the interior showing the turbine room and the operating gallery, from which the operations of practically all of the equipment in the generating station is controlled. This control is by means of low-voltage electric current without any hazard to the



Figure 4. Coal in reserve piled by electrically driven machinery.

operator. Assisting the operator are many relays and meters which relieve the operator of constant vigilance, and aid him in the control of the outgoing energy. At this point the model was operated and a glass tube leading from the generator to the oil switches below the operating gallery was lit.

An explanation was made, illustrated by slides, of how the electricity is carried from the generating station by means of cables underground to the substation, and how the electricity from the generating station is converted in the substation, to a pressure low enough to be carried overhead on the streets.

Several substations were illustrated (*Figure 6*) and the various types described. At this point the colored glass tube in the model leading from the generating station to the substation was lighted, showing how the current is carried underground from the generating station to the substation. The various uses of electricity in factories and the homes were illustrated and described, and the substation in the model was lighted, and by means of colored glass tubes the flow of current through the substation and up the pole was shown. A miniature factory in the model was shown in operation, with the lights shining through the windows.

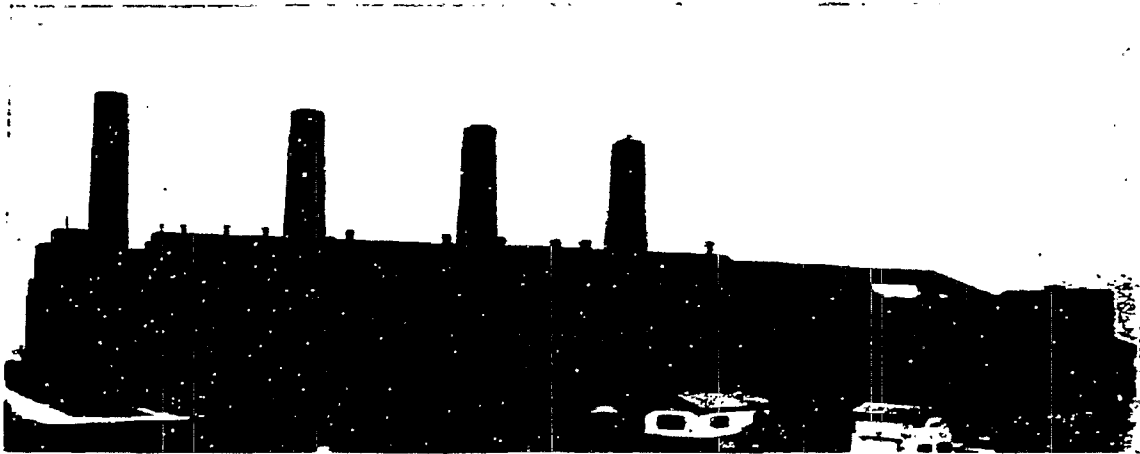


Figure 5. Power house where the modern source, electricity, is produced.

Before showing the utilization of electricity in the homes, a slide was thrown on the screen showing in outline the various operations involved in the production, transmission, and distribution of electricity, with a record of the number of fatal accidents that had occurred during the years 1923-26, and attention was called to the fact that most of the fatal accidents had occurred in that part of the equipment where automatic electrical operation had not yet been perfected or was not feasible.

The use of electricity in the home was shown on the model, by having the wires, leading from the transformer on the pole to the home, glow in a dull red, and a light shine from the windows in the house. A series of slides then followed, illustrating the use of electricity in the home, not only for decorative purposes in the living-rooms, but also its use in the kitchen, the laundry-room, and the workshop. One novel feature in connection with the operation of the model was



Figure 6. Typical substation in a residential district.

the fact that smoke was caused to issue from the chimney of the miniature house.

Passing from the home to the office building of the Commonwealth Edison Company, several slides were shown of the facilities provided for the employees of the company in the way of rest-rooms, restaurants, and a beautiful summer resort nearby Chicago, where the employees can spend their vacations at a reasonable cost.

"We of the state of Illinois," said Mr. Wulfig, "are proud of the fact that the great slave emancipator, Abraham Lincoln, lived here for many years. We, of the United States should be proud of the fact that this is the home of another slave emancipator who has liberated for our use the slaves of the coal mine and the water-fall. Thirty tireless slaves are now at the command of each man, woman, and child, and the number is increasing daily, giving us more and more conveniences and necessities of life, allowing more leisure time, and forming the very basis of our present civilization. The man who has taken the mystery out of electricity and changed it from a laboratory curiosity to a willing slave is the greatest inventor of all time—Thomas A. Edison.

"Tonight when you go home and press the button which floods the room with that pleasing light, think of it as the sunlight of millions of years ago caught in the leaves of the fern-like forest, stored in the veins of coal, and now released in the huge boilers of the powerhouse, transformed, and delivered to you as Edison service."

The President of the Council Was Welcomed

CHAIRMAN OPP: I don't know how we are going to express our thanks to Mr. Wulfig and those who have cooperated with him in the demonstration which we have just witnessed except by a rising vote of thanks.

(The members arose and applauded.)

CHAIRMAN OPP: We deeply enjoyed every bit of it. It wasn't by mere chance, I guess, that the presidency of the National Safety Council came to Chicago, because at the head of the organization of safety and personnel relations in this particular company whose work we have seen illustrated and charted here, is a man that we want to present at this time as the new president of the National Safety Council. Mr. Homer E. Niesz, with whose presence we are highly honored.

(The members arose and applauded.)

PRESIDENT-ELECT NIESZ: Mr. Chairman: Thank you very much for this opportunity to say to this group with which I have been connected for a great many years that I certainly appreciate the privilege of meeting with you. I would like to say just one thing about this particular section of the National Safety Council. It has grown so remarkably that those of us who have been following it for a number of years are amazed at its size and its following.

It is also interesting to me, as it is to those who have spent a good many years of their life in the utility business, that the men who are now running this section are the younger men in the industry. The older men are giving way to the younger men who are coming along to take their places, and this is as it should be. It keeps the interest up to a higher point, it makes for better organization and work, and it improves the sense of our safety work in the development of the younger men as they come along, because those who are still younger (and there are some who are still younger than the ones who are officers of this section) are encouraged to come along so that they, too, can be leaders in the section and in the Council as a whole.

CHAIRMAN OPP: I am sorry that the time has grown so short. I think it would be making an anti-climax for this wonderful meeting if we should now revert into a round table discussion. I know you may be disappointed in not getting an answer from the floor to queries you may have turned in, but if you will take my word for it we will see that those are answered by letter just as soon as possible; and if

in the meantime you are eager for an answer I, along with the officers of the section, will be willing to stay here for fifteen or twenty minutes or longer to go into detail with you on the particular question which you submitted, rather than keep the whole assembly, some of whom may not be interested in those particular points.

We certainly have had, without any question, the most wonderful meeting this section has ever participated in. Again, let me remind you it isn't the work of any one particular man, not the work of any particular Program Committee: it has been the united team work of the whole official family of your section.

For the final word, we would like to stay for another week at a congress like this. We certainly would like to continue rubbing elbows and exchanging ideas, but, of course, circumstances and the call of duty will not permit. We do want you to leave this Congress with the feeling that we have received something well worth while: something that is going to stimulate interest in the wonderful work we are doing. As you go out just make to yourself the pledge that you are going to come back next year, not yourself alone, but with a large delegation from your respective companies, so that we may look forward to breaking next year the splendid record we have established this year.

Good bye for this year.

ADJOURNMENT

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Public Utilities and Electric Railway Luncheon

Wednesday, September 28, 1927

HARRY J. BELL, Toastmaster

Executive Director, Milwaukee Association of Commerce, Milwaukee, Wis.

The joint luncheon of the Public Utilities and Electric Railway Sections of the National Safety Council, was called to order at one: fifteen o'clock by the Toastmaster, Harry J. Bell, executive director, Milwaukee Association of Commerce, Milwaukee, Wis.

TOASTMASTER BELL: It seems to me that the morale of this meeting is great and that we are going to have a very profitable time. It strikes me also that every one ought to be pleased with the music furnished by the employees of the Illinois Bell Telephone Company.

We regret that the time is so late that the orchestra must stop playing. As your toastmaster, I regard it as an honor and a privilege to preside at this meeting. It strikes me that you gentlemen of the Electric Railway and Public Utilities Sections deserve great commendation because of your interest in this meeting, your interest in the Congress, and most of all upon the fact that you are in the safety movement, the greatest movement in the world.

To me, as one who is now on the side lines after many years actively engaged in safety, I am particularly proud to have this minor part in your program.

Perhaps I am in the position of the ham actor who was required at one point during the play when the villain shot the hero, to exclaim, "My God, I am shot." He got to the point and said in a very lackadaisical way, "My God, I am shot." The stage director became quite concerned about it. He said: "We have got to do something to fix this or we will spoil the show." They decided to load the gun, not with a blank cartridge but with rock salt, and when the ham actor received the charge of rock salt, (nobody knowing about it with the exception of the stage director and the villain in the play), he said with a good deal of gusto: "My God, I am shot."

Now, Dr. Stewart is alleged to have the wisdom and the wit and the philosophy of all good Scotchmen, and I feel sure that he is going to deliver to us a very interesting and profitable address. In addition to being rector of St. Luke's Parish, Dr. Stewart is a trustee of Northwestern University, and (coming from Milwaukee, I say this with unusual conviction) I think that, having addressed the St. Andrew's Society in Milwaukee, he must be a good Scotchman.

I have then the extreme pleasure of introducing to you the Reverend George Craig Stewart of St. Luke's Parish, Evanston, Illinois.

Address

Rev. George Craig Stewart, Evanston, Ill.

It is my privilege, as an ancient Chicagoan, to do my share in welcoming to this city a great many distinguished groups of men who are interested in building up the safety of human life in various forms of activity throughout the country. Those of us who have lived in Chicago for a generation (and I have been rector of the Parish of St. Leger's for almost a quarter of a century) are immensely proud of this city in which you find yourselves.

A while back, I was speaking to a distinguished Englishman. I said to him: "My Lord, have you ever been to Chicago?"

"Chicago?"

"Is Chicago so far off? It is just over night. I come down to New York every week, and New Yorkers come down to Chicago."

I then proceeded in a typical Chicago way to tell of the glories of Chicago. I pointed out that it was the greatest center of university education in the country; that we had two universities while New York had but one. I told him that we had more libraries than any city in the country with the exception of Washington. I was going fine when he interrupted with this remark: "But, how about your crime?"

I said, "My Lord, we beat the world."

Chicago is incomparable in many fields, and yet I must hasten to remark that I am proud of the fact that as a Chicagoan I live outside of the city limits.

A woman in Chicago went to the telephone to inquire how much the charge would be to call Hollywood. The reply was, \$1.00. The woman said, "In Chicago, you can telephone to Hades for ten cents."

"Yes," the answer came back, "but that is inside the city limits."

I find myself in the delightful situation speaking to a group of men, not on religion and business or the relation of the higher life to the lower life of commercial pursuits, but merely as an entertainer. The sermon will be a little later by Doctor Storrs.

So I am just going to attempt for a few minutes to tell some Scotch stories that may interpret some of our Scotch life. I suppose there are some Scotch here who are committed to the fundamental premise that the Scotch are the greatest race in the world; the greatest race in business, and the greatest race in thinking. Well, they have, as the Scotch say, a good conceit of themselves.

I remember once in Scotland upon the top of a castle in the gloaming, I fell a cracking, as the Scotch say, with an old man, and I was saying to him how unhappy I was to have to go back over the border. He lamented with me and felt a deep and serious regret; and then he told me this story of a man who came down out of Scotland into England and was cracking, as the Scotch are wont to do, about the glories of Scotland and the bonnie lasses. Finally, the Englishman got so bored that he said, "See here, if you are so crazy about Scotland why didn't you stay there?"

He said, "I will tell you why. Up in Scotland where I come from all the lads, mind you, are as clever as myself. I came down to England, and I am doing fine."

Now, the Scotch have a reputation for being tight in many ways. Someone said that an Irishman "O's" money and a Scotchman "Mc's" money. And, that is attributed to the Scotchman as if it was something of reproach. But I want to remind you that the Scotchman has a capacity for making money because he is bred in the school that makes good business men, strong capable traders, strong capable leaders, bred in the school of hardship. A Scotchman will never go under

a dentist's gas until he counts his siller. After all, I know of no virtue that is more indicative of strength than the virtue of very careful conservative administration of money.

I know this is no opportunity for me to speak on one of my favorite subjects, which is prohibition. But, if you spent as many days and evenings as I do getting people out of difficulties who got into them by bootlegging and drinking, you would understand that I regret very much the name that Scotchmen have got for being fond of the water of life.

I was attending a banquet here in Chicago some months ago when a man delivered a speech that went something like this : I am a Senator from Illinois. I come from the southern part of the state, not quite as far as Herrin, but just south of the Smith and Wesson belt. When I was a young man, I lived down there. We used to go to church, and the minister preached a good long sermon for about an hour and a half. The congregation was made up of men, their wives and children. At the close of the sermon, they would stand around and the men talked politics while the women talked something like this: "You take a pound of flour and two large pieces of butter and a little milk." You go to the same church in the same district today and you find only a few people attending. The clergyman delivers his sermon in about twenty minutes. When they get outside, the women talk politics while the men talk something like this: "You take ten raisins——"

We are, of course, living in a changing world. It reminds me of the Scotch minister who said to Sandy one day as he was under the weather, "Sandy, where have you been?"

Sandy Had Been Collecting for the Church

Sandy said, "Well, I have been about the parish collecting for the church."

The minister said, "What do you mean? Where did you get the load you are carrying around?"

"Well," he said, "mind you, I got it in the houses while collecting for the church."

The minister said, "I know very well that there are plenty of people in the parish who don't have liquor in their houses."

Sandy said to the minister, "I wrote to those."

I want for a moment or two, because there may be some men here who like the Scotch people and the Scotch tongue, to give you an example of that Scotch tongue. There are two kinds of Scotch, the highland Scotch and the lowland Scotch. The lowlanders talk like Robert Burns. The highlanders speak the Gaelic. The highland people are an entirely different group of people; they have different traditions from those in the southland. When the highlander is learning English, he learns it in a very peculiar way and has great difficulty with it, mixing sentences, and always making a "she" out of the letter "I." So, when he learns English and sees that letter "I," he can't help it, and he calls it "she." He says, "She will be very good, however." He always puts in "however," "moreover" or some such word at the end of a sentence.

There were three Scotchmen who were learning to talk English. One day while the three of them were drinking the first Scotchman picked up his glass and smacking his lips said, "This will be the greatest whiskey she will have tasted nevermore." The second one said, "So was she, however." The third one said, "Never was she, too."

The lowland Scotchman talks in an entirely different lingo, because he talks a language that is made up of Saxon, German, a little Gaelic (but very little), and that is the language of Burns. I want to give you an example of it before I sit down.

As the toastmaster spoke about the St. Andrews Society, I am going to tell you of an incident that happened there some few years ago. Mr. Forgan and I were

the speakers. Mr. Forgan was the first speaker, and he used all my stories, the stories that are common to Scotchmen everywhere, and I was driven back upon the necessity of rearranging my speech hurriedly. Being a good Scotchman, I gave the speech that wee Willie Demarest gave 25 years before. At the close of the address the pipes began to play. As the men were leaving the hall, one man jumped up and said, "A most extraordinary thing has happened: William Demarest is in this hall tonight." Up stood an old man with a long beard. He came up and shook hands with me and said, "Mind you, I wrote those five and twenty years ago and I never heard them on human lips until tonight." He is 84 years old. I hear from him constantly.

I am now going to give you a translation from the psalms. I suppose every man knows one psalm at least, and that is the twenty-third. I will give you that as rendered by Wm. Dearness, of the Orkney Islands, so you can hear the Scotch that is spoken by the lowlander, who knows his onions.

"The Lord is ma' herd; nae want sall befa' me; he louts me tae lie doon in the green howes; he airts me atowe beside the lone waters; he waukens ma' wa-gaen soul; he weises me roond for his ain name's sake intil recht roddins. Na-tho I gang through the dead mirk dale, e'en there sall I fear nae skaithin, for yersel are near by me; yer stock and yer stay haud me baith fu' cherry. Ma buird ye hae hanselled in the face o' my faes; ye hae drookit ma heid wi' oyle; ma bicker is fu' and skailin; e'en sae sall gude guidin and gude gree gang wi' me ilk day of ma livin' and lang syne i the Lord's ain howf sall I mak bydan."

TOASTMASTER BELL: I am sure that I express the sentiment of everybody in this room when I say that Dr. Stewart's address was very interesting indeed.

It is now my pleasure to present to you Mr. Lucius S. Storrs, managing director of the American Electric Railway Association, and a former president of the Connecticut Company. As the President of the United States has a Herbert Hoover, and the moving picture industry a Will Hays, so has the electric railway industry our speaker, who is about to address you.

I am sure that Mr. Storrs has a message which will be of great value to every one of us in and out of the public utility and railroad field, and it is an unusual pleasure to present him.

Address

Lucius S. Storrs, Managing Director of the American Electric Railway Association, Chicago, Ill.

The local transportation industry is an active participant in and a strong supporter of accident prevention work. It takes part in this great movement because it feels a keen sense of responsibility for its 16 billion annual passengers and also because it has been clearly demonstrated that the prevention of accidents means a direct saving of money and, therefore, is good business.

You need only to read the names of men who have been active in accident prevention work in the transportation industry to realize how sincere are their efforts. That list of names itself speaks volumes for the humanitarian side of the work. The other side, the dollars and cents angle, can best be appreciated when it is stated that approximately four per cent of the \$1,000,000,000 income of the local transportation industry is being spent every year in the payment of accident claims. Thus, you readily see, our industry has a mark of approximately \$40,000,000 a year at which to shoot. It is a saving well worth making. Concretely, it is a leak that is greater than the average net earnings of the industry during the last ten years.

This is a staggering total loss, but it would have been larger, I am sure, if the industry had not been so active in accident prevention work. There is no case on record where a company has installed intelligently and carried on actively for a prolonged period a sensible line of safety work, that it has not turned in an actual dollars and cents profit, to say nothing of the good will it has engendered.

Do not gather from this that I am saying every bit of accident prevention work which has been done in the local transportation field has been successful. That would not be true. There have been many companies which tried accident prevention work for short periods and abandoned it as unsuccessful without giving the best recommended methods a fair trial. Of course, "Failure" has been written after these tests. As you all know, there never was a safety campaign run half heartedly or sporadically which was successful.

All Members Are Urged to Be Active in Accident Prevention

Leaders of the industry for many years have been urging all members of it to become active participants in local accident prevention work. They have pointed out to managements that they, as the responsible agents who carry by far the greatest number of persons in public vehicles and as engineers and experts in traffic management, should be the natural leaders in this work. In some quarters there has been hesitancy among local transportation men in coming to the fore for fear that they would be charged with using a humanitarian movement for a selfish end. In such cases the leaders of the industry have urged companies to go along with accident prevention work and lend their best assurance even if they did not appear in it publicly. Many local transportation managements are following this plan. They are giving the services of their best engineers, traffic and advertising experts to aid in local campaigns. Whether this is the best plan or not is open to grave question. Intelligent, open and enthusiastic leadership means so much in accident prevention work that it would seem to be the best plan for everyone who is interested in it to come out in the open regardless of captious criticism.

Unfortunately, utility men are inclined sometimes to turn over the accident prevention job to the man who had the most enthusiasm, rather than the most capacity, for it. This is a mistake. No man is too big for safety work. The ideal man to lead safety efforts is one not only with enthusiasm but also with a keen analytical mind who wants first of all the reason why for accidents, and, second, insists on getting at the causes of accidents in order to prevent them.

The men who have had the most success in accident prevention work in the local transportation field have been those who were leaders in other lines of endeavor. They have organized their fights against accidents along the same definite lines that experience has taught them are successful in fighting against floods, fires, falling traffic and other incidents of their daily life. They have realized initially that they must have an objective before starting a campaign and then work directly toward this objective along well-planned lines.

An example of what I mean is found in the safety work that an American Electric Railway Association committee is doing at the present time. Some months ago leaders in the safety movement within our industry decided that great good could be accomplished by pointing out to employees the six most common accidents which happen for which the employees are to blame. An analysis of the accident records of the leading companies showed very quickly what these six accidents and their causes were. The committee at once designed

a series of posters, intended primarily for the use of employees and depicting the causes of these accidents. Then by the use of posters, talks and other means, managements went directly after the causes.

This is not a new idea in safety work, of course, but it is a very good one which too frequently is lost sight of. In other words, there are definite causes which lead to the majority of accidents and they only can be reached by a definite-minded director who uses direct methods to reach them. That, in a nutshell, is the whole story of accident prevention as it is being followed in the electric railway industry. Our efforts are specific and not general.

Too many companies hesitate to enter into accident prevention work because they say they have no expert to direct their efforts. I believe that any man who is expert enough to design and lay a track properly, erect a power house correctly, keep cars running on time, or perform any other similar duty that requires exact knowledge and clear thinking, can do constructive safety work if he will apply the same business methods to it that he does to his other work. The great trouble is that safety, like some other jobs that fall to the lot of public men, too often is assigned to some one to do in his off hours.

More and more electric railway managements are coming to realize that any leak which causes a loss of four percent in industry's gross income annually is too big to be trusted to anyone who does not think clearly and see far ahead.

Enlist and Sustain the Interest of the Employee

Of course a leader alone cannot carry out accident prevention work successfully. Particularly in the local transportation business, employees, such as conductors and motormen, must be depended upon to discharge the great part of the industry's efforts. Hence it is imperative that the interest of the employee be enlisted and sustained properly. Herein lies an assignment that is worthy of the best efforts of the biggest men in the industry.

I do not subscribe to the theory that many accidents are the results of deliberate carelessness. I believe that most of them are due to persons being preoccupied with other thoughts when the accidents happen. It would seem then to be good judgment to take every precaution to see that employees and others who are entrusted with safety assignments—and that is what it amounts to in our business every time we send a man out with an electric car or motor—are free of all worry so that he can keep his mind on his job.

This being true, safety work literally begins in the home. If an employee is pressed by creditors, if his children are sick and not obtaining medical attention, if his domestic situation is unhappy, or if he is suffering from some physical disability even as small as a tooth ache, it is not reasonable to suppose he will be able to divorce his thoughts entirely from these little irritations and apply himself whole-heartedly to his job when he goes to work. All of the safety lectures in the world, all the pamphlets, and all the rules that an industry can formulate for the bringing about of accident prevention, will take secondary place to his thought about his personal situations. This is only human nature and it can not be avoided. Therefore the employee best qualified to prevent accidents is the one who is in a calm state of mind and whose home affairs, particularly, are running smoothly.

It may be said that these are personal matters and none of the employer's business, but when such situations prevent a man from exercising the precautions that prevent accidents, then such seemingly minor personal affairs become very great public affairs. It is decidedly the duty of the employers to see that such things do not interfere with public welfare.

In a word then, is it not worth while, as a background to safety work, for the safety director either to do some home welfare work on his own time or else cooperate very closely with the person in an organization who does this welfare work?

This suggestion that the safety department dovetail its efforts into those of another, is one that should have wide application in every organization where safety work is started. The experience of local transportation companies has been that there is no department which cannot contribute advantageously to safety work and that the perfect safety organization is obtained when every department works together understandingly and enthusiastically to bring about the best results. Nor should this cooperative effort cease when all the members of one organization in a community are working toward a common end. Each unit should link up its efforts with others in the community and all organizations, both private and public, work together. Such efforts have brought the best results in local campaigns whenever they have been tried.

Keeping Everlastingly at the Safety Work

There has been much disagreement in the transportation field as to whether personal appeal to the men's loyalty or bonus systems are the best means of preventing accidents, but there is universal agreement on the theory that good safety work requires keeping everlastingly at it. It is not a job that can be done successfully if attacked spasmodically. Convinced of this the American Electric Railway Association advises against so-called campaigns of a week or a month duration. Such campaigns sometimes serve only to key up, excite and unnerve employees and occasionally result in more accidents than have been had during similar periods when no campaigns were in progress. What the association urges is that every day be made a safety day within the industry. Practical results have shown that this is good advice.

A recent survey of the industry by the association developed universal agreement that frequent meetings at which everyone, including the safety director and the employees are permitted to speak their minds, were invaluable. It has been found that unless these frequent meetings are held interest in safety work is likely to lag. Doubtless what is true in the transportation field is true in others. Safety is not a thing that you can talk about once a year and then neglect for another twelve months and hope to get good results. It must be made interesting at all times. In order to make it interesting much ingenuity must be used in getting up safety meetings, putting out interesting safety posters and doing other things that will keep the subject alive. Merely harping on "Be safe" and "Be careful" is very likely to cause men's interest to go stale.

The banquets to successful contestants have proven very attractive. One of these banquets was held at three o'clock in the morning, it being the only time that the men could get together, and it did not break up until five o'clock. An interesting feature of the occasion was the compulsory waiting on tables by the operators who had had accidents on their cars during the month. They enjoyed the banquet as much as those who sat down to eat and declared unanimously that they would run their cars so well during the next month that they would not be compelled to wait on the tables.

I have touched only the high points in some of the safety work that the local transportation industry is doing. If you are interested in further details, the association's statistical department has many bulletins which are up to the minute and which you could use advantageously. If you can, the association will gladly supply them to you without charge. The association believes sin-

cerely in safety work and it is doing its best to forward it. It believes the problem is one for national, state, community, and organization effort. Just as our transportation service keeps everlastingly at it, day and night, in sunshine and in rain, so are we going to go forward with our safety effort.

TOASTMASTER BELL: Mr. Storrs, we are grateful to you indeed for that very illuminating and interesting address.

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



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JOHN RICE, JR., The General Crushed Stone Company, Easton, Pa.
E. D. SHERIDAN, Chico Stone Products Company, Dallas, Texas.

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Tuesday, September 27, 1927

L. R. CARTWRIGHT, Chairman

Vice-President, Mid-West Crushed Stone Company, Indianapolis, Ind.

The first session of the Quarry Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, Mr. L. R. Cartwright, vice-president of the Mid-West Crushed Stone Company, Indianapolis, Ind.

CHAIRMAN CARTWRIGHT: We will start right off with our program. I can't tell you what pleasure it gives me to have with us the president of my own line, the crushed stone industry. He is one who has given us a great deal of pleasure on many occasions and I am sure you will be delighted to hear from Mr. Otho M. Graves, president of the National Crushed Stone Association, Easton, Penna.

Value of Accident Prevention

Otho M. Graves, President, National Crushed Stone Association, Vice-President and General Manager, The General Crushed Stone Company, Easton, Pa.

Since the time when our Puritan forefathers landed on Plymouth Rock and since the time when under fairer skies and on more fertile soil the cavaliers of Old England established their colonies in what is now Virginia, this nation has flourished and prospered. With natural resources of almost unbelievable richness and seemingly unlimited in quantity, with a population growing in leaps and bounds, the tide of progress has continued to sweep westward. Blessed with material prosperity and success, it has seemed as though the thread of our destiny has been woven into the fabric of world affairs by the hand of a fate graciously inclined to our needs and welfare, forming a part of that design known only to the Master Weaver.

Nor is this prosperity confined to any small and fortunate class of our population; it is shared and enjoyed by the mass of our citizenry. True it is that some fortunes have been amassed which would awaken the envy of a Croesus or Nero, and these are thrown into strong relief by the dark shadows of poverty among a few as abject and misery-stricken as were the lower classes of France immediately preceding the French Revolution. But these extremes are limited in number and are the result of circumstance and opportunity seized by some and ignored by others, whether their failure be due to ignorance, laziness, drunkenness, inability or any of the other causes operating to prevent a successful grasping of potential opportunities. We have, as Gladstone pertinently pointed out, the froth and the dregs; but, thank God for the good beer in between.

With a continent stretching to the westward of the early settlers on the eastern shores, the western limit of which was not even conceived by them, it is not strange that the generations following came to believe that our natural resources were unlimited in extent. It is only in recent years when we have spanned this three thousand miles of territory and planted cities on the Pacific Coast rivaling in magnificence and in population those of the east that we have come to realize that these natural resources must be conserved and guarded with jealous care if we are to continue to thrive and prosper. It is not so long ago when the phrases "conservation of forests," "of water power," "of coal," "ore" and the other gifts of a beneficent deity sounded strangely in our ears. We have come now to accept such economy as a matter of course; and yet we have largely continued to overlook the conservation of the greatest of all material, mankind itself. Of all the material with which we have to work, there is none so vitally important nor so fascinating as the human.

Over its coffee cups the world reads the morning newspapers with horrified amazement as fatality after fatality is reported among the aviators daring the transoceanic flights and asks that laws be passed prohibiting such a useless sacrifice of life. Yet complacently we go our way without giving thought that last year in the United States alone approximately 180,000 persons suffered accidental death and 7,500,000 endured casualties that did not result fatally.

These daring aviators, risking their lives in the cause of science and human progress, bear a relation to our own age such as did Columbus, Magellan, De Soto and others of their courageous faith to an era past and gone. Our pride in achievement responds with a thrill to the accomplishment of such men, but we can see nothing more in industrial accidents than sordid carelessness on the part of the employee or almost criminal lack of interest on the part of the employer, with possible resultant poverty, misery and mental anguish to the family of the injured one.

A relatively new thought is manifestly permeating industrial activity—the recognition of the interdependence of employer and employee, a relationship which now approaches economic equality. We are beginning to recognize that the employer prospers in direct ratio to the prosperity of his employees. Industry is demanding a new type of executive, one who not only intimately knows the processes of manufacture, but who also sympathetically visions and understands the problems which confront his men, one who while directing and governing creates in those associated with him enthusiastic cooperation; in other words, a leader, not a boss, one whose integrity and qualities of judicial fairness and human sympathy awakens and holds the confidence of his men. To such an executive the physical safety of his men is of paramount importance. He is motivated in safeguarding them in their employment no less by reason of their economic value (impaired as it is by lost time from any cause), than of their humanitarian interest in their welfare and contentment of mind. A contented worker is obviously of more value than one discontented and disgruntled, whether his disturbed state of mind comes from a belief that he is underpaid, unappreciated or unduly exposed to unnecessary hazards. We have outgrown the moral crutches evidenced by such phrases as “Business is business,” “Honesty is the best policy,” and “*caveat emptor*.” We now clearly perceive that business is good business only when it is conducted along sound, ethical lines. We are honest because we should be, and the values of honesty come as by-products. The buyer is not expected to beware, but is protected, and so should be the worker.

Safety From the Economic Standpoint

Is the time and money required to promote accident prevention in any particular plant economically justifiable? The answer to this question is in the handwriting on the wall, with abundant proof of an affirmative answer in the experience of our largest industries. The evidence is overwhelming that a safe plant is an efficient one, and conversely, an efficient plant is a safe one. It is being constantly demonstrated that by giving due attention to accident prevention, insurance costs, however carried, are lowered; and, moreover, production is correspondingly increased.

The committee on safety and production of the American Engineering Council has just completed its study of the relationship between industrial safety and production. Some of its conclusions, after the most exhaustive and thorough study ever given to this subject, confirm the beliefs held by some of us and are startling to those who do not yet share them. There is detailed material in the report of the committee to support the statement that maximum productivity is dependent upon the reduction of accidents to an irreducible minimum, and that there is such an intimate relationship between safety and production that it is impossible for a plant to continue to increase in productivity unless it reduces at the same time its accident rates.

Not long ago a well-known producer of a mined material was quoted as saying that he would not sacrifice production for the sake of reducing accidents in his

mines. Such an attitude would be humorously paradoxical were it not tragic. In discussing the incident the memory whimsically came to mind of an old negro who said that on his farm in southern Georgia he used to raise horses, black horses and white horses, but that he gave up raising black horses because they ate more than the white horses. When asked why this was so, he said, "Ah can't exactly account fo' it lessin it is that ah had mo' black hosses than ah had white hosses." The logic of the manufacturer and of the old negro is equally unconvincing to the enlightened executive. It seems almost obvious that a clean, neat and safe plant, factory or mine in which the employees contentedly work under conditions as pleasant as the circumstances of the work may permit is necessarily more efficient and richer in productivity than one of which the opposite is true.

Many Savings Made Through Accident Prevention

Though it is generally recognized that a reduction in the number and severity of accidents is reflected in lower insurance costs, however the insurance be carried, this is not the only nor even the largest financial saving. The Travelers Insurance Company, of Hartford, analyzed 5,000 specific accident reports drawn at random from the claim files of that company, disclosing the almost amazing fact that the "hidden" cost of accidents is four times the direct or insurable cost. In this item of "hidden" costs such factors were considered, weighed and estimated as lost time of injured employee, time lost by other employees who stop work out of curiosity or sympathy to render assistance, time lost by foremen and superintendents in assisting the injured one, preparing accident report, attending hearings before industrial commissions, injury to machinery or property as the result of the accident, interference with production, the less effective work of the man replacing the one injured and other factors which suggest themselves but are too numerous to mention. While this ratio of the hidden cost to the insurance cost may not be four to one, as analysis of these five thousands cases would indicate, it is at least something to one, and that something is too much. It is reasonable to believe that intelligent and organized effort to prevent accidents, both as to number and severity, results in lower insurance costs, even greater reduction in the hidden cost, difficult to estimate, and increased plant efficiency due in part to the improved morale of the worker. But for such endeavor there is yet another reason, either stronger or weaker, dependent upon one's ethical conceptions, and that is the obligation resting upon each of us to do his part to prevent needless suffering and privation.

It is not the intent of this discussion to enter into the various phases of the relation of employer to employee, nor to consider the several factors tending to produce that harmonious and sympathetic accord which alone can develop the fullest potentialities of any industry. That a human, intelligent and sympathetic interest on the part of the executive of any business is a factor in creating a responsive spirit on the part of the other workers must be admitted. While the paternalistic attitude may be resented, the kindly personal interest of the executive makes a direct appeal to the heart and head of the rank and file of labor. Assuming then that accident prevention is worth while from the several points of view upon which we have lightly touched, there remains only to consider briefly ways and means for accomplishing the desired purpose.

With the thought that it would be both interesting and illuminating to ascertain the attitude of mind of quarry producers throughout the country as to accident prevention, a questionnaire was submitted recently to the members of the National Crushed Stone Association inquiring as to certain phases of this

work as conducted by them. The response was generous and prompt. Certain of the information received in that manner seems sufficiently interesting to be worthy of comment.

Sixty per cent stated they were not members of the National Safety Council, and of the remaining 40 per cent holding membership, the average life of the membership was three years. The non-members were asked to state their reasons for not joining. Sixteen per cent replied that they did not believe membership in the Council would sufficiently assist in plant safety work to warrant their joining. The membership of 35 per cent has not been solicited. The literature concerning the value of membership and the work of the Council has not been sufficiently interesting or appealing to obtain the membership of seven per cent. The other reasons were scattered, although tending toward an indication of unfamiliarity with the aims and purposes of the Council.

In reply to the question if membership in the National Safety Council was of value, and if so, in what ways, such statements were received as: "It is worthwhile being associated with others in the safety movement," "Stimulates interest in safety and keeps one informed as to accident prevention." "In securing reliable data and information as to safe practices, as well as assistance personally rendered by safety officials." "Through safety posters and magazines."

Crushed Stone Men Should Be Council Members

It may be concluded from these replies that crushed stone producers to a much greater extent should hold membership in the National Safety Council, and a fair inference is set up that the responsibility for the present low percentage of membership must be shared in part, at least, by the Council itself, due to the fact that the membership of so large a percentage has not been solicited in any manner. While it is not our intention to presume to suggest methods to the Council, it is commonly recognized that personal solicitation is far more effective than correspondence; but every member of this industry should be invited by letter at least to join the Council, even if at present personal solicitation is not feasible.

An even lower percentage of our membership is enrolled in the National Safety competition, namely, 27 per cent. Of the 73 per cent not enrolled, some of the reasons are as follows: negligence, 10 per cent; do not believe that entry in the competition would be of assistance, 14 per cent; operations too small, 17 per cent. Other scattered reasons, each having a low percentage, are: too much clerical work entailed; not familiar with it; didn't know there was such a contest; safety organization too young to compete with credit; intend to join next year; not located in the United States.

As a respectful suggestion to those conducting the National Safety competition, it is worth consideration, in view of so high a percentage reporting their plants are not sufficiently large to be eligible, that it might be well to lower the requirements in this regard, as accidents occur in small plants as well as in large ones, and also possibly to render the Canadian producers eligible, as there is a number of members of the National Crushed Stone Association located in Canada.

Of those entered in the competition, all replied that they had noticed increased interest in accident prevention as the result of the competitive spirit aroused in employees as the result of the competition.

In reply to the question, "Do you believe that accident prevention and insurance should be made a major issue in the work of the National Crushed Stone

Association." 75 per cent replied affirmatively, commenting somewhat as follows: National Crushed Stone Association can put this across with quarry producers better than can the National Safety Council; believe that N. C. S. A. at next convention should adopt vigorous policy as to accident prevention; believe that N. C. S. A. should take hold of this issue and put it over in same thorough manner in which other Association matters have been handled.

The 25 per cent which are accredited with replying in the negative modify their vote by such comment as follows: Accident prevention only, omitting any reference to insurance rates; not necessarily a major issue, but given an important place in the affairs of the Association.

One producer who voted "no" replied that with the Associated General Contractors, the United States Bureau of Mines, the various insurance companies, the several state bureaus, the National Safety Council and other bodies all working on accident prevention, the subject is becoming overemphasized and should not be handled by the Association. It is safe to conclude that there is an overwhelming preponderance of opinion in the crushed stone industry favoring the Association making accident prevention one of the major issues of its affairs.

Safe Practices Pamphlet of Value to Many

The pamphlet on "Safety Practices for Quarrying," prepared jointly by the Quarry Section of the National Safety Council and the Committee on Welfare and Safety of the National Crushed Stone Association, has been of benefit to 75 per cent of those replying to the questionnaire. Ten per cent stated they had received no benefit and 15 per cent replied that they had not received a copy. There is a correlation of thought between the 15 per cent of the crushed stone industry not receiving a copy of this pamphlet and the membership in the National Safety Council of 17 per cent not having been solicited. Both of these conditions should be promptly rectified.

The requests to "Describe briefly the manner in which safety matters are handled throughout your organization," received elaborate reply, into which it is hardly feasible to enter in detail. It is apparent, however, that those plants which have well-planned and orderly operating safety organizations have shown the greatest decrease in both the number and severity of accidents. Far too many replied in an indifferent, hazy manner, such as, "Believe in it, myself, and tell all of my men to be careful;" "Insist that any man who isn't careful be fired;" "Keep machinery in order and expect men to handle it properly," etc. One executive operating only one plant goes so far as to state that he meets personally once a day with all of his employees and talks caution. If this is actually done it should achieve splendid results, but I am somewhat reminded of three women who were talking together, one of whom said, "In all the fifteen years of my married life my husband has not said a single cross word to me." The second woman replied, "My, I wish I could say that." The third one said, "Well, why don't you?" She did."

It was also requested that the results of such accident work as is conducted be noted as to the number of accidents, the severity of accidents, the decrease in insurance rates and the improved morale of employees. Practically all of those who give any attention whatsoever to accident prevention, whether in a hit-or-miss manner or by orderly planning, reported that the spirit and morale of the employees was improved. The decrease in the severity of accidents and the number of accidents, as well as the decrease in insurance rates is more noticeable in the case of those companies which devote the most time and effort

of accident prevention. Naturally this would be expected to be true and is merely confirmation of common opinion.

As to the chief difficulties encountered in conducting successful and effective accident prevention work, seven per cent replied, "Lack of interest on the part of the employees" and 11 per cent, "The difficulty of overcoming characteristic carelessness of workers." Smaller percentages stated, "Getting the men to believe that we do not want them to get hurt even though we are insured" and "The difficulty of impressing upon superintendents and foremen that accidents are costly." In the case of nine per cent the chief difficulty was the failure to secure proper cooperation from employees. This is a frank admission, but I am inclined to feel that the responsibility is the employer's rather than the employee's. Several replied that negro labor is indifferent to such efforts in their behalf, as compensation for ten days for small cuts or bruises is extremely attractive. Those who have had experience in employing negro labor will recognize the truth of this observation.

Though it would seem that the answer to the last question of the questionnaire should be obvious, namely, "Do you conduct your accident prevention work from humanitarian motives or in order to reduce insurance rates, or both?" 18 per cent replied, "From humanitarian motives only." The remaining 82 per cent stating that both were considerations. As a matter of fact, a third reason could have been included in this question, namely, "Or for the purpose of increasing plant production?" This was not done, because of my belief that the acceptance of the quarrying industry in general of the value of accident prevention work is not sufficiently advanced to readily understand and interpret such a suggested reason. It is highly probable that we do not place sufficient emphasis upon the fact that a safe plant is an efficient plant and that maximum production cannot be obtained without reducing preventable accidents to a minimum.

The Organized, Intensive Effort Pays

In reducing the number of preventable accidents, as in any other human activity, orderly-planned, intelligent effort results in greater accomplishment than loose, slipshod, hit-or-miss methods. It is far from adequate for the manager or chief executive to earnestly desire to reduce accidents with a cautionary word or two every now and again to the employees to being careful. In the crushed stone industry we have but to compare the latter type of effort with that of plants in which accident prevention is a highly organized activity to realize the value that lies therein. Those members of the National Crushed Stone Association entered in 1925 and 1926 in the National Safety competition have shown a marked improvement in the latter year over the former. In 1925 the accident rate of those plants entered in the competition was 6.7 days lost per thousand man hours of exposure, as against 6.0 in 1926; and an accident frequency rate per million man hours of 61 in 1925, as against 41 in 1926. This indicates an improvement of 10 per cent in the accident severity rate and 33 per cent in the accident frequency rate. These figures relate to 38 quarries in 1925 and 37 in 1926 and are furnished through the courtesy of Mr. Adams, supervising Statistician of the Accident Statistic Section of the Bureau of Mines. It is to be regretted that the number of quarries entered did not show marked increase in 1926 over 1925.

Improvement equally encouraging and gratifying has been made by those quarries holding membership in the National Safety Council. In fact, it is largely true that practically all quarries entered in the National Safety competition are members of the National Safety Council.

An analysis of the questionnaire submitted to the quarry industry tends to

confirm another conclusion of the committee on safety and production of the American Engineering Council, previously referred to—that the accident and production performance of the best plants in each industry clearly shows that tremendous improvements can be achieved by the remaining plants in each industry. As a corollary, it might be stated with equal truth that the accident and production performance of one industry should encourage other industries to achieve similarly successful results.

The experience of the Portland Cement Association in the reduction of accidents is inspiring. In June of this year 164 cement plants employing 45,000 workers participated in a no-accident drive. It is almost amazing to know that accidents dropped 75 per cent during this month, as compared with June of a year ago. During the June drive this year 50 lost time accidents occurred, as against 192 during the same period last year. Only one man lost his life in June of this year, as compared with six in June of 1926. To endeavor to explain such a marked improvement in corresponding months of two succeeding years as a mere coincident is futile and absurd. Such improvement can only be attributed to the intensive drive of the Cement Association to reduce accidents.

Various Organizations are Emphasizing Safety

In other industries almost equally great improvement can be shown over periods of intensive accident prevention work as compared to similar periods during which no such campaign was in progress. For the sake of humanity in general and a lowering of production costs, it is encouraging to realize that various industries, through their national associations, are giving increasing attention to the value of this work. The Associated General Contractors of America, alert as they are to improved methods of construction and lowering of costs, are, through their association, entering intelligently into this worthwhile field.

In the transmutation of an unsafe plant or factory to a safe and consequently more efficient one, certain fundamental principles must be followed, however much the detail of their execution be varied. First, the responsible executive must recognize the several values of accident prevention effort and conceive the intention of improving conditions. Second, his recognition of such values must be transmitted throughout the organization until every man is reached. Third, the formation of a general safety committee operating through local plant committees. Fourth, the education of the employee, however tactfully it may be disguised or through whatever means it be accomplished. Fifth, through mechanical and engineering means the diminishing of all hazards and the total elimination of some.

The human spirit is adventurous: it seeks new experience, new sensations, gropes its way unflinchingly into unknown territory, both mentally and physically. The progress of civilization has largely been due to those adventurous spirits who have dared unknown dangers to blaze the way that later generations may follow in safety. It is not unnatural to believe that in many instances the lack of care and caution of the workman is attributable to this willingness to face danger and a desire to more quickly and effectively serve the ends of his employer, whom he may like, respect and admire. He must be taught to discriminate between the bravery of the hero, courageous without stint for a worthy cause, and the unnecessary exposure to danger which may be easily avoided with proper care and caution, and that in exposing himself unnecessarily to plant and factory hazards he does not serve his interest nor that of his employer, but actually is jeopardizing both.

I firmly believe that the employee, if convinced that his employer's interest in him is not hurt is prompted by good will and human kindness, will respect and admire his leader all the more for that interest in him and his welfare. He is not in a position to ask that he be protected; he would feel that it was undignified and cowardly to do so, but the responsibility is on the executive none the less. I wish that everyone who has labor under his control and who feels a proper responsibility for their welfare, could carry in his mind and heart those lines of Pope, which, though written two centuries ago, seem prophetic of their application—

Teach me to feel another's woe,
To hide the fault I see,
That mercy I to others show,
That mercy show to me.

May God speed the day when this thought shall guide and govern our conduct.

CHAIRMAN CARTWRIGHT: We are indeed grateful to Mr. Graves for this address and for going into such detail in getting accurate information. I think this statistical information will make a mighty fine record to start off for another year and if we can each year go ahead and cut down that percentage it is only a question of a little time to get it within reason.

We are next to be honored by a representative of the lime industry, Dr. E. M. Parlett from Pittsburgh Limestone Co., New Castle, Penna.

The Study of the Human Element in Its Relationship to Organized Accident Prevention

M. Parlett, Supervisor Health and Safety, Pittsburgh Limestone Company,
New Castle, Pa.

Herbert Spencer, one of the world's most profound students of human life, declared that "without health and energy, the industrial, the parental, the social and other activities become more or less impossible." Pursuing this line of reasoning a step further, the Committee on Safety and Production of the American Engineering Council has this to say—with specific reference to industry itself—"Maximum productivity in industry is dependent upon the reduction of accidents to an irreducible minimum—the weight of evidence supports the common belief that the safe factory is the efficient factory, and the efficient factory is the safe factory."

Wherefore, if the wealth, prosperity and happiness of industry itself is promoted and proven to be actually dependent upon, first the health of its units and secondly upon its behavior with specific regard to self-protection against physical danger, may we not venture to broaden the scope to include society itself? It is with this promise that I would approach the problems of industrial safety and its corollaries, industrial efficiency, social advancement, national prosperity—in a word—world progress.

Confining my chief remarks to the individual worker and not the equipment, health may be considered as normal, subnormal, abnormal.

Normal health infers physical well being, reason, sanity, judgment, energy, aptitude, clear thinking or vision, resourcefulness, self control, repressions, a willful desire to serve and advance, individually and collectively. Upon these characteristics, which are those of the higher type human, as Herbert Spencer has well said, rests the foundation upon which reposes the happiness, the power, the progress and the wealth of the country. Therefore, it may with satisfying truth be said that while a normal and healthy individual will not only in emergency and

instinctively protect himself from physical violence, he goes a step further in the desire to think, to study, to cooperate with fellow humans in developing scientific ways and means of abolishing accidents by and through the prevention of both the direct and remote causes thereof. Further, it is not only the duty but the desire of the normal or highest type human to shield and protect the individual who may through the congenital forces of nature or otherwise fall into that classification of inferior grade, be it subnormal or abnormal, and may I say that ample evidence is at hand that the normal human being is fulfilling that duty of shielding and protecting the less fortunate, as witness the ennobling ideals and efforts of the membership of this splendid and inspiring organization, the National Safety Council.

Of late years the doctrine of conservation has received a new impetus in our American system of government. The Supreme Court of Ohio, speaking in 1921, said "Originally this doctrine was largely applied to mines, forests, water power and natural resources. Later it was extended to hogs, cattle, buffalo and wild animals generally, and strange to say, lastly it was applied to human beings."

Human Losses Are Met on Every Side

In this connection and for a moment considering the matter of the destructiveness of disease itself, the world has ever been confronted by conditions, not theories, frequently local in character, sometimes national, occasionally world wide in scope. Devastating plagues have threatened communities, nations. We are proud of the glorious victories of the medical profession over yellow fever, malaria, typhoid, small pox, diphtheria and other scourges. Such achievements are both wonderful and patriotic, beneficial alike to the individual, the industry, the nation.

Students of the vital statistics, however, know that the achievements of man, no matter how wonderful or how patriotic they have been, are but half accomplished.

We are yet confronted with an appalling death rate upon our highways, in our industries, upon the seas, within our homes, beneath the earth's surface in our mines, at varying altitudes above the earth's surface in our conquest of the air, from external physical violence, the immediate effects of which produce an unending train of permanently handicapped or killed.

The medical profession having taken the lead, as it obviously should, in conquering plagues and devastating disease, it is not surprising that it should give attention to that other arch enemy of man, external violence to the physical structure of the body, and lend its aid and bend its thoughts and energies in cooperation with the leaders of industry in an effort to conquer this other scourge of the human family—accident—for it must be observed that prevention of suffering in whatsoever manner it may have been produced is the cardinal aim of medical men, of industry and all clear thinking individuals.

Health promotion and accident prevention are therefore akin and equally appealing as subject to scientific investigation, study and formula, and amenable to scientific methods of approach and application. For example, science has not only been the means of discovering weak metallic structures, as well as weak tissues, by means of the X-ray, the prevention of death from shock to the body tissues of the electric current, the avoidance of acute and permanent physical harm from dusts, fumes and gases, the prevention of infections from contaminated lubricants, polluted drinking water, metallic poisoning from lead, copper, zinc, etc., the avoidance of contact or communicable disease, and of solving the problems of ventilation, industrial cancer, anthrax, stone cutter's and other respiratory diseases of industry, but science is solving the problems of human behavior, covering a multitude of human mental traits, deficiencies, perversions, aberrations, etc., to which the industrial employee may be subject, even to an appreciable degree.

To make myself clear: Conduct is defined as the way a person acts or lives; the

idea of personal and moral responsibility is inherent in the term; an energy phenomenon. When an accident occurs involving injury to the industrial employee, the first question usually to be asked and determined is "What was the cause thereof?" "Who was at fault?" The usual answer is one of the following: "Employee neglected instructions." "Machine guard not replaced." "Employee was not wearing goggles." "Disobeyed orders." "Absent minded." "Took a chance," "Became confused." "Failed to give correct signal." "Defective tools, chain, cable, etc." ad infinitum,—a long and interesting, if sordid, list of the failure of the human element, of insufficient or sustained mental endowment to anticipate, to organize, to plan and think ahead, to safeguard, to instruct and supervise, to systematize effort both personal and collective for self protection from external violence. That we are curbing accident directly or remotely charged to human trait characteristics, the sudden failure of the human element, human deficiency causes, thanks to you industrial scientists, is to be freely confessed, but that we have only just prefaced the undertaking is evident.

Admitted that there still remains a great demand for hand or manual labor, and realizing the palpable fact that many of the laboring groups may be classified scientifically as within the moron type group, we must acknowledge that fact and face the problem of placing and utilizing the energies of this class labor in an atmosphere of protection which may be devised or provided by forethought, research and careful planning by those blessed with a higher degree of intelligence. To so organize is to instruct and to supervise to such a degree of refinement that there should remain but scant excuse for flagrant failure when these children of industry are maimed or killed, realizing as we do that many are victims of perverted thought and conduct, singular human traits, inherited or acquired, submerged or quiescent under casual circumstances. These, we, as students, must realize, anticipate, correct as far as it may be possible and regulate for the protection of the employee and industry.

Proceeding Toward Safety in the Best Manner

With the established facts in mind, how are we to proceed to the best advantage of industrial prosperity and social welfare after we have first appointed a safety and health director, put our plant in good housekeeping order and safeguarded our operations to the limit of our experience and ability, instigated and promoted by a wise, a benevolent and a cooperative management?

(a) We should by careful physical examination eliminate the flagrantly vicious in mental and physical attainments.

(b) As thoroughly instruct the new employee, as well as the old employee, in specific detail as to the hazards of individual occupation and plant operation, and to broaden the field of education as time and opportunity warrant from apprentice courses to advanced instruction in craftsmanship.

(c) Organize the man and the mass into complete units for systematic and automatic functioning. Organization means systematic concerted unit effort; a marshalling of forces for efficient orderly mass action; the management first, the direct supervising forces next in line and the subdivisions of the army of employees in the order of sequence. If you wish to accomplish certain definite objects you must proceed in a certain definite and orderly way.

(d) Supervise thoroughly and continuously.

(e) Originate and utilize every means or avenue of research possible.

(f) Make practical application of known psychological laws bearing upon human traits, human emotions, human perceptions and reactions, human limitations of intelligence, interest, sustained forces of attention and memory, human physical frailties, characteristics of race, sex and age of individual and mass temperament, as the character of toil may dictate.

(g) Promote the best working environment possible and eliminate fatigue wherever possible, keeping abreast of advanced thought relative to air conditions, light, rest periods for monotonous toil, the evils of prolonged constrained attitudes, etc., thus promoting the sustained health and indirectly the safety of the worker.

(h) Discipline when necessary. Some adults are like children in their attitude and response to discipline, involving as it does the element of fear as a guiding factor in their conduct.

(i) Promote good will, thrift, respect, cooperation, personal initiative of the worker at every opportunity by personal contact, fair play, patient instruction and friendly advice and assistance and by some welfare activities from school courses and insurance features to first aid and nursing facilities.

(j) Minimize labor turnover and seasonal occupation by all legitimate means and as economic conditions permit.

Complete Safety Organization Is Essential

k. Organize safety. The writer feels that the plant safety organization should be complete from the water boy to the president, and that each should play an active and specific part. The psychological factor of such method firstly gives prominence to the self esteem of the lowliest individual in the plant, and secondly awakens his desire to cooperate with his fellow employees and means that he will become interested to a greater degree than he would be otherwise, even though such a person makes report daily only concerning the safe condition of his tools or his work surroundings. Committee organization is paramount, and most efficient the farther down the line it operates. This does not necessarily imply that formal meetings among groups of men under each or even any of the sectional foremen, but each employee nevertheless knows that he has a daily safety report to make and that his foreman represents him as a member of permanent division of the plant safety committee. Meetings when held, be they daily, weekly or monthly, should be routinely systematized, reporting unsafe conditions and practices, should be made easy, free of embarrassment and exact, for the individual key men by furnishing them with safety booklets in which to write their findings and recommendations in advance, and by such procedure to thus keep the meeting alive and to make it possible to conduct the business in hand with snap and order, even to those discussions that follow specific recommendations. Here is where contacts are made, friendships develop, cooperation inspired, thinking stimulated, reasoning promoted. One soon learns that "He that can not reason is ignorant; he that will not reason is a bigot; he that dares not reason is a slave," that no pursuit is so important as the pursuit of facts, especially those impressive and established facts of safe and economical plant operation.

Membership of the plant safety committee is composed of two groups, the permanent and the temporary committeemen. The permanent members are foremen, the temporary committeemen are appointed quarterly from among the rank and file of employees, each operating department being represented, the representation being approximately one committeeman to every ten employees. One of the first and outstanding facts that these committeemen learn is that the management both by word and action is thoroughly and sincerely supporting safety, first for humane reasons and secondly as a necessary part of production. That is important and far reaching. When recommendations are made by committeemen or men from the ranks they are given intelligent consideration, and when original or exceptional recommendations from the standpoint of value to the greatest number of employees involved are submitted and accepted, money prizes and bronze watch fobs suitably engraved and emblematic of quarry and mine activity are presented to such employees. This is also important and far reaching.

We have organized Blaster's Schools—who meet once each month and conduct

their meetings in an orderly manner similar to those of the plant safety committee. We have recently organized Trainmen's Schools, who will hold regular meetings covering train operation, train signals and safety. We have organized Five Year No Accident Clubs and Ten Year No Accident Clubs at the respective operating plants, each member of which is distinguished with an appropriate and attractive button.

We have special foremen's meetings at which every effort is made to impress on them the value of special qualifications in their relationship to their subordinates, such as leadership, alert supervision, initiative, diplomacy, sympathy and understanding, good judgment and example by respect. Every foreman has his goggles in full view at all times, not only as an example to his subordinates but ready for instant use when the occasion arises.

Naturally we endeavor to take advantage of all advanced safety thoughts, devices and methods from the psychological realm to the machine guard and operating processes that we may utilize with advantage and without too much repetition or over indulgence. It is not unusual to surfeit to the extent even of narcotizing the employee or nullifying safety effort by too much propaganda, remembering that although you may not have given the applicant more than a cursory intelligence test upon employment, and although he may not be definitely rated a moron, that nevertheless his powers of successful mental digestion are limited.

However, we look with favor upon such modes of safety approach and application as:

Arousing the Enthusiasm of the Individual

Safety rallies, picture shows carrying safety propaganda, extensive bulletin board service, envelope slips pertaining to such matters as safety at work and in the home and upon highway, health, sanitation and personal hygiene, addresses at intervals by the local plant surgeon, attorneys, men from the ranks and officials, plant picnics, competitive contests between work sections, departments and plants, the awarding of trophies and pennants to such groups, and individual prizes as above mentioned, publication of plant accident rating as compared with other similar plants, posting the accident records of respective plant foremen, subdividing the safety committee into sub-committees and exacting a written report monthly of inspections made of chains, cables, ladders, machines, shafts, set screws, air compressors, explosive magazines, tools, falling objects, including quarry face and mine roof, fire equipment, holding routine fire drills, checking plans and specifications for safety, monthly written reports by foremen describing conditions of their respective departments with specific regard to the safety features thereof, etc.

Every accident no matter how minor in nature is reported and treated immediately. We do have infections now and then, but few indeed. Some of these I earnestly believe are the result of injuries, later claimed to have occurred on the job. To put an end to this type accident, and as a measure of protection to the company against fraud, we are arranging to have each employee at the end of the day's work mark opposite his name whether or not he has received an injury during the working hours.

Time does not permit of more detail or further discourse upon this most interesting topic at this time. Let me say in conclusion that the results in health, safety and welfare among the employees of the Pittsburgh Limestone company, Subsidiary Companies of the U. S. Steel Corporation, have more than justified the sincere efforts of the management both as to the added security of their plants and the intimate and gratifying relationships, the mutual welfare and public interest that this sound and constructive policy has inspired, and by the number and severity of injuries, the reduction to a minimum of the possibilities of death, that have been promoted thereby within the organization.

CHAIRMAN CARTWRIGHT: We thank you, Dr. Parlett, for this enlightening address. I think it inspires in us some idea of our responsibility to employees for their health as well as accident prevention.

The next paper is from Mr. Jones of the Indiana Lime Stone Company on the subject of the "Safe Handling of Rock."

Safe Handling of Rock

Areli Jones, Superintendent, Hoosier & Joyner Mill, Indiana Limestone Co., Oolitic, Ind.

Rock quarries are as many and as varied as the ships that sail the seas. A rock quarry is a place where they get out rock of any description, whether it be road rock, shale, stratified rock, or the more substantial building rock commonly known as granite, marble, sandstone or limestone. In the quarrying of building stone, all conditions of hazards are very similar.

It has only been in the last two years that the quarries of southern Indiana have taken any real interest in safety problems, which confront every quarry operation, large or small, and whether it be road rock or building rock.

Just as long as men are indifferent we will have accidents to contend with. Why do some men get hurt in the quarries more often than others? Possibly for the same reason that some men have more automobile accidents than others.

We are trying every day and every hour to solve the problem of automobile accidents, because it affects the life of every one of us. We believe the only remedy or solution is an education in safe methods, regardless of the few seconds we lose at the stop signs. We must bring order out of chaos by learning to obey all signs and signals—stop at the highway and the railway crossings; when in doubt proceed with caution. With an education in safe methods of driving the subconscious mind will assert itself, regardless of the surroundings and the humdrum of life. That little substation within you will automatically control the breakers of the mind, breaking contact at stops and red lights.

Education is the key to progress. If we do not learn to control our actions, then the State must step in and find out how much we *don't* know about safe methods of running a car—just as a trainman must know the rules of the road, and just as we know that when a train crew disobeys the rules of railroading something is going to happen. Education in safe methods has reduced accidents on railways and in many industrial plants. Why not seek to attain the same results in rock quarries?

To my knowledge, the first concerted effort to establish safety principles in the stone quarries of Indiana were put forth by the Bedford Stone Club with the assistance of The Travelers Insurance Company.

This campaign was started August 1, 1925, and was personally managed and conducted by M. J. Morgan, who was then president of the club. He was ably assisted by E. C. Walters, secretary of the Stone Club.

Committees were organized in each plant, men who could be relied upon were picked for the committees, and an enormous amount of literature was passed out setting forth the advantages of safe methods. True, we agreed with the disaffected employee that it was an advantage to the company, but we pointed out that it was even a greater advantage in a saving to the worker and his family. Posters of many designs, with which all of you are familiar, were posted, more ably illustrating the point—possibly more forcibly than the pamphlets could do. Noonday meetings were held in each plant; speakers

on safety were secured; night meetings were held in the public school buildings; the men and their families were invited to these meetings; local singers entertained all present with the singing of safety songs, many of which were original, thus adding a little spice to the movement; safety slides were used showing the operation and the progress made in other industrial plants; safety engineers were also introduced, who instructed us in the safe methods they had used and the success attained. I do not doubt that there are some men at this Congress, who remember an evening spent in Bedford or Bloomington, Indiana; and thus it was we inbibed the "Spirit of Safety."

This intensive campaign terminated with a successful issue August 14, 1925. We were all tired out, but felt the message had been put across. Future events proved this to be a fact, regardless of some of the raw material we had to contend with. For our supply of men came from the farms, many of them from the mountain fastnesses of old Kentucky—men who had heard of the law, but the word "Safety" was not in their vocabulary, men who would go about their work on the ledge with the utmost abandon when a large block of stone was swinging overhead, weighing an average of fifteen tons, and as these blocks in swinging over might cast a shadow at their feet, it was received with no more concern than a passing cloud. These men realized no danger.

Each Plant Built Its Individual Record

Yet with a foundation so well laid, it was up to each plant, each mill, each ledge, in the quarry district to contribute its part to the building of this safety structure according to the approved plans and specifications. True, there were spots where the pioneering was rough, the brush and thicket had grown dense and was hard to penetrate, and instead of the bountified yield as produced on limestone soil, it seemed that some of the seed was smothered by the dense growth of previous years. Transplanting had to be done, and the records prove that it was done successfully.

I was interested at that time with the Indiana Quarries Co., which was one of a group of quarries working indirectly through the Stone Club, which sponsored this safety movement.

After the campaign, and under the direction of N. Joyner, general superintendent of the Indiana Quarries Co., we proceeded to form our plant organizations, by first electing a Board of Directors composed of 12 men, each of whom held an official position with the company. This board then picked men from the different departments, whom they considered capable of doing the committee work, because of their influence and boosting capacity. After all the committees were organized, we began holding joint meetings of all committees one night every week, exclusive of the regular department meetings. Board meetings were held once a month. It was our desire to keep up the pep previously created, and to get thoroughly organized, so as to inculcate the lessons and principles of safety just as fast as the men might be able to absorb them. Continued interest was shown by the committees and the men, safety became a real issue and foremen took as much interest in safety as production. I have no comparison of records to show what was accomplished in such a short space of time, but I do know this: the Indiana Quarries Co. carried its own insurance, and it was more than pleased at the saving made in the insurance budget up until June, 1926, when the Indiana Limestone Company absorbed the Indiana Quarries Co.

After the merging of the quarries, Fred Hatfield was appointed safety engineer, and with his able assistants, Nevin Tovey and Wm. French, a trio of

earnest and zealous workers was enlisted, a combination that is bound to win and bring about the safe handling of rock in the quarries, which of itself is a big proposition, not so much because of the number of men employed and the various branches of industry in connection with it, but because of the scattered condition of the quarries and ledges.

One does not realize the territory that must be covered by the safety engineer. If you have never been down in southern Indiana the trip is worth while, as you pass through a country of wonderful scenic beauty. As a safety suggestion, be sure your brakes are tested before you make the trip, because you will encounter wonderful hills, with long, graceful curves and some that will be rather abrupt and winding around the hillside.

Each hill or combination of hills is composed of rock that has withstood the ravages of the glacial period and the washing and pounding of many waters, when the southern part of Indiana was covered at one time with a body of water similar to Lake Michigan. If you visit Orange county you will see a lost river which drops into the ground and disappears from the eye of man, perhaps fashioning out some cave for future generations to discover.

Handicaps in the Quarry Territory

Then we have Marengo cave with its spacious halls, rooms and passageways, all washed and worn out with the irresistible force of some previous lost river. Such are the surroundings of the Indiana limestone quarries, a stone almost identical in texture and analysis with the stone of the Pyramids of Egypt.

After a prospective stone quarry has been located and tested, it may be necessary to cut off the timber, after which the hydraulic machine is set up. This water power will certainly remove all the clay, dirt and roots of trees, leaving a nice clean ledge to work on, sometimes level, sometimes exceedingly rough and jagged, resembling very much the rock bound coast of the sea. Many and varied are the ledges of rock. Sometimes merchantable stone lies just under the surface; after cleaning off the light soil, the track can then be laid on the ledge.

The machines are set to work cutting out the rock, and the derrick is raised. Several kinds of machines are used, each with some special feature or improvement over the other, if the limestone rock does not extend to the top of the ledge. Then we have the Mitchell rock to contend with; this may extend down five to 20 feet. There are times when this could profitably be taken out and used for road rock. Taking off the top rock is an expensive and more or less dangerous proposition, because of the rough nature of the stone and the work. Blasting is done where possible, all depending upon the formation of the rock. Accidents occur. Men have tried to thaw out dynamite on the hearth of the blacksmith shop; men have used drills to remove the tamping because of a misfire, drilled too deep and set off the explosive, with the usual result; men have left powder cans open and exposed to sparks—of course the inevitable happened, because a safety law was violated; some individual decides to climb up on the pile of rock just blasted out, only to step on and release an over balanced rock, causing a slide which if not disastrous to himself may be to others. Sometimes big grout, blocks weighing five or six tons, are set on the pinnacle of the grout pile, and some one is there to release the dogs and trip the blocks over to their everlasting resting place—a hazardous job, and a man who knows how should fill that job, as a trap is very easily set, and when sprung, a slide may extend up to the pinnacle and jeopardize the life of the tripper. So much for the stripping of rock.

In getting back to our channelling machines, now that the rock stripping is complete, sections of track are laid on the floor of the ledge, similar to the laying of railway track, except that the track is fitted up in sections and fastened together with rods and braces, then laid together end to end. The track is then leveled up with blocks of wood, so that the machine can run true. The channel drill bits are clamped on the machines, the machine travels up and down the track striking a blow from the piston. Some other machines work on a leverage basis. The machine runner sits at the throttle, the fireman throws in the coal and looks after the water. If he happens to be standing with one foot on the rail when the machine runs back, and the fireman forgets his foot is on the rail—well, he is liable to lose half of his foot, or at least, some toes. Men have sat on their machines and kept them running until they went over the edge of the ledge into an abandoned quarry hole from the previous year's work, falling perhaps a distance of 50 feet. Men have stopped their machines under the same conditions at the edge of the ledge to tighten up a nut, the wrench slipped off the nut and the pull on the wrench was towards the quarry hole, with the result that some one again went over the ledge into the quarry hole. It seemed to be just a case of luck, as to how serious he was hurt. Dump boxes of coal have been set down on the upper ledge, only to slide over on some one working on the ledge below.

And so we could go on enumerating accident after accident. Was the machine at fault? Only the human machine slipped a cog. So we are thoughtless, careless, and indifferent to danger. Safeguarding machinery is worth while, and money is well spent, not so much because it makes the machine fool proof, but because of the object lesson to the man employed. It is a continual reminder of safety.

The Safe Handling of Men is Paramount

To me it is not so much the safe handling of rock at the quarries as it is the safe handling of men. There are some unavoidable accidents, but with the education of the human element accidents are bound to decrease. I wish to repeat that a foreman should feel obligated to his employers for the safety of his men, if not from the human viewpoint, then from the economic standpoint. Why not cut down this economic loss, reduce the cost of production, which would be equal to about one cent per cubic foot? And yet, a greater obligation, owed to your fellow workmen, to his wife and children, to your employers and to humanity at large, is the protection of your men in every conceivable way. Safety comes first.

If you, as a foreman, have been elevated from the ranks because you have shown foresight and skill in the handling of rock, you are to be congratulated; but there are a number of tests for qualification as a foreman. Do you believe in safety? Have you been taught that accidents decrease production and increase costs? Are you interested in the welfare of your men? Are you treating your men as you would like to be treated? In so far as you treat them on the square and show appreciation of their efforts, have you succeeded in winning the confidence of your men? This alone proves the highest type of foremanship. Someone has said, "Give no man your confidence until you have found him worthy." So, to be worthy of the confidence of your men is something worth while, and proves that you have passed the acid test. Men are just overgrown boys, and we don't have to go back very far to remember the days when we moved in a new neighborhood, or some kid moved in our neighborhood. We or he had to meet the test whereby we or he gained, or lost, the confidence of the gang. You men here tonight have passed that test also, or you would not be here, because the boy is father to the man.

To handle rock safely in the quarries, there must be leadership. Not such a big word, and yet true leadership spells success in every walk of life. Leadership at the quarries runs from the executive office down into and through every depart-

ment. Out on the ledge a one track mind cannot lead. Just as the derrick runner is capable of taking up on the boom, hoisting up on the mainfall and swinging the rock around into position on the car, all three operations at the same time, accomplishing a three-fold purpose, so it is with the foreman; he must have at least a three track mind,—the condition and security of his machinery, the safety of his men, the production of rock. Are the powers bolted down securely? Are the derricks and guy-ropes safe? Has he taken time to take up the slack on the guys, and keep the mast plumb? How about that fall rope with its strands of broken wire? Does he know the limit of its endurance? Does he make inspections regularly, or just previous to heavy lifts? Has he instructed his men in regard to the relative position of the boom when dragging in cuts or making lifts of various loads? Are the chains and dogs, cables and slings in good condition? Are the ladders in good shape? Are the steps made standard so that the men can use a regulation step in climbing up and down the various ledges?

No Human Machine Can Be Replaced in a Day

For the safety of his men, is he insisting that the men on the ledge keep out from under loads that are being hoisted and swung around overhead, even though the men are running machines and producing rock? It is dangerous practice to allow men to remain on machines when loads are passing over. Get away from the old idea that men can be replaced along with machinery. A machine can be replaced in one day to one week's time; a man's life can never be replaced, and if crippled, he can never be made new like a machine. And, remember, it takes two to four years to make a capable man in the quarries. As with machinery, so with the men, does he know where they are weak? Does he know the man capable of the heavy job? Does he know the man capable of the hazardous job?

Know your men. Remember, there is no group of workmen capable of perfect co-ordination in themselves. The powerman must change gears on the derrick hoist, so must the foreman change his men to suit existing conditions.

Then comes production. This I am putting last, because in a well organized department it comes last. It is a natural result of previous preparation. As acting foreman or superintendent, I have never thought of my work in terms of production. I rather like to plan, and combine things to work together. I do not wish to sacrifice material, just to get out some certain size blocks today. I believe in preparation, just as the athlete, who expects to win in the fight, whether it be in the ring, in the channel swim or on the field of sports. There must be preparation and it must needs be the proper preparation, if you are to get results. So it is with the farmer and the gardener, preparation comes first, then follows the production of crops. Some of you can remember when your mother or some one else's mother, made bread; perhaps you had been invited by your chum on baking day to come in and get a nice big crust of fresh, hot bread covered with butter and honey. Upon your arrival, the bread was just being taken from the oven, and right there all your anticipated joys and pleasures were blasted. An accident had happened; the bread had fallen flat; production had fallen to a minimum in that household, because something was overlooked in the preparation.

So it is with the drilling and breaking of blocks that have a rather mean grain. If proper preparation has not been made to take care of the adverse grain, the break in the block may run under and below the line, and again we lose in production.

The Indiana Limestone Company owns 6,600 acres of land in Monroe and Lawrence counties, and in order that you may realize the magnitude of their operations and the responsibility of the safety engineer, I will add that they operate 220 channelling machines, both steam and electric, 200 derricks, some of steel and some of Oregon fir, all operated by electric power; 12 hydraulic stripping pumps with a

capacity of 500 to 1,000 gallons per minute. They operate their own machine shop, boiler and forging shops, heat-treating system, acetylene and arc welding outfits, the electrical department doing all their own rewinding and repairs, carrying 75 machinists, electricians and mechanics. Also operating in the quarries, we have seven lime kilns shipping out 60 tons of lime each day.

In addition to the quarry operations, the safety engineers also supervise the safety work in the mills and stone planing shops; these are a part of the Indiana Limestone Company. So that you may get some idea of the extent of their work in the mills, I will name over the machines in operation: 101 traveling cranes, 243 gang saws, 287 planing machines, 8 diamond drag saws, 38 diamond circular saws (for ripping stone), 64 diamond circular saws (for jointing stone), 9 large column lathes, 39 baluster lathes, 29 milling machines, 4 carborundum planing and molding machines, and 5 surface and polishing machines.

The company anticipates a 12,000,000 cubic feet production this year from the quarry department based on figures of previous years. Indications are that we shall beat the schedule set by one million feet or more. I am wondering to what extent safe methods have helped to increase this production.

Our short experience in safety work has taught us that education in sane and safe methods gives a man self reliance, helps him to stand on his own feet, and creates a feeling of responsibility in that the life of other men may depend on his actions. Safety education brings to a man the realization that he is capable of taking care of himself; also gives him the ability to control what otherwise might become a dangerous condition. He will develop a keen insight as to what might prove dangerous and, if not able to control it, report to those in authority. Such a man, instead of being a liability, becomes an asset to his department, his employer and his home.

As I understand it, these are the ideals safety engineers seek to attain.

Details of the Round Table Discussion

CHAIRMAN CARTWRIGHT: We thank you, Mr. Jones, for this paper. I think it is a matter of a good deal of interest to many of us who are not closely acquainted with this particular line to have Mr. Jones go into detail.

Mr. Sanborn, I wish you would take charge of this round table. You set your own schedule of time limit and conduct that as you see fit. I think we ought to count on 30 minutes; that would give us ample time and I have appointed Mr. Soder, Mr. Hewitt, and Mr. Coville on a nominating committee and they can report immediately after this 30-minute period.

A. C. HEWITT (American Lime and Stone Company, Bellefonte, Pa.): Mr. Chairman, the nominating committee asked me to make the following recommendation for chairman. We had in mind the report Mr. Graves made you. We were hoping to go on with this work. For chairman the nominating committee recommends D. K. Soder, director of insurance and safety, France Stone Co., Toledo; vice-chairman, R. E. Coville, assistant manager, United States Gypsum Co.; for secretary, J. R. Boidsek, National Crushed Stone Association, Washington, D. C.

CHAIRMAN CARTWRIGHT: All those in favor of the recommendation of the nominating committee say "Aye."

(The nominees were elected to office.)

I shall now turn the chair over to Mr. Sanborn.

CHAIRMAN SANBORN: Gentlemen, we had better divide that 30 minutes into three ten-minute periods. First, let us consider Mr. Graves' paper. Gentlemen, what have you to say? This is your party now.

A. C. HEWITT (American Lime & Stone Co., Bellefonte, Pa.): Last year I was unfortunate enough to be elected secretary of this section, but I did not know it until

several weeks ago. I had gone home from Detroit. I hope that we won't have any such luck this year and that we will have an organization that will really accomplish something in a constructive way. I feel that the past year we have done very little and I blame myself perhaps more than any one else. I was very much surprised at the figures mentioned by Mr. Graves. Especially that figure where he said that 35 per cent of the membership of the National Crushed Stone Association were not members of the National Safety Council and had not been solicited for membership. That, indeed, is a surprise. I had assumed that the National Safety Council had solicited membership from practically every industry in the country. Evidently it has not. It seems to me that one excellent track which might be followed in the coming year, especially in view of these figures, is that the new organization make a decided and determined effort to go after the members of the National Crushed Stone Association and the members of the National Lime Association. I do not know whether there is a gypsum association or not; if there is, include that. They should go after every organization in the quarry business. I think they should be solicited for membership. I think it ought not rest with a single solicitation. If it is not possible to get new members by the first attack and the secretary is unable to get a response of the right kind, let him turn the names over to some other individual and make a second or third attempt. I feel that there is no organization in the country that can do as much for humanity as the National Safety Council, and if we don't go out and spread that good news we will not get members, and if we don't go ahead we will go back.

The Cement Industry is Represented 100 Per Cent

CHAIRMAN SANBORN: Mr. Graves, I may say for your information, we are biting into your paper for the next ten minutes.

T. L. HALPER (Marquette Cement): It might be of interest to those in attendance this morning that we are connected in part with this association, and that the cement industry is represented 100 per cent in the National Safety Council. In other words, every one of the 150 plants in the cement industry is now a member of the National Safety Council—and, by the way, the only section of the council that is represented that way. I wanted to say that if our section can in any way help at any time or give you any pointers we shall be very glad to. Unfortunately for that section, I was elected chairman yesterday, so I shall be very glad to cooperate with you.

CHAIRMAN SANBORN: That is a record to envy.

MR. CARTWRIGHT: I sent my contribution to the questionnaire. I should like to emphasize this point. Some one asked what our record was on safety. We fought it along pretty actively and had splendid results at our plants in reducing the frequency and severity of accidents as a general thing, but at one plant we had two or three of the severest accidents we have ever had. Right in the face of our active safety campaign, during the season of our heaviest production, we had two accidents to members of the safety committee. One fellow was careless and injured his finger by cutting toward him instead of away from him. Another was working on a shaft that was running. I don't know how he got pulled in but it took off the end of his middle finger. Those fellows happen to be members of our safety committee, and have to be at our meeting twice a week. They make the typewritten reports of the meetings. Their word goes if they recommend a change for the sake of safety. In spite of all that here were two members, as I say, of the safety committee who had accidents, and in one plant we had the severest accidents that we have ever had. One reason perhaps was that we got into heavy production and everybody was busy. We must get out everything we can in three months of the year. Then the trouble starts. We haven't taken the time to organize anything more than our regular safety committee. But I am thoroughly convinced that we must make

a special effort during these times of heavy production to bring our men in for some special safety meeting to instill in them the safety idea, and not do just routine work. We must give some special attention to safety work.

MR. GRAVES: I don't wish to embarrass the temporary chairman, but haven't you something to contribute, Mr. Sanborn?

CHAIRMAN SANBORN: I fully intended to have my superintendent at this meeting today, but sad to relate, he is the victim of a casualty, and we have been unable to place the blame on him or any one else. He got a little scratch somewhere (he doesn't know where), and the result is he has an infection and has had quite a serious time for a couple of days. He is now out at the plant with his hand in a sling. However, he is on the road to recovery. It is one of the perverse things of the times that the one particular man I wanted to bring up here is in such a condition that he is unable to go very far from first base.

Many Men Must Be Treated Like Children

MR. JONES: I stated in my paper that we have a number of men whom you have to treat almost like children. They don't realize the danger; and the point we have tried to bring forth is that any little scratch, the slightest accident, should be reported to the foreman who immediately sends them to the first aid department. They get that first aid service right away. We have had no cases of infection in the last twelve months. Not a case. It seems that you must get enthusiasm into the men. Everybody must be sold on safety, from the superintendent down. The superintendent must be better sold than anybody, because if the superintendent is not sold, you wouldn't get results. The foreman looks to the superintendent and, just as in production, it is how hard the superintendent presses the foreman. Just as he gets more production by pressing the foreman so will he get better results if he pushes for safety.

I think we should also look ahead to prevent accidents. We have men of that class and we are proud of them. The thing is to get the foreman sold on safety. That has been our experience. Hold your meetings for the men and tell them how necessary it is, and have the first aid man explain to them the reasons for first aid and that he wants them to come back if necessary so that they may have the proper treatment and prevent blood poisoning. He gives them examples of cases in other quarries where men have lost legs or feet through being negligent. Some of these accidents do happen off the plant, but it is better to take hold of them as soon as you can, say nothing about it, gain the good-will of the men and have them report whether the accident was in the plant or at home. That is the way we handle it, and we are getting good results. We have been in the safety work a year, but the men are all interested in the safety idea and the safety engineers and workers have done excellent work.

CHAIRMAN SANBORN: We will pass to Dr. Partlett's paper.

MR. GRAVES: It seems to me in reference to what Hewitt said about increasing membership, that it would be well to put that as a motion to commit the quarry section to such a policy.

MR. CARTWRIGHT: If the cement association can get 100 per cent membership why can't the crushed stone association? I think they are blaming the National Safety Council for something they are not responsible for. I know some of these folks of the crushed stone group have received invitations and the chances are they have gone into the waste paper basket. As a matter of fact the National Safety Council did all they could.

MR. HEWITT: We would like to get behind that motion to try to be responsible for getting every member. In order to get definite action, I move you that this section make a definite attempt during the coming year amongst all of the quarry

operators, with the possible exception of cement, which is already in 100 per cent, to solicit them for membership in the National Safety Council. I would suggest, however, that circulars not be used for this purpose, that the secretary or whoever is commissioned to handle this write individual letters. He may use it as a general letter, but he should write an individual letter addressed to the president or general manager.

(The motion was seconded and carried.)

MR. CARTWRIGHT: I think the cut stone organization generally meets at the same time the crushed stone association does and I am sure we can depend on these men to carry the thing through their organization.

CHAIRMAN SANBORN: It strikes me that Dr. Parlett had a number of very helpful suggestions and these should elicit considerable discussion. Personally, I like the scheme of having the man report at night that he has gone home uninjured, because some of the nastiest accidents we have had to contend with seemingly originated some week or ten days after they happened.

The Effect of Lime Stone Dust

J. G. HALPIN (Consumers Material Corporation, Kansas City, Mo.): I should like to ask Dr. Parlett if he has any opinions on the effect of lime stone dust on the health of the worker.

A. J. EOLES (Bessemer Lime Stone & Cement Co., Bessemer, Pa.): Dr. Parlett answered that question yesterday in the cement meeting. He said respirators were not important at all as protectors since he found that the lime stone dust was rather beneficial, particularly in the case of tuberculosis, and the like of that; and he stated that dust on an open cut has rather an antiseptic quality rather than a detrimental effect. Of course we usually say dirt is dirt and dust is dangerous. However, with lime stone dust it doesn't work that way, and our medical officer voiced the same opinion. He has been in various industries and he finds cuts heal more rapidly in the stone industry than in other industries, so the point we reached yesterday was the cut was not dangerous.

CHAIRMAN SANBORN: Did he cite authorities?

MR. EOLES: He cited some but I don't recall who.

MR. A. JONES: For the information of the gentleman I will state that the Old Indiana Company had trouble with the stone cuts, and the company sent to Indianapolis and got two physicians who examined all the employees and examined the dust and took the history of the families; this was six or seven years ago, and the results were just as this fellow stated very favorable on cuts. In fact it had been suggested by the nurse who has charge of Orange County that he would like to get men who had been working in what we call the "bug" dust plant. This is a plant where they grind lime stone for use in agricultural work, for sweetening the soil, and it is also used in glass factories, beet sugar plants and in some steel plants. This place is just full of dust. It causes up any sores on the lungs; and as a worker in lime stone myself, I know that in the old days while cutting stone with a hammer, if you knocked the skin off you could throw some stone on it and it healed up. I have also noticed among machinery having motors in our industrial plants, that this lime stone doesn't have any effect on the armature whatever.

CHAIRMAN SANBORN: I think it is now up to us to begin the discussion of Mr. Jones' paper. There are certainly some of you building stone men who are better qualified to discuss those phases than some of the rest of us. May we hear from some of you?

Mr. Jones, the building stone industry has been particularly hazardous, hasn't it?

MR. JONES: More so than the quarry.

CHAIRMAN SANBORN: There have been a number of casualties?

MR. JONES: Yes. Every year there are some fatalities.

CHAIRMAN SANBORN: Gentlemen, we ought to be able to get more round table discussion on this.

MR. JONES: We have a gentleman here from the Ohio Quarries Company.

CHAIRMAN SANBORN: We shall be glad to hear from him.

H. E. DULMAGE (Ohio Quarries Company, Amherst, O.): That is sand stone. We have the silica dust. We quarry down to a depth of 100 feet with open pit quarry, and while we are doing considerable work with safety we want to do more. I notice one fact that has been brought out, and probably other industries find it the same; that is that we haven't had an accident in several years which we could blame to defective machinery. Over 90 per cent of the accidents are due to the individual workman's carelessness or thoughtlessness. Mr. Jones spoke about channel machines running over men's feet. We have the same trouble. We employ the same methods the lime industry does and we used to have a considerable number of accidents through men not removing their feet quickly enough; but now we have a guard that will push the foot off. It might be interesting to know that in making an examination of the health of our workers it was found that men who had been turning grindstones for 40 years, which is supposed to be the most hazardous work in regard to dust, were healthier and stronger than a lot of younger men.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Cement and Quarry Joint Session

Wednesday, September 27, 1927

R. FRAME, Chairman Cement Section
Insurance Manager, Alpha Portland Cement Company,
Easton, Pa.

L. R. CARTWRIGHT, Chairman Quarry Section
Vice-President, Mid-West Crushed Stone Company,
Indianapolis, Ind.

The joint session of the Cement and Quarry sections of the National Safety Council convened at two-thirty o'clock, R. Frame, insurance manager, Alpha Portland Cement Company, Easton, Pa., presiding.

CHAIRMAN FRAME: This session is a joint meeting. As many of you men know, the cement and quarry industry have a lot in common and it has always been the practice to have one joint session at which we could discuss the subjects pertaining to our mutual interest.

I am going to ask Major Reninger to announce the nominations of officers for the Cement Section for this coming year, and immediately following will be the elections.

H. A. RENINGER (Lehigh): There is one thing I want to bring out that I am very proud of as far as the Cement Section goes. That is in regard to the new membership in the National Safety Council. We have 13 new members, making a total of 79 in the Cement Section, with no cancellations, giving us a 100 per cent clear record, and the only section in the National Safety Council having a 100 per cent record in membership.

There were four companies who were reported as having cancelled their membership. These companies—the Pennsylvania, the Dexter, the Penn-Allen, and the Penn-Dixie—have not cancelled their membership but have all combined under the Penn-Dixie. They are all actively represented in the Cement Section.

Another question was brought up by Mr. Curtis in connection with community activities, upon which I would like to touch. What can we do in the way of helping the community? Those of you who have plants in large communities, are not up against it as much as the smaller community. Where you have a small community, as we have in a number of places—at Mitchell, Indiana, for instance, where the plant is more or less the chief manufacturing concern—we believe there is a field for our safety committees to do some good, active safety work. Perhaps it isn't so necessary that we go into public safety as we have to in other cities, unless you are on a main

highway, but I believe we have a field in the schools. There should be put into the school system a course of safety, starting with the child in the first grade and keeping on up to the seventh or eighth grade.

Years ago it was hard to do that, for the simple reason that we didn't have the material and when we came to the teacher and said we would like to put across some safety work and asked what she could give us in the way of help she would have to go and dig out stories and plays and different things; and, of course, she didn't always have the time to do it. However, with the inception of the Educational Section of the National Safety Council, we have gathered a great amount of information from cities all over the country and a course has been outlined. This course has been studied by some of the best educators. It has been worked out in detail now so that the mind of the child from six years on can absorb that information, and I believe we can do a great deal of good. Get the school authorities in your community interested and have them become members of the National Safety Council.

Let us get our school people interested in home safety and public safety. Eventually when the child has reached the age to enter into industry he will have absorbed a great deal of that safety we are trying to give him now. It will become more or less of a habit and that is what we want in safety work.

I think it might be a good plan to have one representative of every plant here and hold a meeting this afternoon or tomorrow morning and get one of the National Safety Council people here to talk to us. If we can, let us get Miss Stevenson to talk to us on school safety and what we could do. Are you men interested enough to get together after adjournment of this meeting and have a talk by Miss Stevenson or some one of those girls of the Education Section who are familiar with this work? How many of you would like to come to a meeting of that sort?

(A number of men raised their hands).

The School Children Are the Workmen of Tomorrow

We can set that meeting for four-fifteen. I know that many of you are interested in this work and have suggested that we do something of this sort. I would like to have one representative from each plant. We could go into the details and find out what we might be able to do.

CHAIRMAN FRAME: Major Reninger will be glad to answer any question in regard to this matter.

MISS M. JORDAN (Indiana): I think that would interest everyone here because the school children of today are going to be the workmen of tomorrow, and if you start in now teaching them the rules of safety and how to be careful in their play, in their household duties, if you get them at that age when they start working in your mills and plants you won't have nearly as much trouble with them.

I want to know if the procedure of that will go through the school boards.

MAJOR RENINGER: Yes. You won't have any trouble if you show them just what you have to offer.

CHAIRMAN FRAME: The average school superintendent, from my experience, will readily admit that he knows very little about the aims and the progress of the National Safety Council; and he will just as readily admit that it ought to have its beginning in the public school and he will welcome any suggestions from any community man as to what might be done.

MAJOR RENINGER: There are outstanding cases where industry could take hold of this thing. Mr. Kreglow, of the New Jersey Zinc Company, backed up this work with the schools. I am going to ask Mr. Kreglow if he won't review briefly their success.

MR. KREGLOW (N. J. Zinc Company): Most of the men who are interested in safety are members of the school boards. However, we have found the teachers very friendly toward it and also the superintendent. A number of times we took them along to our

local meeting and we got them interested. We have memberships for everyone of our school buildings. We also have the safety patrol. I think it is the right way to attack the problem and it is going on now without any trouble at all.

MAJOR RENINGER: The Nominating Committee of the Cement Section wishes to report as follows:

Report of the Nominating Committee

Chairman, T. F. Halpin, Marquette Cement Mfg. Co., LaSalle, Illinois.

Vice-Chairman, F. E. Town, Supt., Manitowoc Portland Cement Co., Manitowoc.

Secretary, A. J. R. Curtis, Portland Cement Association, Chicago, Illinois.

Chairman Membership Committee, Henry A. Reninger, Lehigh Portland Cement Co., Allentown, Pa.

Chairman Poster Committee, R. B. Fortuin, Penn-Dixie Cement Corp., Bath, Pa.

Chairman Program Committee, Russell Frame, Alpha Portland Cement Co., Easton, Pa.

I want to present these names as the ones placed in nomination by the Committee as officers for 1927-28. Signed by the Committee, Mr. White, Mr. Fortuin, and myself.

CHAIRMAN FRAME: Of course, it is your privilege to nominate any other gentlemen for the positions which are open at this time. It will now be in order to listen to any other nominations you care to present.

(It was regularly moved and seconded that nominations be closed).

CHAIRMAN FRAME: It has been regularly moved and seconded that the gentlemen proposed by the Nominating Committee be elected to serve as officers for the Cement Section for the ensuing year.

(The motion was put to a vote and carried).

CHAIRMAN FRAME: I declare the gentlemen duly elected. I take pleasure in presenting Mr. Halpin, of the Marquette Cement Mfg. Company, your next Chairman.

Mr. Curtis tells me he received a telegram from Mr. Town regretting that it is impossible for him to attend the session. Mr. Curtis will again serve as Secretary of the Section.

Now we come to the first subject on our program—"Fixing Accident Responsibility." The first question when an accident occurs is, who is to blame for the accident. We believe it would be of interest to discuss this, and I am sure it was placed in able hands when Mr. W. L. White, Jr., General Superintendent of the Sandusky Cement Company, Cleveland, Ohio, was selected to present the subject. I take great pleasure in introducing Mr. White.

Fixing Accident Responsibility

**W. L. White, Jr., General Superintendent, Sandusky Cement Company,
Cleveland, Ohio**

Fixing accident responsibility is a most serious problem. It calls for a decision, which, under any circumstances, is hard to make; one which must be carefully studied, and only a cool, clear, unbiased opinion is to be used in handing it down.

The safety movement, as we know it today, particularly in the cement industry, is really an innovation compared to the age of the industry. The year 1919 saw the beginning of extensive accident prevention work by the Portland Cement Association, and, while there were a good many individual plants and companies which paid particular attention to the prevention of accidents before that date, yet, nationwide attention to accidents began in that

year. Attention to accidents means placing the responsibility on the party directly responsible for them. Little or no attempt was made to fix accident responsibility in years previous to 1919.

It might not be amiss to state here that the first day I started with a cement company there was an accident at the plant which resulted in a fatality. but, to be honest, perhaps through inexperience, or youth, or both, it did not make the impression that an accident does today. I do not recall any attempt to fix accident responsibility in the first years of my work. The general attitude in the cement industry was to take an accident, serious or otherwise, with a shrug of the shoulders, as if it had to be, or, as if it were part of the routine operation of the plant or quarry.

There are four headings into which "Fixing Accident Responsibility" can be classified:

- (1) Executive or company policy
- (2) Plant Manager or superintendent
- (3) Plant Safety Committee
- (4) The individual

(1) It is a well-known fact that the attitude of the superior officer or executive, president or board manager, or whatever individual or group directs the policies of an organization, is reflected down to the humblest employee. If this individual, or group of individuals, is not squarely behind the welfare of the employees, and does not sanction safety work, it has a bearing on results secured by the company. This might be termed more psychological than actual, and, therefore, a president could hardly be accused of being the cause of an accident. However, careful analysis shows that he is responsible to a much greater degree than a casual glance first discloses. The mere fact that most individuals and groups look up to leaders for initiative is sufficient cause for the statement that the executive is responsible in a certain measure, for accidents if he, or they, are indifferent to the safety movement.

The Modern Executive Must Be Behind Safety Work

It is inconceivable that an executive of today is not squarely and actively behind the safety movement. There are some who are passive, though, and such should certainly be held liable for at least part of the responsibility of the accidents occurring in their organizations.

(2) The second party on whom the responsibility of accidents rests, is the plant manager, or superintendent. In a great measure, the entire success of safety work depends on him. If safety is not being pushed energetically, or, as in some few cases, is not even considered, then this man is directly responsible, except, perhaps, in the rare case where his good intentions are held in abeyance through the orders or wishes of his superiors. A good plant manager includes the safety movement as part of his daily duty. I say daily because safety work is largely missionary work, and the true safety man can be likened to a missionary who toils unceasingly, day after day, without any thought of reward, gratified entirely, through love of his work, with but small visible results. He must be a keen student of human nature. His interest must never lag. He must be able to put across the idea of safety, not only to the safety committee, which should be directly under his supervision, but also able to put the idea across to the individual, through his actions and speech.

The following case occurred during the war period. The common labor at the plant was composed mostly of the rag, tag and bob-tail which had escaped the draft, and more negro than white. During a particularly rainy period, with the coal storage low, it was necessary to put a force of laborers

shoveling from the coal pile into the screw conveyor under the coal trestle. This screw conveyor was guarded with a heavy bar grating, bolted down to the concrete. The plant superintendent was in this particular department for some little time, principally with the intention of putting across the safety idea to these men, as several serious accidents in screw conveyors had occurred prior to this time. No sooner had the superintendent left the storage, than one of the negroes removed the grating, straddled it, and started to shovel in coal.

He slipped, fell in the screw, but miraculously, had only the flesh and muscles of the calf torn, instead of losing his entire leg. While he lay on the stretcher waiting for the doctor, the superintendent asked him why he did it, and he was frank enough to admit that he wanted to hurry his work up, that is, fill the coal tanks over the boilers, and then sit down and rest, which is characteristic of the negro as you know. This accident brought the superintendent face to face with placing the responsibility, and he felt guilty because he did not have the ability to read human nature better, or else was unable to sell an idea, and, from that time on, this superintendent became a better safety man.

The Functioning of the Safety Committee

The injured man was not censured at the time. He was suffering enough pain without giving him mental stress in the bargain; but on his return from the hospital, coming back to work, he became one of the best safety men in the plant.

Perhaps you have all had similar experiences, and the plant executive who is unable to strike the chord of safety, and cannot sell or put across the idea of safety, lacks one of the fundamental characteristics which will make him a success.

(3) It is no easy task to have a safety committee function properly. In the early beginning, when safety committees were first organized, while it was not the rule, yet a good many plants had a safety committee in name only. This committee might be composed of any number of men, meetings would be called at various irregular intervals. Sometimes the members of the committee were "too busy," having a small repair job to work on, and considered the operation of the mill of more importance than the safety committee meeting. Again, the spirit of the organization would be dominated by the plant executive because he took it upon himself to turn down all recommendations except those which he himself might bring before the committee, feeling that an employee was "treading on his toes," or presuming beyond his station, or overstepping his authority. In other words, the safety committee was not being handled right by the plant executive. A good executive will have a good safety committee, and this is the third group upon which the responsibility for accidents rests. It is not right for a superintendent to take upon himself the duties of a safety committee, so to speak, nor to inspect the plant at such times as he may see fit, perhaps with one member of the safety committee or alone, nor to install certain safety devices and consider good safety work being done. Such practice, in reality, is nothing but the result of egotism on the part of the superintendent.

A manufacturing plant as large as the average cement plant today needs a safety committee that consists of not less than six, and ten is considered approximately the right number for a three thousand barrel plant.

The committee itself must be made up of real safety men, whose enthusiasm must be ever to the front. The members of the committee should not

necessarily be chosen by the superintendent, as the employees know best who of their number is most interested in safety work.

The committee should meet at regular intervals, and, in addition, have special meetings when the occasion demands, such as a serious accident, and it is only right to place in its hands the fixing of accident responsibility.

A man does not have to be college bred to make a good safety man, but he should be one of sound sense, a thinker, and have a good understanding of the idiosyncrasies of human nature, coupled with unflagging interest and endless patience. When all of these characteristics are found in one man, he is a jewel well worth keeping and generally demonstrates his worth through the results obtained. However, it is not difficult to find many of these characteristics in the average plant employee. If the safety committee is properly organized, and has the shining example of a good superintendent, it is bound to function efficiently.

Bad Safety Records Pull Down the Average

The accident records of the Portland Cement Association show that there are a "vicious few" plants which apparently lack something to bring their safety records to at least normal, and this record of the few pulls down the record of the majority through an excessively large number of man hours lost on account of various kinds of accidents. On the other hand, there are a number of plants which have an enviable safety record. A major portion of the success of this record can be traced directly to the safety committees.

It will not do to appoint a safety committee and then, on the day or days specified for the regular meetings, permit its members not to attend on account of some breakdown in the mill, or other excuse which might be forthcoming; or, on the other hand to cancel the meeting until the next day, or the day after, as the superintendent may have something which he considers needs his attention. There should be, as stated before, a specified time for the meetings and the schedule should be adhered to, and, except for unforeseen, serious reasons, no member should be allowed to be absent. If there are one or two members who would rather not attend, it is usually an indication of lack of interest, and they should be removed without further consideration, and others appointed in their places.

Neither should the plant superintendent, through the authority vested in him, become a jury of one and veto valuable suggestions offered by various members of the committee, merely because they might not strike him as the right move. If the suggestion is approved by a majority vote of the committee, unless he questions it at the time it is discussed and gives reasons sufficient to vote it down, the resolution should be placed on the books and the work done as suggested. Too often a peremptory veto takes the pep or enthusiasm away from the committee, and this, in turn, is reflected throughout the organization. With what result? Either there is an increase in accidents or a failure to obtain results in periods when drives are put on, such as the recent campaign of the cement industry in June of this year. Accidents in plants can be reduced if the safety committee is functioning properly, under a good executive. If they are not reduced after the organization is started, then it must assume its share of blame for all accidents, major or minor, which occur, for it has failed to do its duty, which is, first, putting across the safety idea to fellow employees, and, second, providing the good example.

No doubt some of you have observed members of your own safety committees doing foolhardy things in the plant, or making disparaging remarks in the presence of other employees. If these failings are not corrected after a heart-to-heart talk, they should be dismissed from the committee and the

fact published throughout the plant, which, as a rule, is sufficient punishment and makes them better safety men. Sometimes one hesitates to use the big stick, but it is necessary with certain types. It is rather difficult, perhaps, to cite cases where safety committees have flagrantly violated their duties. Actually, the idea of the formation of the safety committee originated from the fact that the plant executive cannot reach each individual throughout the plant, not coming into daily contact with as many of them as the members of the committee do, and on its shoulders rests the responsibility, which is very heavy. If this idea is instilled into the minds of its members, there is no doubt that the committee will never be censured nor taken to account for accidents which might occur.

(4) Fourth and last comes the individual himself. Except in catastrophies, where many are injured, and some killed, it is the individual who is generally responsible for the accident, and that responsibility must rest on his shoulders. Only, however, after a thorough investigation. If the plant superintendent is a safety man, and his safety committee is working properly, the injured employee has had an opportunity, through observation of the actions of his fellow workers, and discussion with them, to learn about the safety movement and has been instructed regarding all hazards about the plant. If he does not benefit through these methods he is entirely to blame.

The Other Side of the Subject

There are certain individuals who seem to be unlucky and who are continually unfortunate. In one particular case it was necessary to discharge the man. He would be injured, and, a day or two after his return to work, he would have another accident. Within the course of a year he suffered ten accidents, not quite one a month. It was finally decided that he was too great a risk and he was let go. Such is an unusual condition, however.

These comprise the four headings into which responsibility for accidents can be classified, but they are only one side of the subject. There is another side, which some people have emphasized, that is, the sentimental. It is not the intention to take that up in this paper as sentiment should not be used in handling safety matters. The only sentiment which enters into the situation is this; the man, or men who are responsible for an accident, and on whom the responsibility is placed, are usually punished sufficiently through the knowledge that they are the cause of pain and monetary loss to a fellow being, and further punishment should not be meted out, except in cases of gross carelessness, other than the publishing of the fact that they were directly responsible for the accident. That is as far as sentiment should be considered in handling this matter. Nor should generosity be considered in placing the responsibility.

There is one type of accident which cannot be accounted for even after a thorough investigation, and the responsibility for such accidents cannot be placed on anyone's shoulders. Particular reference is made to a fatality experienced at a cement plant in 1926 where one man was electrocuted and two others severely shocked while pulling on a cable from a car puller. These men were in the packing department and it was their duty, in connection with packing cement, to unroll the cable from the drum of the car puller, attach it to the last car of the string, and, after this hook was attached, pull the cars in front of the packing house door. These three men took hold of the cable, after starting up the motor of the car puller; two of them were knocked ten feet, one unconscious and the other severely bruised, but the third, presumably from a weak heart, was electrocuted.

Just who should be held responsible for this death is still a question. Starting at the top, the president of the company is a safety man; the superintendent has been giving, and continues to give, all there is in him to have an excellent record at his plant; his safety committee is composed of good safety men, and the general attitude of the whole organization of the plant places it in the front ranks of the safety movement. A thorough investigation of this electrocution brought forth the fact that it was caused by a faulty electrical connection. The first deduction would be that the plant electrician, who, incidentally, is a hearty worker on the safety committee, was responsible, but, if this conclusion is reached, why should not the plant executive take his share of the blame, or, going higher, why should not the head of the operating department, or even the president be implicated? To place the responsibility on any of those individuals would be wrong, because the motor received regular inspection, and the short circuit, which was the cause, evidently happened shortly after the motor was inspected, without giving any sign of happening at that time, and it could have happened the first time the machine was started up after it was inspected. It would, therefore, be most unfair to place the responsibility of that accident on the shoulders of any one individual.

In Numerous Cases Responsibility Difficult to Place

Another fatality which a cement company recently experienced, happened to a young foreigner while stripping in the quarry. He was excavating in a pocket. A large stone suddenly slipped out of the bank. Close inspection failed to disclose the possibility of this stone moving. It fell against the man's leg, breaking it above the knee. He was removed to the hospital and the bone was set and the leg placed in a plaster cast. Examination several days later showed that the set was broken. An operation was performed, but the man died from strombosis or blood clot. Perhaps the quarry foreman should be blamed for this accident in that he did not detect the loose stone at the location where the man was injured. We all know that careful inspection does not always disclose defects, and the company feels that this man is not to be blamed for the original accident. Being a muscular fellow, the doctor claimed, was the cause of the original set being broken, and they had every reason to believe he would survive the operation. Strombosis is apt to happen to anyone undergoing an operation however slight, where blood vessels and arteries are cut. On just whose shoulders the responsibility for this fatality should rest is a difficult problem to solve, but the doctor came in for censure, perhaps unfairly.

Numerous cases where it is difficult to place the responsibility even after a most thorough and careful examination, could be cited.

There is another type of accident which occurs frequently in cement plants, which is to be most heartily condemned, that is, accidents caused through "horse-play." The responsibility can invariably be placed on one or several men, and those men should first be given a fair chance to stop the practice, and if they do not heed the warning, dismissal is called for.

One reads and hears of so many horrible results such as those of ruptured intestines through the application of compressed air, or, electrification of the drinking cup, which caused the death of an employee who had a weak heart, and, while meant as a joke, such practice can be called nothing but horse-play and should not be tolerated. This is one of the few cases where accident responsibility is easily placed, and the person condemned should not be given much consideration.

I had occasion to discuss safety with an officer of one of the cement com-

panies some time ago, and remember distinctly his making the remark that he had not been pushing safety work as he should in that year, and the record of his company was much worse than in previous years. This I took as an indication of his thoughts on the matter and have watched the record of that company from that time on, and the results obtained by it have been truly remarkable. In fact, it is now near the head of the list in the length of time during which no accidents have occurred at their various plants, where before this record gave anything but a good impression.

If all executives have safety work at heart it would do worlds of good in reducing the number of accidents in their plants, for every individual would be proud of the fact that he was doing his little bit to have a good safety record, and one of his reasons for this satisfaction is the knowledge that his superior officer is keeping a close check on the plant's accident record.

On the other hand, there are numerous cases where safety work comes from the heart of every one concerned, from the president to the humblest employee, yet the accident records are deplorable. The records at the various plants where this is a fact will go along unblemished for months at a time, except for an occasional scratched finger or other minor-no-lost-time accident, and then, suddenly be spoiled by a fatal accident.

Unceasing Effort for Safety Is Necessary

I have in mind one plant in particular which would build up a wonderful record; all the members of the safety committee and the organization as a whole were on their toes to make the record 100 per cent for a year at least, when, out of a clear sky a fatality would occur; for instance, an electrocution where a man stepped from the crane girders down to the bucket and touched the trolley cables. Part of the craneway did not have a roof over it and it was raining at the time of the accident. That he neglected to shut off the current on the trolley cables before he went to repair the bucket, was assumed. The man was worked over for hours, but without result.

A year went by with a very good record before another accident occurred. This was the electrocution previously mentioned, where a man was killed when pulling the cable on the electric car puller.

About twelve months later, an employee working in the basement of the silos, in crawling over a screw conveyor which was three feet above the floor, got caught in the screw, tearing his leg out at the hip. The man died shortly thereafter.

Such accidents as these can be enumerated indefinitely, although the general trend is toward reduction. Various methods are tried in an effort to overcome and reduce them to a minimum. Placing the responsibility for such accidents has been gone into in this paper. It is poor practice, however, to close the door after the horse is stolen, and the best way to prevent waste of time, trouble, and perhaps hard feelings due to placing accident responsibility, is to prevent accidents, or, to close the door of the stable before the horse is stolen, and this can only be done through unceasing effort on the part of every one, or, in plain words, constant missionary work.

CHAIRMAN FRAME: Mr. White has given us something to think about when we try to fasten responsibility for accidents and for deaths. I know he will be glad to answer any questions.

A. JONES (Indiana Limestone Co., Bedford, Ind.): In Mr. White's talk he spoke of an accident that occurred through a rock falling out from the face of the ledge and breaking a man's leg. I would like to ask if they ever decided what was the cause of that rock slipping.

MR. WHITE: The formation of the stone at this particular quarry was up and down. This stone slipped out of the side. Why, we don't know. There wasn't any blasting at the time. The quarry is regularly inspected by the foreman and whether there was moisture there that let go all of a sudden we don't know.

E. W. BALDWIN (Solvey Process Co., Detroit): This question arises in my mind: If a man has had ten accidents in a year, shouldn't he be let out a little before that. We let a man out if he has had two, three or four.

CHAIRMAN FRAME: You mean lost time ones?

MR. BALDWIN: Yes.

CHAIRMAN FRAME: That is one way to create safety rules.

W. R. DUNN (Vulcanite): I recall an accident some 15 years ago where the rock was of a vertical formation at the top, that looked as if the rock was about ten feet wide. You couldn't tell what it looked like when you were down at the bottom, 50 feet below. The rock tapered to about one foot at the bottom. Naturally, you would suppose the rock was ten feet wide below the same as it was at the top. Without a warning of any kind it crushed down and toppled over and killed nearly all of the men in the quarry.

P. E. SANDT (Edison): May I ask Mr. White or Mr. Dunn what time of the year, if they recall, when these slides occurred? We have a great many in the spring of the year and it is a case of constant education with our men to keep everyone on their toes in the spring of the year.

MR. WHITE: I believe there is a misunderstanding on that. This pocket proposition, as we have it down in this quarry, is not over six or eight feet. We dig the clay out to expose the limestone. This stone just kicked out and was big enough to fall against the man's leg and break it.

MR. DUNN: In that case I mentioned, the rock was perfectly dry. The accident occurred about midsummer.

CHAIRMAN FRAME: You heard Mr. Curtis report this morning on the splendid accident record which had been obtained by a number of members in the Portland Cement Association so far in 1927. He mentioned the fact that there were 23 plants which so far have a clear record. It has been said many times that one of the most difficult problems after you have gotten a fine record is how to keep it up. That will be a burning question with a lot of our members in the Trophy Club. In this connection I am delighted to introduce at this time Mr. W. H. Weitknecht, superintendent of the Lehigh Portland Cement Co., Mitchell, Ind. Mr. Weitknecht's plant is the one member that has won two trophies. He is going to take up a new angle this afternoon.

How Can a Mill with a Perfect Record Keep It Up?

**W. H. Weitknecht, Superintendent, Lehigh Portland Cement Company,
Mitchell, Ind.**

I feel that I am in the position of that writer on farm topics in a leading farm paper, who wrote splendid articles on successful farming for some years, only to have his farm mortgage foreclosed sometime afterwards.

How can a mill with a perfect record keep it up? I hope we haven't been foreclosed. I know we haven't, but we haven't quite kept it up. That perhaps calls for an explanation and we are always willing to justify our position on any question or condition.

In 1923, we had what we called a very enviable record, but we were beaten for the trophy by a few fractions of man lost-time per hundred thousand man hours. In 1924, we succeeded by having, I think, just one and a fraction lost-time hours per hundred thousand man hours. In 1925, without any other lost-time accidents, we had a fatality in November chargeable to us, and yet it did

not result from any negligence on the part of any of our employees. It was due to carelessness, rather, on the part of the railroad company. In 1926, I am very glad to say, we were one of the companies that had a perfect record and we won the trophy again. In 1927 we continued the good work until about the middle of July when, after the whistle had blown, one of our men leaving his work to go to the clock house to register out was bumped by another employee in his Ford; he fell on the concrete pavement, giving his left knee a twist to such an extent that he was unable to report the following day. He reported for work the following Monday, this having happened on Thursday night. So we have two days' time lost on our record.

Perhaps that in a way—the type of accidents and how they happened—is a justification for my being here, since we have not had any serious accident in the industry arising from the employment itself.

We believe that the knowledge of any subject is the true basis for success in that line, and we have come to know that personal injury accidents can be prevented. After what you men have heard today you dare no longer rest on a belief that it can't be done. For if 23 cement plants (cement being an industry known to be hazardous) can operate for seven or eight or nine months, employing many thousands of men, without a single lost-time accident, you know that plants can be run without personal injury accidents.

Responsibility is Preventive and Corrective

That brings to you the matter of responsibility, which is twofold—preventive and corrective. The preventive side, of course, is involved. Who can say that the employment offered to the employee was in accordance with his capacity? The employer knows more about that employment than the employee possibly can know. Instruction is required before that employee goes to work. Was that instruction competent? Did it cover the nature of the work and the performance of it sufficiently? That is a responsibility for the management, more so than of the employee, through its foreman. So that the responsibility of the management as a result of the accident to the workman extends far more than to safe places. It involves, also, to a large extent, safe practices. Have you had foremen in whose departments accidents happened because the men practiced what the foremen had practiced, what they had seen him do? Isn't that a responsibility?

The other is corrective. It deals with placing the responsibility after the accident has occurred, and that is perhaps more specific and more personal. Who is responsible for it? A responsibility, to have any effect or force, must be personal, it cannot be impersonal. That is the duty of the investigating committee which we have in our program of safety work. But you say, if you have had so few accidents, what investigation of accidents does the safety committee or the accident investigating committee engage in? The answer is it engages in preventive investigation. There are many near accidents that almost result in personal injury. There are bad practices that should be discovered, and will be discovered if you have a good safety committee and a good organization; and it is just as much their duty to investigate the possible cause of any accident before it happens and place the responsibility, as it is to have the accident happen first and then fix the personal responsibility. For it follows that if you have in your industry a number of minor accidents, not lost-time accidents, but near accidents that might have resulted seriously, you are going to have personal injury accidents that will be serious.

Now, we have come to the point where our accident investigation work deals almost wholly with those near accidents and those bad practices, as a preventive measure. We try to discover the bad practice, we try to discover the responsibility for a near accident, and place it before the accident has happened. And you will find, I think, that that will be one of the keynotes of maintaining continued interest on the part of your safety committee in the way of accident prevention.

Before the Portland Cement Association awarded those splendid trophies for the best record, our company, because of the number of mills they had, began those contests at the different plants, instituting a no-accident-month campaign; and it unified the work of the safety organization of the several plants of the Lehigh Portland Cement Company and put every safety committee, every employee, every foreman on his toes. They wanted to win the safety flag. After they won that they wanted to win the cup. It was the incentive of competition that started them. We now have so many cups and so many flags that we can decorate our entire plant with them. But every cup that we get and every flag that is sent out to the mills seems to be more appreciated by the men than the first one. They know, first of all, that accidents can be prevented. They know they are standing on a record of which they not only feel proud, but one they must defend.

We are never satisfied, we always want more. Capitalize that spirit in your organization. We want to win the trophy in 1927 and we want to win it twice in succession. Those of us who attended these meetings were told by our safety committee if we wanted to win the association trophy in 1926 that we must have a perfect record, because the progress made in the reduction of lost-time accidents is such that hereafter no mill will win the trophy unless it wins it on a perfect record.

Men Must Acquire Safe Practice Habits

In 1927 we said the same thing, and much as it has hurt to lose those two days it has served to do one thing: it has served to make the men more circumspect in the real sense of the term. They look around; they are no longer content with taking care of their own safety, but are looking around for the safety of others. That is the very thing I have been trying to impress upon our safety committee. They cannot possibly be safety committeemen and serve in the plant only. They cannot be safety men at mass meetings and not be safe men on the job. It is a matter of habit. They must develop safe practice habits. There again, if I may disgress a moment, if you instruct your men and supervise their work in safe practice habits, you will prevent accidents; and that is the chief reason why plants will get along with relatively few personal injury accidents. If they cannot minimize their accidents because of the natural deficiency and delinquency of some workmen, the unlucky fellow, as we say, let him go. Be fair to the others. Transfer him from that department to another where the work is less hazardous, but if he is a fellow who stumbles over his own feet give him a few nice talks and say, "John, if this thing happens again we will let you go; you must look for employment elsewhere."

And after several transfers from hazardous to less hazardous and still less hazardous occupations, he still has near accidents, we let him go. We recognize a responsibility not only to that man, but we recognize a responsibility to his fellow men. The wife of one of the men came to me begging for the re-employment of the man. I said, "Has it ever occurred to you what a serious thing it would be for your husband to become crippled while in our employ? You are thinking only of the immediate future. He is not safe to work in the line of employment in which he wants to work. He doesn't want to be a common laborer. He is a better grade workman, as far as mechanical ability is concerned; but we cannot continue him."

We are careful not to humiliate him by letting the rest of the employees know why he was let out. Speak to him and let him quit. It is labor's respectful resignation, just as you, an executive, do not expect to be bodily discharged in being given your walking papers, but you are politely asked to resign.

What about this spirit that pervades among the men of the plant or the safety organization? They call attention to things, they want that thing prevented. They don't want the man to get fired. It isn't a question of winning the trophy, it is a question primarily of realizing our responsibility to that man and to his fellowmen,

ment to inculcate in them before they leave. They come back to their safety committees and report to them, and sometimes they don't get through in the first meeting. We continue to have a report at the next meeting, or we call a special meeting, and in that way we continue to keep the matter of accident prevention alive.

But as I said in the beginning, the keynote of the whole thing is the fact that the men know that it can be done, and they would be ashamed today if our accident record got bad. They keep up the spirit and I, for one, believe that we have our employees at Mitchell thoroughly sold just that way.

CHAIRMAN FRAME: Mr. Weitknecht has given us a sound, sensible, well organized and conscientious method by which he controls accidents in his plant, which radiates from himself as a superintendent and, as you have gathered from his remarks, extends through every one of his foremen down to the very men themselves, who have begun to appreciate that an accident record means something to every plant. He has brought to the surface many interesting thoughts on accident prevention. Some of you, I know, have questions to ask Mr. Weitknecht.

V. ROBERTSON (Canada): I would like to ask the speaker, after they have had an accident, which, of course, is investigated, is that investigation made by the executives or by the safety committee?

Special Committees Often Appointed

MR. WEITKNECHT: It is made by a subcommittee of the safety committee, which is an investigating committee usually appointed for the occasion. We appoint a special committee for every particular occasion; it tends to distribute the work and it gets more people interested. Those people who investigate accidents are better safety men because they have served.

MR. ROBERTSON: Are the findings of that investigation made public or are they confidential?

MR. WEITKNECHT: The findings usually are made public. We have had but few, but I cannot recall an accident where the cause was not evident. The reason for the investigating committee is more to ascertain just exactly in what practice this accident had its origin. If there is any mystery attached to it, it is fully explained. Usually the matter is gone into in detail at the next meeting of the safety committee, and sometimes we have a special meeting just for that purpose. I might add this: prior to the June no-accident campaign we had mass meetings and we had departmental meetings where we got a large number of men together in our shop. These men were addressed by the foremen. The men in the quarries, which are about two miles away, were called together and we had special meetings. So we may call a special meeting at any time when some particular near accident has happened. When I say near accident, I mean some occurrence which almost resulted in an accident. We make it a point to bring it to the attention of the safety committee and they to the department committees, and that is the duty of the accident investigating committee.

CHAIRMAN FRAME: I want to emphasize that a little bit stronger if I may—Mr. Weitknecht is right after the near accident. They have gotten to the point where they have few lost-time accidents. He is transferring his activities into looking into every near accident and thus he maintains a clean slate.

MR. HEALY (T. H. Martin Co., St. Louis): Do you have any difficulty in getting the men to adopt respirators where necessary?

MR. WEITKNECHT: Yes. However, we have few places where they are necessary. We have one place in a certain part of our packing house; but we have found that there is a risk involved in their use. We haven't found a single case where inhaling of cement dust such as exists in our plant has injured anyone. I think that is a matter of record for the Portland Cement Association.

CHAIRMAN FRAME: In that connection I wish to announce to anyone who is interested in respirators, the New York State Department of Labor has recently issued a pamphlet in which it is discussed from every angle. After reading that it is my personal opinion that its practical use is limited in the cement industry. You can get that pamphlet from the Department of Labor, Albany, New York.

DR. E. M. PARTLETT (Pittsburgh): I was glad to hear you say what you just said about limestone dust, because it is so. I have interested myself in that for some years. I have some data that limestone dust is free of silicate and is harmless.

QUESTION: Do you make these men who are involved in accidents appear before the safety committee?

MR. WEITKNECHT: We have not had any serious accidents. A man was injured and lost two days' time and he was before the safety committee largely as an example to the others. We don't want these men to feel that they cannot appear before the safety committee. We want them to feel somewhat like the real honest-to-goodness boy who, while he may get into mischief, will tell the truth, but he hates like anything to face his dad.

When Responsibility Is Definitely Placed

A. C. HEWITT (American Limestone Co., Bellefonte, Pa.): There are two questions I would like to ask, one from Mr. Weitknecht, and another of more general interest. When you investigate the cause of accidents and find that the responsibility can be definitely placed on a particular individual, how do you handle that case? You say that you make public the findings. Do you make public the responsibility and cause shame on the fellow who caused the accident?

MR. WEITKNECHT: All accidents that require any investigation are like gossip in our plant. You can't keep it secret and we don't want to. It is reported and then investigated by the committee. If it is of a very serious nature we call a special meeting of the safety committee. If not, it goes over into the next meeting. The findings go to every department and become public. We even issue in particular cases notices on the bulletin board. We have had so few to issue that the practice has almost been discontinued. But that is exactly what we do if we find some fool stunt practiced.

MR. HEWITT: I would like to have some idea of how many cement plants—not companies but individual plants—have a full-time safety man who does nothing else except safety work?

CHAIRMAN FRAME: I think there are very few of them. That is my personal opinion, however, and I may be wrong. I will ask those plants represented that have a full-time safety man in their plants to please stand up.

(Twelve men arose.)

CHAIRMAN FRAME: That is better than I expected.

R. E. HOFFMAN (Atlas): The gentleman beat me to the question I intended to ask. I have heard four talks today and I haven't heard the mention of a safety supervisor except just now. I would like to know from some of the plants that have safety supervisors what part they play in their success?

G. C. HUTH (Universal): I am a safety supervisor but I don't care to talk about myself. However, I can tell you about my job. My job as supervisor of safety is a combination job. I supervise the safety men of the mill. The biggest job that any safety man has, I believe, is getting the job out of the office and putting it out to the fellows who are actually doing the work. The safety supervisor organizes and helps them along. I think ultimately the fellow on the job should carry all the work. That is the way I have been trying to work it out.

A. J. EALES (Bessemer): I don't know just how to explain this, with regard to my own personal job. I don't handle the employment of the men at all. That is done by the foremen individually. I spend most of my time around the plant, not in the quarry. But with regard to putting the safety thing over, I think the foreman is your

best man for that. The men will take more from your foreman than they will from your safety man. Your safety man can handle the foreman, but the ultimate success rests with the foreman.

CHAIRMAN FRAME: Since we have gotten into the engineering phase of this important subject I notice we have with us today an engineer associated with one of the largest cement manufacturing concerns in the United States. I see Mr. Carlson sitting there and I wonder if he won't add just a few words to the importance of engineering in regard to the prevention of accidents.

A. G. CARLSON (Universal): I am not going to attempt to tell you how to prevent accidents, but I will say something about how we prepare equipment to help prevent accidents. The Universal Company has spent thousands of dollars for safety equipment. In recent installations this safety equipment is considered part of the job and the cost of same is swallowed up in the construction work. Every job, before it leaves the office, is inspected to see that all dangerous places are properly guarded. Previously, safety features were things the companies delayed putting on until forced to do so, and this cost them more money than if they had been installed at first. I think it is safe to say, since we have installed safety devices, there have been considerably less accidents. Before we had all the safety equipment, we had considerable accidents which cost the company more money than the installation of the safety equipment.

A Month to Investigate Plant Conditions

D. ADAM (Lawrence): Our friend, Mr. Hoffman, I think, asked a question which has remained unanswered. I happen to be a safety engineer. In 1924 I took over the duties of the safety engineer in our company. I faced 1,276 lost days, some permanent disabilities and two deaths. I was told to go to it, which I did. Today we have 110 lost days and 11 lost-time accidents.

When I first started in the safety work I took a month to go around the plant with my eyes open, my ears open, and my mouth closed. In that month I learned a lot. In three months' time I realized that guards and bulletins were good, but they didn't mean everything. I realized the only way to get the men interested in the safety movement was to tell them the reason why.

Our results merit what I tried to do. I introduced a Thursday afternoon talk which I consider has been the backbone of the safety work in our plant. I get a man from each department for half an hour and sit down as man to man with him, talk from an ordinary, common sense point of view and tell him about the rules and regulations of our organization; why they were made, how they are based, the reason they were made, and the benefits that would accrue from them. In that way we eliminated all our accidents. Previous to that we had one every week.

It doesn't go home unless you have a heart-to-heart talk with the man. We can collect the ideas at this meeting, formulate them and transfer them on to the individual.

In that connection I would like to mention this: Sometimes it is not always possible for a fellow to talk and explain those things to a man. I attended the public speaking class this morning at eight-thirty given by Professor Hardy. As Professor Hardy says, the main point in a talk is to get at the fellow direct, not to shoot over his head. Don't be dogmatic about it and say they must do it. It is not a case of, "you have got to do it." Tell them why they have got to do it.

MR. BLACK (Philadelphia): I wish to say something in regard to the dangers of dust. My company conducted an informal investigation. This investigation involved going over the records of physical examinations of in the neighborhood of 25,000 men exposed to cement and limestone dust and other dusts of that nature. The evidence was definite that their average health was so high that we came to the conclusion their health was above the average of workers alongside of them.

We put those various dusts, including dusts of silicate, granite, and that sort of thing, under microscopes and we found, without exception, that where you find a

sharp dust it is dangerous, but where you find a dull dust it is not dangerous, unless there is poison in the dust itself. That was our conclusion. It would be hard to support it in a general way.

CHAIRMAN FRAME: Thank you very much, Mr. Black; we are glad to know of your findings on this important question.

Is Mr. Jacobsen in the room today? I wonder if he is prepared to tell us something about his observations on the safety engineer?

H. G. JACOBSEN (Bates Valve Bag Co.): It has been my experience, if you want to get my angle on it, that in safety work, if we have 100 plants possibly we have 100 different methods, inasmuch as we have 100 different managers, and they all work more or less differently. They all have different personalities and they attack the problem somewhat differently, although possibly along the same main lines, and generally if they use common sense, they arrive at somewhat the same results.

Mr. John this morning spoke about the difficulty that was met with during the years that we had to do the pioneer work, and I can speak freely on that subject. It was difficult to get the various companies to report their accidents and take hold of them in a real two-fisted manner. I think that period has been passed and I am certainly more than pleased to be here today, because I never have yet seen a meeting quite as well attended as this one, nor have I seen a meeting that has been attended by men of such caliber as I see here today.

Safety Suggestions Come From Everybody

CHAIRMAN FRAME: I am sure we all have a very fond recollection of our pleasant association during the years Mr. Jacobsen was in charge of accident prevention work for the Portland Cement Association, and we all know what strenuous efforts he put into the organization of the various plants and the ground work he laid for the success we have recently attained.

J. R. KLINE (Universal): I have similar lines to offer about the general safety work in our plant. We are safety men at the plant all the way down. We take suggestions from anybody in the mill on any subject and give him a reasonable answer. There have been at least 1,800 suggestions made at our plant this year and every one of them has been put on record and sent out to the departments that take care of them. Each department has meetings at least once a month. Every man attends a meeting at least once a month. I talk to them at the meetings, tell them anything and everything. I give them reasonable answers to their inquiries about plant operations, safety work, or the general topics of the community.

CHAIRMAN FRAME: Don't lose sight of the fact, gentlemen, that Mr. Kline's plant is a member of the 1927 safety club.

I would like to ask Mr. Weitknecht about a problem that has been a prominent one in the cement industry almost ever since operation began. I refer to the guarding of screw conveyors. As you men know, we have had a large number of deaths and very serious injuries caused by screw conveyors. The Alpha Company recently had a fatal accident at a location we thought splendidly protected. The screw conveyor is contained in a concrete box some 26 inches high from the floor. The sheet metal covers on the top are securely bolted down. Somehow, it seems, the pressure was so great that it warped or caused the sheet metal covers to raise up and spill out the cement into the tunnels. We had a man working in these tunnels whose duty it was to clean up the spill. There was no witness to the accident but from the best information we could gather, we think that for his own convenience this man unbolted the sheet metal cover from the screw conveyor or laid it to one side, which is contrary to our safety rules. He happened to have some other duties in one of the other tunnels and when he came back he somehow or other got into the trap which he laid for himself.

I know of two other fatal accidents that happened just recently on the screw conveyors. We have made wonderful progress along many other lines, but the

We use no methods that are different from anyone else's. Management has its own responsibilities, it is true, but we are proud that we have a loyal body of safe workmen, men who know that, outside of the loyalty to their plant, an accident means something to them. We have also tried as much as possible to do away with the word "accident". In looking through the dictionary you will find that "accident" is something for which no provision can be made, it is something that happens unforeseen, something that is wished on you. We claim that an injury is not really an accident, because it is something that can't happen. We always have shown the men where the accidents have been caused, and as soon as they understood the policy the management assumed with regard to them our accidents stopped.

Among Effective Methods Is the Plant Publication

One method we use is the plant publication. We never know whether that does any good or not. It is a humble, mimeographed thing. It is not put out as the official voice of the company. It is not an attempt to high-hat or patronize the men; it is just a medium of conveying orders or wishes or commendations from the office, from the man higher up to the man lower down; and by attempting to place all on the level in that little publication we may have accomplished something.

Which of our methods has brought about the greatest results, we probably will never know. Today we are proud to stand in rank with some of the highest in the land, United States or Canada, as a plant and a company that is second to none in accident prevention.

CHAIRMAN FRAME: Has anyone else anything to add to the meeting.

A. JONES (Indiana Limestone Co., Bedford, Ind.): I don't feel like leaving this meeting without giving you another angle of this safety work. I am with quite a large organization. We employ in the limestone industry some 5,000 men. We are closely situated to Mitchell and I just want you to know the influence of the Mitchell plant on the community it is connected with. The Mitchell plant has been doing a lot of safety work in the schools in Mitchell and I have found out that they have spread that work to Bedford, Indiana. It has come into our territory and is tying up with our safety work. It had gotten so that we became ashamed of ourselves and we attended some of their meetings at Mitchell, and it has been my pleasure to become acquainted with Mr. Weitknecht and his assistant there. Whenever they make a good record we are proud of it, because they are now helping us to organize a safety-first campaign. However, it has been through the instrumentality of the Mitchell plant that we started this work, so I want to throw a bouquet right now to the Mitchell plant while I have an opportunity.

CHAIRMAN FRAME: I don't think Mr. Weitknecht knew what was coming when he tried to beat out Mr. Jones to the floor.

MR. WEITKNECHT: No, otherwise I would have insisted on my rights and addressed the Chair first.

In connection with general accident prevention, I want to give you this by way of illustration: Some years ago I was called into a meeting that had to do with the solving of a problem, and one of the men who was there said, "Now, let's put the thing over, let's all get very enthusiastic and put the thing over." Another man said, "That is all right as far as it goes, but is it a problem that requires enthusiasm alone? We know it has to be done, we know we can do it; what we want is resolution."

I said at the beginning of my talk we have settled the matter in our own minds, not by what we have done, but you men certainly should have had it settled in your own minds by what the cement plants have done so far this year. You know the thing can be done. It isn't enthusiasm you want. Of course, you want to be proud of it, you want to be glad of it because it gives you stimulus, but what you want to do now is to go home and carry this resolution with you. Get the determination and

enthusiasm from your workers. You who are responsible for the work must become resolute and not merely enthusiastic, because you have many difficult problems and enthusiasm will soon be robbed if it has too many variations.

CHAIRMAN FRAME: I will now turn the Chair over to Major Reninger, who will conduct the discussion on school and community safety for those of you who are interested in that particular phase of safety work.

CHAIRMAN RENINGER: I have asked Miss Telford to address us on this subject. She is field secretary for the Education Division of the National Safety Council. Miss Telford has had over three years of experience in traveling over the United States, making a study of safety in the schools in cities like St. Louis, Chicago, Cleveland and Detroit; and it is through her efforts and the efforts of her colleagues, Miss Stevenson and Miss Smith, that we really have the education magazine as it is today. It is through their visiting the schools that they have been able to collect the data and give it to us in the form that the teacher can use.

Address

**Miss M. Laverne Telford, Field Secretary, Education Division,
National Safety Council**

May I first of all, before I say anything about the program that I want to present to you, define safety education? Forgetting for the moment pedagogy, forgetting technical phraseology, forgetting the important philosophy associated with the safety movement, may I say that safety education as I see it is teaching children to become conscious of the hazards which surround them, teaching them how to avoid those hazards, and in teaching them, making them anxious to do so? I am thinking of a positive rather than a negative program. We are not saying, "Don't go skating on thin ice," but we are saying to them, "What is the danger of skating on thin ice?"

It seems to me the first thing to bear in mind in a school program is that it must be positive, secondly, it must meet the needs of the group for which it is designed. If you lived in the Iron Range in Minnesota, for example, and your children went to school there, one of the things you would feel should take a major place in safety education would be the danger of percussion caps. Percussion cap accidents are all too common in the Iron Range.

So those are my first two points. Thirdly, it seems to me we have a right to present to the school people, regardless of the school's size, a safety education program. This, I think, is important, because there is a tendency on the part of people in smaller towns to say, "Safety education is extremely essential in Chicago, but we don't need it in this town." Then next I want to present the thought that safety education has a place in our schools regardless of the type of school, regardless of the size of the community in which that school is located.

What we have been trying to do along these lines, with the assistance of the school, with the assistance of the public-spirited citizens, is to develop a correlated safety program to meet present-day conditions, to be designed along the lines that school people insist present-day school programs must be designed. You will find people talking about habits, safety attitudes, and safety skill. We want a correlated program because the school program now is full, there are a great many things to teach children in the comparatively short time they spend in school. So we say to the school people, "We are not talking about an addition of a new subject to the curriculum; we aren't asking for thirty minutes from nine to nine-thirty o'clock on Friday morning; we are talking about injecting safety material into your existing subjects. Talk it in the language class, write about it in the penmanship class."

My illustration on that particular point is a personal one. When I went to elementary school I took the Palmer Method of penmanship. I don't know how many times I was at my desk writting over and over again the phrase, "This is a specimen

of my penmanship." The phrase, "This is a specimen of my best penmanship," isn't particularly important in my everyday life.

We went to the school people and said, "If that is the way you are going to teach penmanship, why don't you give children something to write that will mean something to them?" We talk about safety projects and problems in connection with arithmetic, history and geography, and in the other subjects of the curriculum. It is true that the majority of school safety work to date has been done in the elementary schools, but it is spreading to the junior and senior high schools.

Because it is a correlated program I am discussing today, because it must vary in each community, I can't bring it to you in a brief way and say, "Here is the safety education, won't you take it back to your own community and see if you can't get it across in your schools?" We can't do that; we can't give you examples of safety education, asking you to take them back to your school people and say to them, "Here is something they are developing in Worcester, Mass.; it seems to fill the need there, why can't we do something like it in our community?"

The thing I want to ask of you specifically is that all of you take home with you that little leaflet published by the Education Division of the National Safety Council, so that you will have listed and described in just a sentence or two the school material that is now available. Will you take back with you to your superintendent this little leaflet on safety teaching in the modern schools? And then will you also take a copy of *Safety Education*, a monthly publication of the Education Division of the National Safety Council, a magazine that is designed for the use of teachers and students? And will you go over this material yourself and present it to the school people in your community and say, "This seems to me to represent the type of work that is being done in our progressive schools; hasn't it a place in our own schools?"

Safety Also Taught Through Student Activities

You can't go into a school and teach safety education. I can't come into your plant and make your men safe. But you can call to the attention of your school people the fact that the subject of safety education is important enough in the school field to have become a subject of discussion at the meeting of the Society on the Study of Education.

I have talked up to this time only of safety education in the curriculum. Safety is also taught through student activities, through local safety councils and through payrolls. That may have a place also in your community. The purpose of a junior safety council is to group the children into a small organization, giving them something to do, like being in charge of the passing of the classes in the corridors. They may have charge of the condition of the playground, or the inspection of the playground equipment. At dismissal time they may see that the children, particularly the younger children, are escorted safely across adjoining streets and highways.

There are two very definite methods of presenting safety to your school people—one, safety through class instruction in the class room, and the other, safety through child activities.

I wonder if you are thinking what relation all of this has to your work? If some of you are thinking of asking that question, I will answer it by telling you this: About two years ago I went across the Iron Range in Minnesota. Shortly after I reached Hibben, a student in one of the Hibben schools had come to school with a percussion cap in his pocket. He then took it out and held it between his thumb and his fingers. Mind you, he was in school. He tapped it with his pencil, and when the excitement was over they found his thumb, his first finger and part of the second had been blown away entirely. Immediately the authorities went to every school in Hibben, to all of the other schools along the Iron Range and put up notices relative to the danger of children handling percussion caps.

Don't you suppose the safety engineer in the mining range then talked to his men about the careless handling of percussion caps, and don't you suppose some of those

men went home and talked to their families about it? There was a very effective tie-up between the subject that had been presented to those children by that accident and the man's memory of the instructions which he had received from his safety engineer.

I believe the teaching of safety must begin in the kindergarten. It must begin even before that, if possible.

The Education Division of the National Safety Council not only has certain school publications, but they have a magazine, a junior Safety Council handbook, they have a manual for teachers, various leaflets such as Safety Supervisors' programs, Safety in Women's Sports, and so forth. We are glad to offer wherever it is possible a limited amount of field service, have someone come in and talk to your school people and make an attempt to present it to them from the school person's point of view. We are glad to be of assistance by correspondence wherever it is possible.

I appreciate the opportunity of talking to you, primarily for the reason that from our small office in New York City we can't look out across the map of the United States and effectively pick out interested locations; so if you can help us find out where the interested localities are you will have rendered us a service, as well as perhaps starting a worth while thing in your own community.

The Problem in a Moderate Sized Town

R. B. FORTUIN (Penn-Dixie): We have a problem in the town of Nazareth, which has a population of 5,000 people. There are six cement plants, a brick plant, a foundry, three silk mills, and several other industries of a like nature in and around that town. Several years ago membership in the National Safety Council was given to the public schools by several individuals in the town, with this thought in mind: that after one year's membership the school board would probably feel that they were deriving sufficient benefit out of their membership, to carry it on in the future. The membership expired this past year. Major Reninger got in touch with me and asked me to look into this thing. I went to see the superintendent of schools. He said to me, "I don't want anything to do with it; what do we get out of it? We get a magazine, put that magazine in the library and nobody looks at it."

Now here's a situation where the superintendent is antagonistic to the situation from the start. He never supported it when it was a contributory membership. Now a few of us have gotten together and started proceedings for the future. We have gone to the burgess of the town. He has heartily endorsed the program we have in mind. We have gone to several members of the school board and they have assured us of backing, and we have gone to a number of leading men in industries in town and they have assured us of support. What we intend to do is to go before the Parent Teachers Association and present this idea somewhat as was outlined, and in that way force the school board to bring this membership back into the town.

CHAIRMAN RENINGER: Just as soon as you are ready to have a meeting with those people I feel that we can count on Miss Telford coming up to assist you in explaining the situation to the Parent Teachers Association and the superintendent. I feel sure that she will be glad to do that because we are trying to outline a program to have her come and check up on the Allentown and Easton schools, and I know she will be only too glad to help you out there.

MISS TELFORD: I have a postscript I would like to add. May I make this generalization, on general pitfalls that I think all of us fall into? I don't know your specific situation but you made me think of this general situation, that in all schools, particularly in small schools given over to one type of industry or two or three industries, there is a fear on the part of the school people that the safety education is camouflage cement safety program that we are calling it safety education and putting into these schools our own courses. I see no way to meet the objection of

school people on that score, other than to present it to them from another angle entirely.

If I should be talking to the teachers in your school I should say, "We all agree that the function of our schools is to teach people how to live." That is the very thing we want to do, teach them how to live. But, specifically, what does that mean? Can you teach people how to live in this age, for instance, without talking about automobile dangers and other dangers? Tell them that a certain part of the program of the National Society for the Study of Education was devoted to safety education. It was on the program of the Department of Superintendence, which I pointed out was the largest professional educational meeting in this country.

Starting the Program in a Unique Way

MR. FORTUIN: We have started our program in a unique way. Last June, I believe, was the first time we tried it. We have something like 55 foremen living in the town of Nazareth. In order to bring this safety idea into the homes of this group we had the NATIONAL SAFETY NEWS sent to the homes of each and every one of these foremen and other members of the Safety Council in the plant. Now it was brought out earlier in the day that there are a great many men who do not speak English very well or do not read it as well as they speak it. The children of these men naturally read the articles out of the magazines to the parents.

After an investigation we found that the NATIONAL SAFETY NEWS was the only reading matter outside of the *Bethlehem Daily-Globe* that went into a great many of the homes. We feel that within a couple of months we have accomplished a great deal in a small circle of 55 families. We have quite a number of men come back to us after receiving this copy of the NATIONAL SAFETY NEWS and tell us how much the family enjoyed the various articles in the magazine, and it brought out this: they asked us just how some of these articles pertain to their particular jobs in the plant.

MISS TELFORD: *Safety Education* can be purchased now in single subscriptions as well as in the school membership. Do you suppose that some of your families, the children of the families could find something interesting in that sort of thing? A poster which is a part of each issue of the magazine. I am just suggesting that you add *Safety Education* as well to your NATIONAL SAFETY NEWS.

A. J. EALES (Bessemer): You mentioned something about having difficulty in your school board in support of this safety campaign. I don't see why you should have that difficulty. We have a community of not quite 4,000. We have our schools fairly well sold on safety to the extent that we have two schools, the elementary grade building and the junior and senior high schools. We have a bulletin that we send to the schools. It is changed at least once a week. Not only that, but I get into the schools for talks at least twelve times a year.

Last year the railroads had a school campaign. The agents at both depots asked me if I would give a talk. It happened that they came a month apart and we got in on that. In cooperation with the other plants in our community we have a joint safety meeting semi-annually, with a good entertainment along with it. We had so many children attending this meeting that we decided to hold a meeting for the children in the school during the day. They were let off an hour earlier in the afternoon for this event.

In the high school in our community instead of having a daily chapel program once a week, they enlist speakers to talk to them. Quite often I get in as a speaker on an occasion like that.

Then there are things in the community that the schools are interested in and you might help them out. We had a danger sign in front of our grade school building. They wanted a stop sign on the street there. I happen to be the burgess of the community and that helps some. We got them the stop sign; and incidentally we can get more out of the school board by cooperating in that way.

CHAIRMAN RENINGER: I have asked Major R. C. Haven to come and give us a short talk on what we can do in community work in addition to the school work. After he has given us that talk, it seems to me, if it is the opinion of this gathering, that we organize a committee of half a dozen or more to work out a program of what we can do in the small community where we have other industries besides the cement industry, to put across a community program. If you people think that is a good idea we can carry it out. We could work out a program, nothing elaborate, so that we could get this problem of safety in the schools, which means home safety and public safety. Major Haven will give us five minutes on what we might do in the small community.

R. C. HAVEN (National Safety Council): I don't know why the Major asked me to tell you men and women what you can do in the community, when you have more experience than I can give you in small community work. You fellows are really doing the job. That isn't applesauce, but it is absolute fact, and there are men sitting here who haven't spoken who have done wonders in their towns, both large and small. I don't believe there's another section that has thought out this idea or grasped this idea of going out into the community. There are a lot of things I can say, but if I am going to talk five minutes I have got to get down to brass tacks.

Put the School to Active Safety Use

The school is the common ground where people meet, it is the place to start activities, and it is the place where you work out your political and a lot of other problems. So if you are going to use the schools, use them. I don't know of another place you can use to better advantage. But don't try to teach school safety entirely. I wonder if you men have gotten to the point where you have sort of analyzed the accident situation in your community outside of your own plant. When you go back to your home town, start a little research work, find out where your accidents are occurring and then concentrate. It may be in the homes, it may be through automobiles, it may be through fire, or they may occur in other ways.

Find out about the parents and teachers' home inspection blanks, where you can send a little blank into the home. Perhaps it is your automobile accidents, and really that is the thing that is causing us more concern, as far as industrial safety is concerned, than the industries themselves. What does an accident mean to your factory if a man is killed by an automobile? It affects your labor community just the same as though a couple of sacks of cement fell on him.

Then your fire prevention. You would be surprised how many little fires start in your community that might burn the town down. You will find a lot of these things.

I haven't told you very much that you can do. The Major wanted me to tell you what you can do locally. I would go back, if I were you, get the men together in the plant and sit down and tell those fellows what you have learned here, the contacts you have made; and say, "Let's get together, let's go to the burgess or mayor and tell him the seriousness of the situation." That, of course, would have to come after you have found out just what your situation is. At this meeting a course of action can be decided upon.

It is pretty hard for me to stand up here and work out the details. I would much prefer to leave just one or two thoughts with you. The first is this: Don't go back to your home town feeling, "Well, I attended the Cement Section; I can report to the boss and tell him I was there and have done my duty." Remember that you are the keyman. You are the keymen who have been sent out from your community to bring back to that community something that will help them.

Then there is just one other thought. Did you ever analyze, did you ever stop to think what an accident really means? Suppose you went out here tonight to your hotel room and found there was a telegram for you saying that mother was struck by an automobile today, or perhaps your wife, or perhaps one of your children; have

you any idea what that accident would mean to you? Well, now, that is not an impossibility when you think there are between 20,000 and 25,000 people going to be killed this year by automobiles. What if you got that message? Men, just think of what an accident means and I believe that you will go back feeling that you are something more than just an ordinary man in your community.

You don't have to do that. All you need is to go back with a little energy and determination. Find out the accident situation, get the safety men together and the people, and then work out a little plan which the National Safety Council will be glad to help you with.

CHAIRMAN RENINGER: Those of you who have local safety councils naturally are tied up with them. You can have a little safety council of your own in your own community. What do you fellows think we ought to do? Do you want the Cement Section to work out the program with the help of the National Safety Council and the Education Division? Do you think we could furnish you with some information that you could use in your villages and in your towns? I have gotten to that point where I feel that in the cement industry we have gone ahead, we have shown the people throughout the country and we have shown the executives what we can do in the industry. Don't you think it is up to us to broaden out and help our own community?

D. ADAM (Lawrence): I have tried to the best of my ability to interest the local schools in safety. Once I invited the superintendents of the schools and the teachers to an evening show. In the afternoon we invited the school patrol under the supervision of the teachers to attend the theater. It is purely a sales proposition. You try to sell the safety idea to your men at the plant. In the same way you can sell the proposition to the school.

CHAIRMAN RENINGER: Does anyone have any recommendations to make?

A Committee for More Active Safety Cooperation

MR. FORTUIN: I have had this in mind for sometime: I don't know if it is exactly up to the Council itself, but someone has got to take the lead in it and if the Cement Section does, it will demand sufficient recognition to develop it into something bigger later on. Suppose we have a committee or a group to lay out a plan of procedure to extend over a period of time. In other words, to make it sort of a campaign to institute safety in the community. This information or data can be written up and a plan organized for it and that should be sent out to the various cement districts and in the next three months or in the next six months we, in each of our own individual sections, can endeavor to accomplish what is outlined therein.

R. S. HUEY (Universal): I don't know whether the scheme that is being worked in our town would work in most of these towns or not. Our town is probably a little larger than most of these cement communities. However, the activities of the safety work have been sort of taken over by the Chamber of Commerce and they have a program on accident prevention and safety during the winter. They have a meeting every month, with sectional meetings at this general meeting, where they have metal and woodworking, truck drivers schools and so forth, with a general meeting afterwards in which everybody participates. They have a first-class speaker of national importance come and talk to them. They have been instrumental in getting the men in industry and the police department and everybody else working together on this.

They started a campaign, a safe driver's campaign, in which every automobile owner was asked to sign a pledge to drive safely and this year they have cut the accidents down considerably. They had 22 last year. They have cut them down so there have only been six so far this year. They are working together with the school board and I think practically all this work is being done in our schools. In their English classes they have the pupils write "Look to the right and look to the left," and all

such things. In their arithmetic they are given the number of accidents and such things as that. It is brought home to them in the way Miss Telford has mentioned.

If you get some sort of an organization working like that, a committee which will get the interest of the community and get them out with a good program, you will certainly get results.

CHAIRMAN RENINGER: We weren't thinking so much of that; we were thinking of towns like Nazareth, or Mitchell, or some of the smaller towns of 3,000 or 4,000 population. For the big cities the National Safety Council has its organization, but it is to get some simple program for the smaller towns. If you men are interested enough we will go ahead with this and try to work out a simple program for the cities where probably they have one teacher in the schoolroom, or maybe two or three. Let us see if the Cement Section can't be a couple of jumps ahead of the other sections in this work, as it is in accident records. Let's have it to our credit that this plant in this district has started the safety work in its community. That is what I have in mind. If you feel that it is worth while and are willing to go along with it, we can get the Education Division to work out a program with us and we will hoot it to every cement company in the country.

MR. WEITKNECHT: I make a motion that the officers of the Cement Section constitute a committee to confer with the Education Division of the National Safety Council to develop a program and submit it to the cement industries where that program would be applicable.

(The motion was seconded, but to a vote, and carried).

CHAIRMAN RENINGER: I am very glad we had this meeting, I think a great deal will be accomplished.

ADJOURNMENT.

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Cement, Quarry and Mining Joint Luncheon

Wednesday, September 28, 1927

A. J. R. CURTIS, Chairman
Assistant to General Manager, Portland Cement
Association, Chicago, Ill.

The joint luncheon session of the Cement, Quarry and Mining Sections of the National Safety Council was called to order by the chairman, Mr. A. J. R. Curtis, assistant to the general manager, Portland Cement Association, Chicago, Ill.

CHAIRMAN CURTIS: Whether your problem is to find a substitute for gasoline, to cure an illness or meet the competition of a foreign competitor, the orderly procedure is the same. First of all you must diagnose the situation, find out what the problem really means; secondly, you must devise ways and means to meet the situation the diagnosis has revealed—you must prescribe a remedy.

This procedure is adopted by anyone, consciously or unconsciously, that elects to accomplish things in an orderly and logical manner.

In safety work many industries have been taking headache medicine—doping themselves with a “cure-all” supposed to be good for what ails them. They have taken the dosage without thought about the fundamentals of the problem and without an adequate diagnosis.

The reason we have made such startling progress in safety work in the cement industry is because we have diagnosed our case and then found remedies for specific ills. We have done this by means of a fine system of statistical records and reports. This report system, inaugurated in 1919, shows us what and where the accidents are. The records indicate what season of the year a certain type of accident is likely to occur. They enable us to measure the efficiency of this scheme or at scheme in the promotion of safety in our plants and quarries.

Ethelbert Stewart, United States Commissioner of Labor Statistics, speaking before the Cement Section of the National Safety Congress in Detroit early this year, commented favorably on our statistical system.

“I find that statistics of the Cement Section of the National Safety Council are the very best that come to my office,” Commissioner Stewart said. “You are doing a piece of work that must inevitably result in a rapid decrease in your accident rate. Do not know whether or not you are making effective use of these figures, but they are significant and you certainly should be doing so.”

“In the first place you have an industry devoted to the manufacture of one definite product—cement. Your product does not go, as would be true in the chemical industry, into everything from lipsticks to laundry soap. In gathering your statistics

you have something definite to work on and you have succeeded in doing the basic thing, that is, finding the man-hour exposure in your industry and relating your accidents to that. Statistics cannot reduce accidents, but they can tell you where the accidents occur. They can and do tell you where to apply your precautionary measures and where to spend your money. They make it unnecessary to spend money along several lines when most of your accidents are occurring along one or two lines. Comprehensive accident statistics are worthwhile and I congratulate your industry and the many individual manufacturers who are cooperating to make this statistical work so effective.

"I have been able to show others that you have reduced your accidents. Statistics form the basis for a lot of standard jokes like the mother-in-law joke and everyone thinks he can take a whack at a statistician and his statistics; but, nevertheless, if you are going to improve the accident in your plant you must know where the accidents occur and that requires statistics.

"Your statistics have made it possible for me to show others that you have reduced your accidents. I hope to impress you with the importance of continuing and further perfecting your statistical work, not only for yourselves, but for the influence it is going to have on the other sections of the Safety Council on your own and other industries."

We are so well sold on the diagnosis theory because we can take our limited means and get excellent results. We don't have to guess—we can take one direct shot and make it tell. We are able to do this because our records have revealed a specific situation—the case is diagnosed and we can take steps to remedy a definite problem that confronts us.

All mining and quarrying industries can make the same sort of case study. The experience of the cement industry points to the expediency of this method because in our industry we face problems in both of these divisions.

Let me give an example of what statistics have done and will do for us. Our records show a growth in screw conveyor accidents at a certain time of the year. For the past nine years we can trace a growth in lost-time accidents of this type at a certain period.

Instead of spreading our funds to battle all sorts of accidents at this given period we can centralize our efforts to combat screw conveyor accidents when they are again in the ascendancy. So we gathered a large number of opinions of experts on how to eliminate conveyor mishaps.

This symposium will be sent to all mills when the time comes. Plans will be made well in advance to meet the situation when it arises.

I believe that a large portion of accident success is based, as I have said before, on the diagnosing of the problem in hand and then prescribing remedies for the specific illness.

Now, we are to be favored with a brief address by a man in a position to be familiar with the inside details of the accident situation. Mr. W. W. Adams is statistician for the United States Bureau of Mines, Washington, D. C., and he has kindly consented to talk to us from the point of view of the Bureau. I take pleasure in introducing to you Mr. Adams.

Safety in the Quarry Industry

W. W. Adams, Statistician, United States Bureau of Mines, Washington, D. C.

Safety in the quarry industry is a matter of direct concern to 92,000 men who are employed in the industry and it is also of almost equally direct concern to their immediate families. Thus between 300 and 400 thousand people are personally affected by the accidents that occur in connection with the

annual production of stone in the United States and in connection with the crushing and other work that immediately follows its extraction from the earth. From 120 to 150 of these men are killed by accidents each year, and 14,000 of them are non-fatally injured.

Through the cooperation of the producing companies, the United States Bureau of Mines conducts an annual canvass of accidents and employment covering the quarrying of stone, and such subsequent work as crushing, rock-dressing, and the manufacture of lime and cement. This work began in 1911 and statistics covering the past 16 years are now available. These statistics are based upon reports furnished voluntarily by the producing companies on blank forms supplied by the Bureau of Mines. Each non-fatal injury reported to the bureau involves disability of the employee for more than the remainder of the day on which the accident occurred. In other words, the Bureau's statistics are limited to what are known as "lost-time" accidents. While many of these injuries cause the employee to lose only one or two days, some of them involve the loss of several weeks or months. Taking them in the aggregate, they average about 15 days per injury. Any company whose temporary injuries average less than 15 days each has a relatively safe plant, or is lucky, or is doing effective safety work. If deaths and permanent disabilities are drawn into the picture and given their customary equivalent weights in lost days, the average accident in the quarry industry represented a loss of 104 man days in 1925 and 94 man days in 1924. In this average each fatality and permanent total disability is considered equivalent to a loss of 6,000 days and each permanent partial disability 800 days, the last-named figure being borrowed from the reports of the Industrial Accident Commission of California until sufficient reports of this class of injuries accumulates in the Bureau's records to develop a new average.

An Intensive Study of Quarry Accidents

In addition to the Bureau's annual canvass of accidents which is based on reports from all producing companies in all states, or as nearly all of them as we can obtain, a special and much more intensive inquiry into quarry accidents has been under way during the past two years. This study is based on full and complete reports—a separate and detailed report for each accident—from a limited number of companies. Each of these companies employs at least 25 men inside the quarry. They are the companies that are participating in the National Safety Competition which is being conducted by the Bureau of Mines. Two such annual contests have been completed, namely, that of 1925 and that of 1926. One of the purposes of the safety contest is to determine which quarry has the smallest loss of time from accidents in proportion to total man hours of exposure. The quarry that establishes the best record receives a bronze trophy or statue known as the Sentinels of Safety, which is the gift of the Explosives Engineer magazine. Credit for providing the trophy and for very material aid in connection with the contest, is due very largely to the enterprise of Mr. N. S. Greensfelder, the editor. The trophy is held one year by the winning company, and is then surrendered to the winner of the next year's contest. Each year the name of the winning company is engraved on a pedestal of the trophy and each employee of the winning quarry receives an engraved certificate of honor issued by the Bureau of Mines and signed by the director of the Bureau.

The Bureau's annual canvass of quarry accidents affords a broad picture of the accident situation as it affects the whole industry or any large portion or phase thereof; it also furnishes an annual account of the volume of employ-

ment required to produce the country's annual stone supply and of the total loss of life and limb as well as the loss in Man days that went into the cost of producing the stone. The more detailed reports furnished in connection with the National Safety Competition are usually supplied as a carbon copy of the report which the company is required to send to its insurance carrier or to the state compensation commission. In this way the Bureau is furnished with valuable detailed information on accidents with a minimum of inconvenience to the company.

It will thus be seen that the Bureau of Mines statistics of quarry accidents are collected by two methods from a common source, namely, the quarry companies. It will also be observed that the statistics differ in scope, geographically, and in the degree of detail with which the information is supplied. From these two sources of information and similar information from other branches of the mineral industry, it is apparent that quarry accidents occur less frequently and cause a smaller loss of time in proportion to number of employees than do accidents at metal mines or coal mines. In other words, quarry work is not as hazardous as coal mining or metal mining, considering each of the three industries as a whole. Moreover, differences also exist between the hazard of different kinds of quarries. Perhaps the chief distinction in this respect is between quarries that produce dimension stone and those that produce non-dimension stone. Quarries that produce crushed or non-dimension stone have higher accident rates than those that produce dimension stone. For example, the fatality rate for the non-dimension group, in and about the quarry, in 1925, was 33 per cent higher and the injury rate was 7 per cent higher than the corresponding rates at dimension stone quarries; in 1924 the rates were respectively 76 per cent and 18 per cent higher. A comparison covering all years since 1916 shows that, without exception, the group rates for both fatalities and injuries, have been higher at stone quarries producing non-dimension stone, the excess ranging from 5 per cent in 1921 to 118 per cent in 1920 for fatal accidents, and from 1 per cent in 1917 to 122 per cent in 1921 for non-fatal accidents. Moreover, possible differences in length of work day at the two classes of quarries have no material effect upon this relationship. This is shown by figures which have been compiled for quarries working uniform shifts, that is, eight hours, nine hours, or ten hours.

Increased Accident Frequency Unaccounted For

In crushed-stone or non-dimension-stone quarries, where no care need be exercised to prevent breaking the stone, it might be expected that the rate from accidents from explosives would be higher than that in quarries producing dimension stone that is intended to be used for building or monumental purposes. This, in fact, has often been the case, as shown by the annual reports which the Bureau of Mines has received from the producers of stone. It does not, however, fully account for the higher frequency of accidents at crushed or non-dimension-stone quarries. A comparison of the annual figures for the two classes of quarries during the past seven years, shows that some other classes of accidents also, as a rule, occur more often at quarries that produce crushed or non-dimension stone. Crushed-stone or non-dimension-stone quarries show higher injury rates for accidents caused by handling rock at the quarry face, also for accidents from falls or slides or rock or overburden. Haulage accidents also are usually more frequent at crushed-stone quarries. Accidents caused by falling objects, which records for earlier years showed were of more frequent occurrence at crushed-stone quarries, have been materially reduced during the past four years, and in 1925 the crushed-stone rate for this

lass of injuries was actually lower than at quarries producing monumental or building stone. A somewhat similar situation prevails as to accidents from lying objects; the rates for this type of accidents have been high for both kinds of quarries, but during the past three years the non-dimension quarries have established the better record. Machinery accidents also are among the major causes of injuries at both classes of quarries, but in the past few years the crushed-stone quarries have reduced their injury rates from this cause and since 1922 these rates for machinery accidents have been lower than at dimension-stone quarries. The net advantage, however, still lies with quarries that produce dimension stone; that is to say, the injury rate covering all classes of accidents combined is still lower for the dimension-stone quarries.

Quarrying Less Hazardous Than Other Mining

Accident prevention is a national as well as local problem. It is therefore appropriate that national associations, such as the Portland Cement Association, the National Crushed Stone Association, and others, should undertake or maintain some group action looking to the prevention of accidents. In 1925, more than forty states contributed to the production of stone in the United States, and in more than 34 of these states accidents were suffered by the men who produced the stone. To the extent that quarry accidents are similar regardless of location of plants, it would seem that the national associations might with advantage undertake a study of the accident-prevention problem. It has already been said that the quarry industry is less hazardous than coal and metal mines, both as regards accident frequency and accident severity. This, however, is no more than might reasonably be expected because nearly all quarry work is done in the open daylight, whereas most of the operations at coal mines and metal mines are conducted underground, where the light, which is necessarily artificial, is often not adequate for maximum safety; also in the underground work, there is the additional hazard of falling overhead material. The quarry industry should therefore not be content if it merely maintains an accident rate better than that for the mining industry, but should strive to lower its rate from its own previous levels. This has already been done to some extent so far as fatal accidents are concerned, but not to any material degree as regards injuries of a non-fatal character.

Of the 92,000 men working at quarries in 1925, the operator's returns to the Bureau of Mines showed 52,000 working in and about the quarry pits and 40,000 working at the outside plants. About three-fifths of the accidents occurred to the men working in and about the pits. These accidents accounted for 101 deaths and 8,632 lost-time injuries. The fatality rate per thousand 300-day workers was 2.28 and the injury rate was 195. The injury rate was the highest on record since 1915, when the statistics for inside and outside accidents at quarries were first segregated. On the other hand, the fatality rates previous to 1925 were, in four cases, better, and, in six cases, worse than the rate in 1925. These figures show that more progress has been made in the prevention of fatalities than in the prevention of injuries. A comparison of these figures with those for outside plants shows that more progress has been made outside than inside the quarries, and this fact has contributed favorably to the record for the industry as a whole.

The number of days a quarry is in operation is largely a matter of contracts and weather conditions. Perhaps choice plays little or no part. Yet it may be interesting to know that it is apparently safer for a quarry to work full time than part time. That is to say, the accident rate per day diminishes as the number of days the plant is in operation increases. A quarry that is in operation a full year is likely to have a lower accident rate per day than if it

worked only half a year. This conclusion is based on statistics which the Bureau has compiled for metal mines, which indicate a relationship between accident rates and continuity of operation which doubtless exists in quarries as well as mines.

These statistics (as yet unpublished) of metal-mine accidents show that accidents occur less often when operations are most continuous—that is, the accident rate declines as the number of operating days of the plant increases. This fact was indicated not only by the figures for all classes of metal mines combined, but also by the figures for individual groups. The combined rate over a four-year period (1921-1924) for fatal accidents among underground employees was 7.69 per thousand full-time (300-day) employees for mines operating less than 100 days per year, and it was 3.77 for mines operating 300 or more days per year. The non-fatal injury rate for the former group was 675 per thousand employees, while for the latter group it was 356. Considering mines of equal or similar size, the death rate for mines employing 100 or more men underground was 8.78 for 1 to 99 days of operation and 3.71 for 300 or more of operation. When the mines were classified according to principal product, it was found that iron mines operating less than 100 days had a fatality rate of 11.92 and an injury of 836, whereas those in operation 300 days or more had a fatality rate of 3.01 and an injury rate of 174. Similarly, copper mines had a death rate of 7.58 and an injury rate of 841 for less than 100 days of operation and a fatality rate of 4.09 and an injury rate of 435 for 300 or more days of operation. These figures for metal mines were for extreme groups in respect to operating time; rates for adjacent groups indicated the same tendency, but less clearly.

Similar figures for quarries have not as yet been compiled, but we hope to be able to prepare them in the near future.

An Exposure of Over Seven Million Man Hours

The experience of 44 plants in the National Safety Competition of 1926 was classified on a monthly basis to learn the seasonal variation in the amount of exposure and the seasonal variation if any in the accident frequency rates. These 44 plants had a total exposure of 7,815,377 man hours. The severity rates were also calculated on a monthly basis, but the occasional occurrence of a fatality, with its equivalent of 6,000 days, rendered the severity rates too variable for comparative purposes. The volume of exposure, as might be expected, reached its lowest level during the winter—in January; it increased steadily through June, and held this level through July, then declined slightly but steadily through August, September and October, and continued to decline more rapidly in November and December. The maximum exposure, in June, was two and one-fourth times that of January. The frequency of accidents was smallest during the four winter months of November, December, January and February; it was much higher in other months, the average rates being about 50 per cent higher for the months of greatest activity.

In order to form a mental picture of the field that lies ahead of any prospective safety program, it may be helpful to state that so far as quarry safety rests with the operators, it is necessary to reach only a small number of companies to encompass a large proportion of the employees. Less than 700 quarries employ as many as 25 men in the pit, and these 700 or less plants employ 80 per cent of all men that work at quarries in the United States. If 50 men inside the pit are considered necessary to entitle a plant to rank as a large quarry, then such plants number less than 300 and they employ nearly

60 per cent of the total quarry workers in the United States. These facts are referred to because the cooperation of the company as well as the employees must be obtained to make safety work effective. A relative small number of companies have it within their power to give a tremendous impetus to quarry safety work that will benefit 80 per cent or more of the entire industry.

The accident rates for the whole quarry industry are but slight indication of what individual companies can accomplish. For example, the industry's accident-severity rate for work inside the pits, as nearly as it can be computed from available records, was 8.202 in 1925 and 6.931 in 1924; the corresponding group rate for companies in the National Safety Competition was 7.599 in 1925 and 7.760 in 1926. Yet in the 1925 safety contest, seven quarries out of 102 and in the 1926 contest fourteen quarries out of 118 operated their plants the entire year without a lost-time accident. In 1925 sixty plants or 59 per cent of those enrolled had accident-severity rates of less than 1 and in 1926 67 plants or 57 per cent had rates of less than 1. Thus it is seen that the group average of 8.202 in 1925 and 6.931 in 1924 for the whole industry, and the National Safety Competition group averages of 7.60 and 7.76, respectively, in 1925 and 1926 are by no means the best that individual quarries can do in the elimination of accidents to their employees. In fact, the 1926 contest showed that 97 plants, or 82 per cent of the total number, had accident-severity rates that were better than the group average; 21 plants, or 18 per cent of the total number, had rates that were higher and therefore worse than the group average. This means that 18 per cent of the companies were mainly responsible for the group average being as high as it was. Had it not been for the many good companies, the rate would have been much higher. The record, in fact, showed that the companies whose rates were better than the average had a group rate among themselves of 2.314, while the rate for those whose record was worse than the average was 38.695; 2.314 for the good companies; 38.695 for the bad companies, an average of 7.760 for both combined. The bad companies had a rate that was more than 16 times that of the good companies.

Comparing Accident Experiences Is of Value

The purpose of these and similar statistics is to make it possible for individual quarries to compare their accomplishments in accident prevention with what has been done by other companies. Any individual company may be remarkably successful in the elimination of certain classes of accidents and equally unsuccessful in combatting other types. Neither the degree of success nor the degree of failure can be known without some standard of measurement. The National Safety Competition of 1926 has shown that while all of the quarries combined had a group rate of 7.760, yet 82 per cent of them had lower rates than that figure. The rates ranged from zero to more than 200. Rates for the individual companies have been published, but in such a way that the identity of each company is concealed. Each company has been advised of its own rate and of its relative standing among all companies. Copies of a circular containing these rates are available to any company upon request. Incidentally it may be stated that the circular also contains the rates of coal mines, metal mines, and non-metallic mineral mines. All of these rates have been calculated on a uniform basis and are therefore strictly comparable. The method of compilation is simple. Any company may easily prepare its own accident records in the same way. Those companies that see fit to do so will find that they are following a practice that has become standard not only in the mineral industry, but in other industries as well. Following such a prac-

tice, any company may readily learn how it ranks with other plants of the same type or with any other industrial unit.

It is hoped that the companies represented at this meeting may find it practicable to place their accident statistics on this standard and widely accepted basis. In the event that any company establishes a safety record better than those indicated in the National Safety Competition, the Bureau of Mines would appreciate it if the company making the record would inform the Bureau of the fact. The Bureau desires to learn of cases of this kind so that suitable public recognition may be given.

ADJOURNMENT.

Tire & Rubber Co., Akron, Ohio; E. W. BECK, United States Rubber Co., New York City; E. A. HOENER, The Firestone Tire & Rubber Co., Akron, Ohio; A. L. VILES, The Rubber Association of America, Inc., New York City.

Tuesday, September 27, 1927

W. L. SCHNEIDER, Chairman

Safety Director, The B. F. Goodrich Rubber Company, Akron, Ohio

The first session of the Rubber Section of the National Safety Council was called to order at nine-thirty o'clock by the chairman, W. L. Schneider, safety director, The B. F. Goodrich Rubber Company, Akron, Ohio.

CHAIRMAN SCHNEIDER: The reports of the chairmen of the various committees are, of course, important to every one. However, most of the Executive Committee know what each one is doing during the year, and, therefore, owing to the lateness of the morning program, I will dwell but briefly on the reports of the officers and their activities. I think it appropriate at this time to say that each one of them has served faithfully and conscientiously, and I think we all owe a debt of gratitude to every one of them who are present and those who have taken an active part in promoting the growth of the Rubber Section.

I cannot speak too highly of the cooperation which the various sectional chairmen have given me this year, and I think that each of us here can say that the work of the Rubber Section has progressed splendidly, owing to the fact that each of the members has cooperated with the other to the best of his ability. The work, as a whole, I think has progressed splendidly.

Report of the Secretary

In providing you with a report of the Secretary's activities during the past year, it must of necessity be both brief and somewhat immodest.

As you know, the work has been primarily that of routine correspondence, aside from the preparation of the minutes of the two meetings which I attended at Detroit and Akron. In addition, I have contacted with various of the Rubber Section members and through National Safety Council headquarters have written numerous letters to prospective members and likewise to two or three cancelled memberships.

Several queries relative to safety problems were provided with satisfactory answers. I, of course, should not forget to mention preparation of the docket covering one-day extra session of the Executive Committee held in New York in June.

Other than that, I have not done very much to speak of.

Very truly yours,

R. C. SALISBURY, Secretary.

Report of the Poster Committee

There were twelve safety posters issued during the past year for the Rubber Section. Most of these photographs were sent direct to the office of the

National Safety Council and in turn were sent to me for approval and suggestions for copy. You will remember that you helped me in preparing these suggestions.

Additional material for safety posters was obtained by making arrangements to have Mr. Mathieu, the staff photographer from the National Safety Council, come to Akron and take photographs of subjects at the Goodyear Tire & Rubber Company, B. F. Goodrich Company, Miller Rubber Company and the Firestone Tire & Rubber Company. The result of this trip was very successful, as Mr. Gardiner informs me that all photos taken at that time will be used for safety posters. It might be well to mention that while on this trip Mr. Mathieu also made photographs to be used for safety films at the Congress and these photos were forwarded to Mr. Lawler.

The present status of the Poster Committee is that there are sufficient posters to last until February, 1928, figuring that one will be issued each month. In addition, Mr. Gardiner has promised that the Rubber Section will be favored with a large poster, 17x23 inches, and I am going to keep after Mr. Gardiner until he fulfills this promise.

Aside from our local members, Mr. Quirk was the only outside member sending in material and which consisted of four sketches, three of which Mr. Gardiner has informed me will be used.

In regard to the posters which we were informed will be used in the regular series, I wish to advise that these posters are photographs which have been submitted to the Council by Rubber Section members at various times and are of such a general nature that they are including them under a general number instead of issuing them as Rubber Section posters. Such posters are No. 1983-B, which is the drawing that was sent by Mr. Quirk and which shows the superintendent explaining a wonderful accident prevention record to a visitor in the plant. Another one is Poster No. 1988, which is a photograph showing one workman wheeling another workman on a hand truck. This poster is being made up from an old photograph. Both of these posters will appear in the October issue of the NATIONAL SAFETY NEWS.

I wish to take this opportunity, Walter, to thank you for the wonderful aid you have been to me, not only as Chairman of the Poster Committee but also in my work at Firestone. I have been up against a lot of knotty problems which through your experience you have been able to help me solve, and I certainly appreciate your efforts and only hope that I may be able to reciprocate.

Yours very truly,

C. L. HUNGERFORD, Chairman.

Report of the Membership Committee

Number of Members in Rubber Section, 10-25-26.....	43
New Memberships During the Year.....	7
Memberships Cancelled During the Year.....	2
Total Number of Members in Rubber Section to Date.....	48

List of New Members—	No. of Employees	Date Received
The Wilson Rubber Company.....	.....	11-30-26
Farrell Foundry & Machine Company.....	1167	12- 8-26
The Rubberoid Company.....	.....	4- 7-27
The H. O. Canfield Company.....	347	5-31-27
U. S. Rubber Reclaiming Company.....	495	7- 9-27

Hamilton Rubber Manufacturing Company.....	.....	8- 4-27
Canadian Johns-Manville Company Ltd.....	200	8- 8-27

List of Memberships Cancelled—

Republic Metal & Rubber Company.....	60	1- 1-27
Murray Rubber Company.....	693	6- 7-27

We are practically assured of two more new members, although they may not join before this convention is held. The Trenton, N. J., factory of the Ajax Rubber Company and the Lambert Tire & Rubber Company of Akron, Ohio, are very favorably impressed with the Council and I think it is only a matter of time until they become members.

During the month of February, 1927, the lists of members of the Rubber Section of the National Safety Council and of the Rubber Association of America were revised and copies sent to the National Safety Council and all members of the Executive Committee of the Rubber Section.

A form letter was drafted and sent to Mr. Schneider and to the Council for approval. This letter was intended to be sent out to every member of the Rubber Association of America who was not a member of the National Safety Council. A committee of three was appointed from different sections of the country, namely: E. James Glascock, of the Dunlop Tire & Rubber Corporation, Buffalo, N. Y.; J. M. Hunter, of the U. S. Asbestos Company, of Mannheim Pa., and Reed Harkness, of the Cupples Company St. Louis Mo. and it was thought and planned that these men, working with the Executive Committee of the Rubber Section, could pretty well cover every section of the country and possibly make a great many personal calls. In the meantime, we decided that we wanted to send out with this letter a copy of an article which was to appear in the Rubber Age, which dealt with Safety in the Rubber Section of the National Safety Council and rubber mills in general. It was thought at the time that the article would be published immediately, but it was delayed and was just recently published. Therefore, the form letter was never sent out.

Other form letters were, however, sent out by the National Safety Council, and I have sent out many letters of solicitation. We received favorable replies from some of the solicited companies and probably the new chairman may get these companies to become members during the coming year.

R. H. COCHRAN, Chairman.

Report of the Safe Practices Committee

The following is report of activities of Safe Practices Committee for year 1926-7:

The previous work of the committee included a rough draft of a pamphlet on Knife and Shear Accidents, together with photographs of safe and unsafe practices.

The work of the committee for this year has consisted in revising and rewriting the text of this pamphlet and preparation of a paper on this subject to be presented at the Annual Congress. The text of the pamphlet is practically ready for printing and this should be done shortly after the Congress.

Other material submitted by the previous chairman includes a paper on "Material Handling," which should make excellent material for future activities of this committee.

I wish to acknowledge with thanks the assistance of the members of the

Executive Committee of the Rubber Section in reviewing the text of the pamphlet.

Respectfully submitted,

HOWARD W. LOW, Chairman.

Report of the Program Committee

The activities of this committee are naturally summarized in the two days' session of this section and if it is a success we, of course, take the credit. However, if the meetings are a "dud"—and the chances are far remote—we say it was the fault of the chairman (W. L. S.).

Really, Walter, it is hard to give you much of a report. However, the spirit of cooperation has been excellent at all times in my contact with the various members in the Chicago office of the N. S. C.

Taking the various items on the attached program, I wish to report as follows:
First Session—

1. The appointment of a Nominating Committee in advance is, in my estimation, an excellent idea. It gives the members an opportunity to carefully analyze the situation and sound out the prospects.

2. Report of Chairman. The plan you have adopted of incorporating the reports of the various committees in yours is also an excellent idea, as it will save considerable time and you will know how to bring out the points of importance.

3. Technical Paper, "Knives and Shears," by H. W. Low. This is, as you know, an excellent paper and shows careful preparation, and I am sure it will be of interest to all.

4. Address by Mr. Paul Van Cleef. This is in accordance with our practice of having some official connected with the rubber industry give us a talk each year and as Mr. Van Cleef's reputation is well known, we are sure to receive much valuable information from his address.

5. Pictures of Rubber Plantation. This is a departure from our usual program and I am sure it will interest all, as these pictures not only show important phases of our industry, but I believe it is intended that some reels will be shown that will have a close reference to health and sanitation.

Second Session—

1. Report of Engineering Committee. This is one of our most important committees, and I am sure Mr. Congdon will have very good facts to present to the members.

2. Report of Statistical Committee. We all know Mr. Mansfield's problem in procuring statistics, but in spite of this he has always given a very worthy report, and we are sure to have the same at this time.

3. Technical Paper, "Health Hazards of Compounding Materials." This is of vital importance to all of us, and through two men of the caliber of Dr. Shirley and Mr. Healey we should secure some very valuable information that will be of interest to all of us.

4. Safety Kinks. We have submitted to Chicago for reproduction 27 photos and sketches which, I think, will be more than ample for this share of the program. In addition, we have the motion picture showing the rallies at the plant of the U. S. Rubber Company, which Mr. Beck will have available in case we have time to put it on. I certainly have received wonderful cooperation in securing the material for this subject, as all of the members to whom I have appealed have come across in fine manner. The subjects are excellent and in most cases they have photographed equally as well and we should all get some very good information from their presentation.

I do not know if you consider from the above facts that this is the proper

type of report. However, it gives you an idea of just how I feel about the various subjects on the program.

As to future programs, I think this subject should be held in abeyance until after the Congress so we may secure the comments of the members and also by attending the meetings of the other sections get new ideas.

E. R. LAWLER, Chairman.

CHAIRMAN SCHNEIDER: We will now have as part of our program the paper mentioned previously, which has been prepared by Mr. Low, chairman of the Safe Practices Committee. I would ask Mr. Low to give his talk at this time.

Safe Practices With Knives and Shears

Howard W. Low, The Miller Rubber Company, Akron, O.

Purpose and Scope—Knives and shears in the Rubber industry are a constant source of accidents, mostly minor but occasionally of a serious nature. My purpose is to describe and illustrate simple methods which have been found effective in reducing accidents from this cause. No attempt has been made to cover machine knives or power shears as the hazards presented are different from those encountered with hand tools.

Accidents from Knives When Not in Use—One of the most common causes of knife wounds is brought about by the careless carrying of the knife in the operator's pocket with point up and blade exposed. All employees using knives should be provided with sheaths and their use made compulsory. Workers may have a receptacle secured to the bench or machine in which to keep sharp edged or pointed tools. Carelessness in laying knives down on the table or bench where they may roll or be brushed off is another accident maker, as they are liable to strike somebody on the foot or fall to the floor and be stepped on.

Mill Knives—Milling is an operation common to all rubber plants and the safe handling of mill knives deserves the careful study of every person desiring to reduce accidents in the industry. In cutting stock off the mill operators may receive cuts on the hands and arms. They should be taught to cut off with either hand, using the knife in right hand when cutting from the left end of roll and in the left hand when cutting from right end. Sheaths should be used for carrying the knife when not in use, as knives laid on the mill housing are very likely to fall due to the vibration.

Operators should be warned repeatedly not to grab for the knife if it should be caught in the stock and jerked from their grasp. Pull the safety, instead of grabbing for the knife, and there will be no danger of the hand being drawn into the rolls. The practice of loosening the adjusting screw with another knife blade has caused many painful cuts and should be prohibited. A screw driver of the proper size should be used and the handle of the knife placed on a bench or other rigid support. At the end of the shift knives should be placed in sheath before being put into tool bag, which will prevent puncture wounds caused by the point of the knife protruding through tool bag.

Cutting Rubber with Template—Many cuts are received in this operation by the knife being drawn up on to the template and into the other hand, or by the fingers being allowed to extend over the edge. Operators should be taught to cut away from the hand holding the template. In some plants a flange is placed near the edge of the template, which has greatly reduced the number of cuts formerly received on this operation. For cutting thin goods a roller knife may sometimes be used to good advantage.

Skiving with Knives—This operation is extremely dangerous unless extreme care is used. Never attempt to skive toward the hand holding the work, or toward the edge unless absolutely necessary.

Knives in the Calender Room—Calender operators whose work requires the use of a knife to cut samples of sheeted stock for gauging, etc., should be warned against careless handling of the knives. The operators should train themselves to overcome the instinctive desire to grab for the knife if it is jerked from their grasp, since many cuts, some of a serious nature, have been caused in this manner. When two men are picking strips from the calender roll with their knives they should be very careful not to injure each other. When not in use knives should be carried in a sheath, as the nature of the work, requiring several men to work in close proximity, greatly increases the chance for cuts from an unprotected knife blade.

Butcher Knives—Crude rubber and batched stock are often cut with long bladed butcher knives which are liable to cause very serious injuries unless proper precautions are taken. There are three types of guards to prevent the hand from slipping off the handle onto the blade. One is made by slotting a piece of sheet metal, sliding it over the blade and fastening to the handle with wood screws. A second is a safety handle which may be secured from manufacturers of knives; and the third is a ring placed at hilt of knife, secured to the tang and under the handle. The ring should be large enough to accommodate the index finger. Of the three types described, the first has been found to be the most satisfactory for all around service; the second has the disadvantage of breaking under severe usage where the blade narrows down to form the tang. This is dangerous as well as undesirable from a production standpoint. The ring type is not recommended for rubber workers. Especially around the washing mills or tank washers, so called, as it would cause an added hazard in case the knife is caught in the rubber and is pulled between the rolls. In this case the employee would be liable to have his hand drawn into the rolls before he could release his finger from the ring.

Routine to Insure Guards Are Supplied

If a guard of type first described is used and the guards applied after the knives are purchased, a routine should be established whereby the knives go from the receiving department to the shop to have the guards applied before going to the store room.

A sheath should be attached to the table or work bench and the knife kept in it at all times when not in use.

An ingenious guard for smaller knives can be made by fastening a hooked piece of sheet metal to the bottom of the handle, the hooked portion extending down where the handle joins the blade, preventing the fingers from slipping off the handle onto the blade.

Round Handled Knives—Knives with round handles have a tendency to roll off the table or bench if not laid down with care. This can be avoided and the comfort of the round handle retained by flattening the lower half of the handle into a V shape.

Sharpening and Grinding Knives—Many accidents have been caused by improper methods of grinding on wet stones. The knife should be grasped firmly in one hand, index finger parallel to and resting on the blade, the thumb on the other hand resting on the blade and close to the index finger of the hand holding the knife. The grindstone should be turning away from the employee.

When grinding knives on an emery wheel a glass shield should be provided over the wheel or goggles should be worn. The glass shield will be found superior to goggles for this work, as it is always in place and does not require the employee to spend any time in adjustments, which is frequently the case with goggles.

Severe cuts are sometimes received while sharpening knives on hand stone. The

stone should be firmly secured to table, bench or some rigid support and never be held in one hand or laid across the knee while sharpening the knife. Hand stones similar to meat cutter steels are sometimes used, and unless the correct method of usage is understood, very serious cuts are liable to result. This type of stone should have a guard at the hilt to prevent the blade of the knife passing too far down and cutting the hand holding the stone. The proper method of using this type of stone is to place the hilt of the knife at the top or point of stone, then draw the blade down towards the hilt, at the same time drawing handle of knife away from the stone. In this manner the entire length of the blade will pass across the stone.

A Cause of Many Serious Accidents

Trimming Tires—Trimming tires with a V-shaped knife has been the cause of many painful and serious accidents. Puncture wounds from these knives may be decreased and the severity reduced by rounding the points. Proper receptacles should be furnished in which to keep the knives when not in use. In trimming the tire it should be grasped back of the point at which the knife is cutting, and the thumb should be kept well down on the side wall of the tire. The cutting edge of the knife should be sharp and wet.

Shears—Shears are used extensively in the rubber industry and their use is attended with the hazard of cuts and puncture wounds, of a sometimes very serious nature. The general safety rules on carrying of knives and laying them on tables and benches apply equally well to shears, as the hazard is much the same.

Shears should never be carried in the hand while carrying other material, as this practice may cause the loss of an eye or other serious injury to fellow workers. The points of shears should be rounded where this does not interfere with the operation.

Lack of attention on the part of employees is a frequent cause of cuts from shears. Holding material in one hand and cutting this material with shears held in the other hand while watching or talking to some fellow employee, are things which cannot be done with safety.

Tossing of shears from one employee to another should be absolutely forbidden, as many serious injuries have resulted from failure to catch them and having them fall point down on the feet.

Grabbing for falling shears is another extremely dangerous practice which can be largely avoided by making the use of a sheath or receptacle compulsory.

Summary—Nine-tenths of all accident prevention in connection with knives and shears comprises, proper safety instruction, constant vigilance, providing proper receptacles and the compulsory use thereof.

Supervisors and inspectors should be firmly impressed with the fact that it is their duty to insist upon operators handling tools in the safest possible manner.

A Paper Worthy of Careful Study

CHAIRMAN SCHNEIDER: I am sure we all enjoyed the paper so efficiently prepared by Mr. Low. I think every one in this room can carry home some worth while idea. It proves that we can produce good safety methods, and it is simply a matter of correlating ideas. I think we all feel very highly indebted to Mr. Low for his paper and he is to be congratulated.

We have with us a gentleman who needs no unusual introduction. He is a man who commands the respect of every one, not only in the rubber industry, but in other industries, as a leader in safety work. I take great pleasure in introducing Mr. Paul Van Cleef, vice-president, Van Cleef Brothers, Chicago.

The Important Place Safety Holds in the Rubber Industry

Paul Van Cleef, Vice-President, Van Cleef Brothers, Chicago, Ill.

The Rubber Section of the National Safety Council had its beginning in October, 1919, though the safety movement itself was inaugurated somewhat earlier. In the Akron district this probably occurred along in 1910 or 1911. It indicated a growing consciousness for safety but lamentably a slowly growing one.

That the conditions in the rubber industry require serious consideration is amply demonstrated. Fluctuations in the frequency and severity rates have appeared from year to year. During 1926 the frequency rate was four and one half points above the average for all the industries reporting although fortunately the severity rate was three quarters of a point below. A good idea of the periodic change in the frequency and severity rates for the years 1921 to 1926 inclusive can be gained from the following table:

	Frequency	Severity
First half 1921.....	24.80	.65
First half 1922.....	34.75	.67
First half 1923.....	35.83	1.50
First half 1924.....	25.96	.814
All of 1925.....	.....	.....
All of 1926.....	.....	.....

	Frequency	Average	Severity	Average
Last half 1921.....	37.60	31.20	1.15	.90
Last half 1922.....	37.18	35.97	1.07	.87
Last half 1923.....	26.73	31.28	1.15	1.33
Last half 1924.....	28.87	27.42	1.337	1.08
	.....	29.15	.....	1.11
	.....	30.09	.....	1.17

There has never been a better record than in the first half of 1921, but the year ended badly, for there was never a worse record than the last half of that same year. The year 1924 had the best general average, although the past two years have not differed greatly from it.

Are we to be satisfied with the figures shown, and would they still apply if every rubber manufacturer had turned in a report on his accidents? It is, of course, hopeless to expect in such a highly mechanized industry as the rubber industry to see a zero frequency or severity rate. Even leaving aside the accidents caused by machinery, this statement still holds, for it is said that of all accidents in industry 66½ per cent are not caused by machinery. Nevertheless, the rubber industry is confronted with the fact that the past three years have shown an upward trend in the accidents occurring. When one stops to consider that only 32 firms reported their accident record in 1926, although this was a gratifying improvement over the 22 of the previous year and the 16 in the year of 1924, it is worth while estimating the situation in the whole trade.

Since there are no data for arriving at the position in non-reporting plants, we may venture a guess at it. Suppose that the plants reporting represented as much as half of all the rubber workers. On this basis the grand total averages would stand for 1926 as follows:

Average No. Employees	Number of Accidents—Disability				Total All Causes
	Total Hours Worked	Deaths	Permanent	Temporary	
156,566	322,446,048	20	172	9,690	9,882

Deaths	Number of Days Lost—Disability		Total All Causes
	Permanent	Temporary	
120,000	143,078	137,512	400,590

Comparisons might be made of these figures with those of other industries. It would be both for and against the rubber industry. They suffice to show, not in index figures but in real terms, the facts. A casual examination will convince anyone of the importance of the need for safety work in the rubber industry.

Why isn't there a more general affiliation with the movement? Is there some sort of mental complex which deters firms from boldly facing the safety problem? Do they fear learning something so unpleasant it might stir them to inescapable action? You know the tendency to follow the lines of least resistance. At that I believe the record quoted favors the trade as a whole. I am convinced that only the more progressive organizations have contributed to the records. Doubtless some exceptions will be found because there may be some firms outside of the National Safety Council which are fully aware of their safety problems. But if the truth were known, would the industry be able to make as good a showing?

An Industry with Many Hazards

The rubber industry contains, without doubt, as many possible sources of accidents as almost any other. We are dealing with highly powered equipment. We handle dangerous chemicals, hazardous solvents, electric currents, etc. Many parts of equipment cannot possibly be guarded without interfering with operations. There is an immense amount of handling which cannot be mechanically performed. Yet some factories are indifferent to it. Some feel that the insurance company will take care of their losses. Some believe accidents inevitable. Some give the matter no thought at all. They don't sense this important modern trend. I could enumerate in detail the various causes for accidents in the rubber industry. I could show perhaps how conditions in each case could be remedied, but much of this is already in the records. What I want to show is that the problem can be solved by forcing a realization of its necessity on the whole industry.

Do you know that there are 468 manufacturers in this country that can be classified basically as rubber manufacturers? Yet the Rubber Division of the National Safety Council has only 48 members, four of whom are not rubber manufacturers—hardly a tenth of all. Surely it is not because of the cost of membership, which is nominal. It must be because of actual neglect of the principles of safety in their own plants, for association is one of the best means of fostering an ideal. I have heard of places where the firms thought their duty towards their employees was complete when they paid them well. Any other effort was thought of as expense.

For the sake of argument, consider for a moment in passing what safety work would mean in cash outlay. Take, for example, a firm capitalized at \$750,000 and earning \$100,000 per annum. Suppose it spent \$2,000 a year on safety work. Do you think that amount would make any real difference to the owners? If the business were held by several stockholders they would perceive the difference even less. Smaller or larger firms would feel the cost only proportionately. The considerations of financial expense, it is obvious, must be left out of the picture almost entirely. What is left, then, is the personal element as involved in the relations existing between employer and employee. The safety problem is greatly simplified when there is a better mutual understanding, and this is within the reach of every company. It is expressed by the firm in the form of personal consideration.

This matter of personal consideration has a direct bearing upon the importance of successful safety work. By this term I have in mind welfare in its broadest connotation, which omits the dollars and cents idea. It is not just sufficient to put mechanical contrivances on equipment and feel that that is sufficient—or to pay some recognized wage scale and from there hope responsibility ceases. The best part of the work yet remains. Safety work must be done for its own sake, and be a part of the general welfare work which every organization should do. It must have the support of management and be a part of it. If it is half hearted, if it treats safety work solely as an experiment to determine whether it “pays” or as a necessary evil, success in this field is a will-o’-the-wisp. If management can see the underlying benefits from safety work and enter whole-heartedly into the spirit almost immediately the whole organization will become permeated with the same feeling. Once the latter realizes that safety is not a selfish force applied by the employer for his own good, the interest in safety becomes a vital factor in accident prevention.

The Plant Morale Registers in Safety Work

As I have said, it does not always take a direct expenditure of money to do safety work. What is required in any plant is the building up of a general interest in safety. Even the office boy must learn that it is wrong to leave a waste basket where someone may trip over it. The management must not only take a sympathetic interest in the subject but an active one. When meetings are held it must be present. If there are stockholders they should also be present. Make everyone in the organization feel the importance of the subject keenly by having every official of the company as well as every employee present. Perhaps officials will object by saying there aren’t enough accidents to justify their presence. The answer to that is the standard phrase: “One accident is too many.” Possibly they will say: “Our presence may emphasize the subject so much our employees will become scared and we will drive them away.” This is a false position. On the contrary, I know of one place where operators refused to work because of its hazards until the firm became personally interested in solving the problem. This is the thing that inspires confidence. This is the sort of thing which costs the least and does the greatest amount of good. You will recall that I stated 66½ per cent of accidents were not caused by machinery. This is the group that will be most helped by the personal interest method. It is through safety conferences with committees and direct contact with the workers discussing matters freely that safety becomes a living matter. There are many ways of stimulating interest in safety and in all of them the plant owners must take an active part. Safety work cannot successfully be imposed from without. The National Safety Council can be the means of interchanging safety knowledge. It can be the starting point for safety work and its inspiration, but fundamentally the safety problem is something which must touch the heart of plant management.

We have seen the figures showing the record of the rubber industry during the past few years. We have regarded with regret the relatively few firms affiliated with the safety movement. It was pointed out that the rubber industry has as grave problems in safety as other industries. The monetary cost was shown to be negligible. It has been indicated that in so important a work as this the management must be active in arousing an interest in safety. There is still another approach which will show why safety work in the rubber industry, or for that matter any industry, is important. It is justified solely on humanitarian grounds.

It is really a mistake for safety workers to be constantly endeavoring to

defend their departments by the savings in plant operation which they effect. What if not a penny were returned in increased efficiency? There are other considerations. I am not a sentimentalist, but it really pains me whenever I witness an accident. I know it hurts the real sufferer more. I don't think you are different from me or the men in the 400 rubber plants not members of this great organization. Isn't it up to us to try to reduce the hazards of daily life just for the sake of the distress it will save? Are we to stand in awe of those "ogres" the stockholders? They are just plain people like ourselves, only waiting to be directed. They are not a whit more callous. We only imagine they are mercenary. But what if they were? Some must show the way and be bold enough to stand up for a better understanding.

They must be made to see that accidents are not matters of fate, though of course there are some unavoidable accidents. The indifferent factory foreman and superintendent must be won to the cause by making them more sensitive to the happiness of others. The worker must be made to understand that it is all for his personal welfare. We must talk less of the cost of accident prevention and more of the good it will do. We must make apparent that the safety movement is cooperative in which every participant derives gain. Since we of the rubber section are few in comparison to the rest of the rubber manufacturers, we must hold up the light for the rest to follow. We must inspire others with the necessary zeal. We must talk and write safety until we have their serious attention. We must try to have them enroll in the National Safety Council, where they can derive the good that comes from direct contact with established safety interests. We really ought to have the vast majority of rubber companies as members. It would be good for the industry as a whole, making it a more wholesome place for men to work and justifying a belief that rubber manufacturers have a true love for their fellow-men. Then we could say our industry realized the importance of safety.

Lack of Statistics a Vital Point in Safety Work

CHAIRMAN SCHNEIDER: I am sure we all enjoyed Mr. Van Cleef's talk. I think it is something that should lend us the zeal of which he speaks about in our work. I also think he has done a great deed in giving us his time and has devoted a great deal of attention to this paper. I know he has his heart and soul in safety, both industrial and public.

It is to be regretted, as Mr. Van Cleef states, that there are not more reporting members of our Section. We have earnestly endeavored to secure other members. I am sure that the officers of the coming year have a task on their hands because there must be a greater proportion of reporting members than we have at the present time although we have secured a much larger proportion this year. The number of members, of course, is not as great as it should be, and most of the active safety work is done by a comparatively few members. We hope that every one here will lend their support to the work which the Rubber Section is doing and endeavor to secure more members. After we have secured them, I think we can sell them on cooperating and taking a real active part in our programs.

At this time, we will endeavor to show some very interesting moving picture films, and we are also indebted to Mr. Beck, of the United States Rubber Company, for bringing them here. They are very interesting and I am sure you will all enjoy them.

(Motion picture film was run.)

CHAIRMAN SCHNEIDER: I have an announcement to make. The council asks if there is any one who wishes to make any plant visitations to mention the fact on the back of the registration card.

Mr. Van Cleef suggests that if there are any questions regarding his paper he will try to answer them.

R. C. SALISBURY (The Fisk Rubber Company, Cudahy, Wis.): Mr. Van Cleef the safety problem has always been a difficult one to introduce in the smaller plants. I believe your plant employs about 150 people.

MR. VAN CLEEF: Not quite.

MR. SALISBURY: Have you some definite form of safety organization that you deal with?

MR. VAN CLEEF: Yes, we have, as a subsidiary to the organization I mentioned. We have in this organization the safety and social club. We have a number of committees, and they are, principally: A committee on safety, committee on fire prevention, and committee on personal welfare. The committee on safety brings in various suggestions.

This committee has sub-divided itself still further into a group consisting of a representative of each room in the plant, making about 20 who are called captains. and each one wears a pin designating him as a safety captain; and this safety captain has the authority, which comes from the house itself, to speak to any one he sees committing something against safe practices, and that has worked very well.

Members of the Committee Rotate Monthly

This committee rotates. Once a month there is a change. Of course, the safety committee puts on contests from time to time and makes a study of such accidents as we have and makes recommendations. In fact, the safety committees keeps one busy in trying to keep up with them in the way of correcting things around the plant that are likely to cause accidents.

I noticed among the pictures given here on "Knives and Shears," there was one covering a problem that we have, that is, how the calender and mill men should carry their knives. We ran into some difficulty there. We supplied the men with sheaths which were made out of leather, and were to be fastened with a string around the waist. It appears that the men do not like to wear them, they say they are too unhandy. We have to overcome that in some way. Does that answer your question?

MR. SALISBURY: Yes. Do you make periodical inspections?

MR. VAN CLEEF: Yes, the safety committee has one man who makes a trip around the factory once a week, examines all the fire equipment, and the chairman of the safety committee turns in to me a weekly written report, which is a form furnished by one of the insurance companies, indicating that all parts of the plant are in satisfactory shape, or otherwise; and then each one of these captains turns in a report about once every two weeks. The reports of the captains go to the safety committee for its consideration and are then brought to my attention.

E. W. BECK (United States Rubber Company, New York City): I would like to talk about the figures which Mr. Van Cleef gave this morning. What he says regarding the small plants is very true, and I think it is best illustrated from the figures which he showed.

In 1921, 1922 and 1923, we had a very good severity rate. That is, our days lost per thousand hours worked were fewer than for the years 1925 and 1926. A layman might presume that our safety work is going backward, that we are twice as bad as we were in 1921, 1922 and 1923. That is not so.

A careful analysis of those figures will show back in 1921, 1922 and 1923, the factories and companies that were submitting their statistics to the Statistical Committee of the Rubber Section were the larger companies, like Goodrich, Fisk, Goodyear and United States Rubber Company. Those larger companies, as Mr. Van Cleef stated, were pretty well organized in safety work and they were doing a pretty good job, judging from their severity figures.

We added other companies to those submitting figures. Naturally, they were the smaller companies, and their frequency and severity rates were terrible. When you look at the figures and see .65 as a severity rate, and then 1.11 and 1.17, there is an experience twice as bad; but it does not give you the picture of how much worse the smaller companies are than the larger companies.

I had occasion to consider our own factory. We had 30 factories represented in all those years, and when divorced from the hours worked, I got a picture of our own experience. I have done that each year, and I find it is the smaller factory that is pulling down the average. If you could see the severity and frequency rates for the small rubber factories you would be surprised. There is the big job, as you have stated. There is where we have to get out, roll our sleeves up to our elbows, and do some work. I feel it is our job to show those fellows the light. We can show it as a paying proposition from financial and economic points of view. It is not often that I mention the financial. So often, they are just looking at the dollars and cents. When they have insurance, they feel that is the insurance company's job, they are paying for it and paying a high rate.

I think you gentlemen should know that the experience of the industry, as a whole, is not as bad as it might look, because if you could take the larger companies which represent the large number of workers, I think you would find a much lower rate than that average of 1.11 and 1.17.

CHAIRMAN SCHNEIDER: I am sure Mr. Beck has outlined a true picture of that situation. The officers have known of that condition for some time. It has been discussed individually and collectively by our group, and we have also discussed it with insurance representatives, and I believe that is a true picture of the situation. So, as Mr. Beck says, we must roll our sleeves up and get to work. I think the smaller plants have a definite need for safety work, particularly in the rubber industry.

A Word in Defense of the Small Organization

MR. VAN CLEEF: I want to say one thing in defense of the smaller organizations when it comes to statistics. You take a small organization and it has one accident during the course of a month that causes a loss of a whole day. That ratio will seem very high because it is figured on the same man-hour basis that the larger organization is. The small organization might have a broken arm, and lay a man up for three week, and I think there ought to be something done about that phase so as to encourage the smaller organizations a little bit when it comes to statistics.

MR. BECK: What you say is true. I think that is due to the fact that you are using a severity or frequency rate that is more or less equalized. While our company has 30 or more factories, our best experience is in our smaller factories, because they haven't the exposure. Our larger plant, where Mr. Quirk is located, has a terrible time with new developments, new construction. That happens to be the tire end of it, and you know what has taken place in the tire industry. The Department of Labor in Washington, said the tire industry is the worst in the United States. I do not believe it. They used these figures that we have shown this morning, and these smaller plants are the ones that are pulling down this severity and frequency rate.

CHAIRMAN SCHNEIDER: I think what Mr. Beck says is true. I have to cooperate with him on that. It is true that the smaller factories are pulling down our rates, and, as he states, the method of computation is unfair, because the exposure is so much greater. The method of computation is also by an approved method, and approved by the Bureau of Labor. We have recently revised our method of reporting to make it more simple. Consequently, I believe we are getting as accurate reports as it is possible to get.

M. A. QUIRK (Morgan & Wright Plant, United States Rubber Company, Detroit, Michigan): I believe Mr. Van Cleef spoke about handling their knives. Some of our plants have a receptacle at the side of the mill for the men to put their knives in, or a sheath, with a metal clip, and hung on their belt. It fits on their belt and in that way, it is hung there without any trouble. Maybe, somebody else has some other method.

CHAIRMAN SCHNEIDER: Any other methods used?

DR. J. NEWTON SHIRLEY (Hood Rubber Company, Watertown, Mass.): The idle knife, from the medical viewpoint, is not the trouble-maker; it is the used knife. If there is a holder on the side of the machine, as a rule they use it, and we do not have the accidents when they do use it.

R. A. BULLOCK (Corduroy Fire Company, Grand Rapids, Michigan): We have the apron, without the bib, and the pocket where the carpenter usually keeps his ruler, a fabric lining is put in there and the man keeps his knife in that pocket. Some have a sheath made out of friction fabric and strap it to their belt, and it makes it real handy, out of the way, and no danger at all of any one being punctured with a knife.

CHAIRMAN SCHNEIDER: I think that is very interesting, indeed, for the reason that it makes it a part of the wearing apparel. However, I doubt if you could compel the workmen to use a certain garment.

MR. BULLOCK: Our men seem to approve of that garment, that way of wearing the knife.

Appointment of the Nominating Committee

MR. BECK: I would like to say that at the meeting of this Section, tomorrow, Mr. Congdon, chairman of the Engineering Committee, will give the report of his committee, and as secretary of the Rubber Code Committee, I would like every one to be present who possibly can be here, because you know the outstanding hazards in the rubber industry are the mill and the calender, and we have been successful in getting the unanimous approval of the entire Safety Code Committee in drawing up the code. I would like for you to be present to hear what Mr. Congdon has to say, and possible receive a copy of the Code that has been published.

CHAIRMAN SCHNEIDER: It might be well to announce, to save time, that the Nominating Committee has been appointed to select the officers for the coming year. The Nominating Committee consists of: Mr. H. T. Martin, The Fisk Rubber Company, Chicopee Falls, Massachusetts, chairman; Mr. E. W. Beck, United States Rubber Company, New York City; and Mr. E. A. Hoehner, The Firestone Tire and Rubber Company, Akron, Ohio. The Nominating Committee will render its report tomorrow morning.

Are there any questions any one would like to ask Mr. Beck before closing the meeting? I would like to ask Mr. Beck if he has any means of telling just what type of accidents they have on these plantations? I notice they are doing some wonderful health work, and I would like to know something about the accidents.

MR. BECK (United States Rubber Company, New York City): You asked me a question that I cannot very well answer. I have reports of all accidents in this country, but do not get many report of accidents at our plantations. I think those of you who are in the safety field can well imagine the nature of accidents that you get with employees working under the conditions they are working.

I am sorry that it was necessary to confine the exhibits to only four reels. Last year, we had two young men go to Sumatra to take these pictures. They spent several months over there and took 27,000 feet. You have seen 4,000 feet. You have seen very little. You have only seen a small portion of the medical reels, and I might say that the physicians and surgeons, not only in this country, but abroad, have

shown a great deal of interest in the work of the plantations, and we have had the films printed in foreign languages for their use.

As I say, I am not familiar with any of the accidents of the plantations. I do not go over there every month as I do to my factories. If any one goes there, I understand they make a complete trip around the world? I have seen a great many colored pictures of the plantations, and it is certainly a beautiful country.

CHAIRMAN SCHNEIDER: In closing, I just want to thank every one who has contributed toward this program, and I think and hope that next year we will have even a more successful program. Do not forget tomorrow's program. We have another portion that is just as good, if not better, than we had this morning.

ADJOURNMENT.

Wednesday, September 28, 1927

The second session was called to order at ten o'clock by the chairman, W. L. Schneider.

CHAIRMAN SCHNEIDER: The first matter on the program is the election of officers. As most everyone here knows, the duties of carrying on this work rests on individuals, who are elected and appointed each year for carrying on this work of the Rubber Section.

I would like to ask the chairman of the Nominating Committee, Mr. H. T. Martin, to render his report.

H. T. MARTIN (The Fisk Rubber Company, Chicopee Falls, Mass.): Your Nominating Committee wishes to submit the following report:

Chairman, R. C. Salisbury, The Fisk Rubber Company, Federal Division, Cudahy, Wisconsin. Vice chairmen, M. A. Quirk, U. S. Rubber Company, Morgan & Wright plant, Detroit, Michigan; Paul Van Cleef, Van Cleef Brothers, Chicago; E. A. Hoerner, Firestone Tire & Rubber Co., Akron, Ohio. Secretary and Chairman of Publicity Committee, E. R. Lawler, U. S. Rubber Company, Hartford plant, Hartford, Connecticut. Posters and Slides, H. W. Low, Miller Rubber Company, Akron, Ohio. Program, Harvey Willson, The Rubber Association of America. Membership, R. H. Cochran, Kelly-Springfield Tire Company, Cumberland, Maryland. Statistical, R. B. Harkness, The Cupples Company, St. Louis, Missouri. Health, Dr. J. Newton Shirley, Hood Rubber Company, Watertown, Massachusetts. Advisory, H. T. Martin, The Fisk Rubber Company, Chicopee Falls, Mass.; E. W. Beck, United States Rubber Company New York City; W. L. Schneider, The B. F. Goodrich Rubber Company, Akron, Ohio.

CHAIRMAN SCHNEIDER: You have heard the report of the Nominating Committee. What is your pleasure?

V. L. MEARS (Aetna Rubber Company, Cleveland, Ohio): I move the adoption of the report.

CHAIRMAN SCHNEIDER: The motion has been made to accept these nominations. Do I hear a second to that motion?

(Motion was seconded and carried.)

CHAIRMAN SCHNEIDER: The next on the program will be the report of the Engineering Committee, Mr. Congdon.

The Engineer's Opportunity for Safety

J. E. Congdon, U. S. Rubber Company, New Haven, Conn.,
Chairman Engineering Committee

The term "engineer" today is somewhat broad and to indicate the field of work the term "engineer" must be qualified. We have in the rubber industry all classes of engineers, including designing engineers, development engineers, safety engineers, plant engineers, etc. Each of these plays a contributing part in the advancement of safety.

The designing engineer in the drafting of a machine should include in the design safety guards properly placed and so arranged that they do not interfere with production and may be easily removed for overhauling the machine.

We all know that even today in some cases safeguarding is an after-thought and after two decades of propaganda there is considerable chance for improvement.

However, as illustrations of the advance in safety, I would mention the design of safety treads for stairs, the various safety locks on elevators, the use of safety trip-bars on mills and calenders, all of which are common enough today but a development of recent times.

The development engineer in the invention of new and untried processes and equipment should consider carefully whether or not there is being introduced hazardous conditions with which he is not familiar, and should guard against same not waiting for sad experience.

The safety engineer, or supervisor, a product of the last few decades, has not yet come into his own. Often he is limited in his sphere of work by not knowing what is being done until it is done. In this respect a closer cooperation between the various engineering branches of an organization would be of benefit to all. In fact, every engineer should be a safety engineer.

The plant engineer, superintendent of engineering, master mechanic, or man in actual charge of the mechanical operation of the plant, is the man who, if he will, can play a large part in the program of safety. Why do we say this? Most accidents are physical not mental. It is true that a great many accidents can be prevented by education, but modern inventions and developments have introduced conditions which still more than in the past require the attention of the plant engineer. Just to mention a few of these, pulverized fuel with its attendant explosive hazard, high tension electric current with the necessity of proper insulation, high pressure steam boilers with their greater need for watchfulness, the use of various new ingredients in compounding and the necessity for better ventilation, and so on through a long list.

Each Condition Must be Studied Individually

How is the engineer to safeguard the constantly appearing new conditions? Each condition should be studied by itself. Sometimes the mechanical fails, sometimes the human fails. On railroads accidents have occurred by the locomotive engineer not seeing signals, due to various reasons, and running by the signal set against him. In this case the human fails. To overcome this and similar accidents various systems of train control have been developed and are being installed at the present time so that if the human fails the mechanical would safeguard, thereby reversing the age-old adage of "the power of mind over matter," and showing the superiority of matter over mind in a specific case.

Grade crossing accidents in which automobiles are wrecked by locomotives are of common occurrence. We understand that magnetism has been used to stop an automobile automatically in case it approaches too close to a railroad track. Why not use this method for preventing a collision of automobiles?

The use of the radio and electricity are yet in their infancy. The passing of a hand over a tube starts a large steel plant operating miles away. Who shall say that it may not be possible in the future to stop a line of mills by thought waves?

But to get back to our daily task, what one thing has done the most to prevent accidents? Inspection—thorough inspection by a competent man and if a hazardous condition exists the correction of this hazard. It is true that we have a great many inspectors now, boiler inspectors, building inspectors, fire insurance inspectors, and through a long list, but do we have a competent safety inspector or inspectors of our manufacturing equipment?

It may be true that it is more difficult to inspect for safety on special manu-

facturing equipment than it is on standard equipment common to all, such as buildings, elevators and boilers, but such things as belts running so that they jump off the pulley, gear teeth becoming so badly worn that there is possibility of topping, the links on chain hoists becoming worn so that there is a possibility of breakage, and so on. These are generally inspected very casually, if at all, by some mechanic. Would it not pay, from a safety and financial standpoint, to employ a thoroughly competent and experienced Safety Inspector who would inspect regularly and thoroughly and be a Safety Inspector actually as well as in name?

During the past year the Committee has endeavored to spread the safety idea from an engineering standpoint to the various members of the National Safety Council rather than to write a paper on a specific engineering subject. In this way it was the thought that the most good could be done for the largest number.

As you know we have circulated letters giving information regarding the Safety Code for elevators, the suggested rules for the care of power boilers, the method of operating vulcanizer doors safely, guards for the protection of breaker caps, etc.

We regret to say that we have received no inquiries for an engineering investigation into any specific subject. It would seem that the large experience represented in the Rubber Section could be utilized to good advantage on engineering subjects through the Engineering Committee, and it was our thought in our last circular letter to emphasize this point and to see if during the coming year this could not be utilized.

The new Rubber Machinery Code is of vital interest to the Rubber Section and this code will be discussed at the meeting following this one.

The writer wishes to thank all those who have cooperated with the Engineering Committee for the past year and trust the same and more cooperation will be given to the chairman of the Engineering Committee of the coming year.

Further Cooperation is Emphasized

CHAIRMAN SCHNEIDER: I think Mr. Congdon has covered this subject very well. There is a very close need for cooperation between the engineer and the plant safety man. We all have our ideas, I think, in that respect. I know that the machine begins on the drawing board and the building begins on the drawing board, and the engineer usually specifies the materials that go into that machine and into the building. I think after the engineer has designed the machine and the building and it is built, it requires constant watchfulness by the safety inspector or plant inspector. I believe that the plant engineer is becoming more sold on safety each year.

The Section itself and the Council are carrying on very constructive work, editing pamphlets of all characters for the engineer, as well as the safety man, making the engineer a safety man.

Any remarks in connection with this subject that any one would like to make?

DR. J. NEWTON SHIRLEY (Hood Rubber Company, Watertown, Massachusetts): There is one thing that came to my mind, you mentioned safety appliances being inspected before being put into operation. How many people have a safety man inspect machines before they are put into operation to see that appliances are properly installed? That seems to me a fairly important question. I have seen several accidents where if proper inspection had been made before the machines were used they would, undoubtedly, have been avoided.

CHAIRMAN SCHNEIDER: Can any one qualify that question? Mr. Beck, I would

like to ask you what your method is in taking care of the new machine before being placed in operation.

E. W. BECK (United States Rubber Company, New York City): We fortunately have a development Department that makes an inspection of our equipment before being used, and those matters are watched in a safety factory all the time. Only last week, I had occasion to find a certain machine where the rolls when running idle were not far enough apart to allow a person's finger, if he got caught, to pass through, and I had occasion to bring the fact to their attention.

I think all developing engineers and all engineering departments when designing equipment should design it so that all moving parts, when they do come near a shoulder, that shoulder will be wide enough so that it will not pinch. I am speaking now of footwear machinery, where ladies are working on the small operations in connection with the making of shoes. I have found that our different departments, development, engineering and chemical, are always glad to accept those suggestions, and try to work them up.

I think if we safety engineers pay a little closer attention to those departments, before the equipment gets into the factory to see that it has the proper guards, we are going to make our job much easier. We are also going to help the person who operates that particular machine. I know the machine I have in mind now was slowing up production materially, the rolls had to be cleaned, it was not practical to stop the machine, and it would have been a simple matter to have a smaller roll, or to have had them a little farther apart. I feel, as Mr. Congdon does, that it begins on the board, for a great many other problems come into observation when the equipment gets into production. We have to work with the development engineers.

Inspect the New Equipment for Safeguards

CHAIRMAN SCHNEIDER: Any more remarks in connection with this question? I would like to hear from Mr. Martin.

MR. MARTIN (State Department of Ohio): I would just like to leave a thought with you which I know is in practice in some of the plants that I visit. That is, where new equipment is installed in the plant, that it be kept out of production until the Safety Division has approved this machine. They check the machine thoroughly as to safety appliances and proper method of operation. I think that will answer the doctor's question more than the other discussion that was brought up.

I understood the doctor to inquire what methods are practical and should be taken. Is that right, doctor?

DR. SHIRLEY: Yes.

MR. MARTIN: I think if the safety inspectors in the various plants are given the authority to hold up the machine until such inspection has been made, you will find that the machine will be in good condition.

R. C. SALISBURY (Fisk Rubber Company, Cudahy, Wisconsin): What do you advocate for small plants, where there is no safety department?

MR. MARTIN: I do not know. I would like to answer that just for the state of Ohio. Now, our state has a Division of Safety and Hygiene and any representative of that division is available to any of the small plants that have no safety division.

CHAIRMAN SCHNEIDER: I think the condition that Mr. Martin mentioned, in the first place, is an ideal one, when every one has to see that every piece of machinery or equipment is properly guarded before being placed in operation. When I say "ideal," it is not always possible. It is the goal that we are all reaching for, but we cannot always secure it.

The proper method is, no doubt, to see that the machine is fully equipped

in so far as possible to do so. Some hazards exist which we cannot foresee on the drawing-board and, perhaps, by inspection they would be discovered before being put into operation. Does that fully answer your question, doctor?

Dr. SHIRLEY: Yes.

H. T. MARTIN (The Fisk Rubber Company, Chicopee, Massachusetts): Just another step in there. I dislike to talk about what our company does, that we do so and so, but you cannot always avoid it.

The engineering department, in the organization with which I am connected, keep the safety division advised from the moment an authorization is made out to purchase a machine until it is installed. That gives the safety inspector an opportunity to keep in touch with it from the very beginning and the production department is not permitted to place any machine in operation until the safety inspector has said it is safe for operation.

CHAIRMAN SCHNEIDER: I think that condition is also ideal. The cooperation between the maintenance department, drafting department and production department is very necessary, so that there is no possibility of a machine being put to use unless it is fully guarded.

Opinions From the Smaller Companies

MR. SALISBURY: We have considerable representation of the smaller companies, and I think it would be well to hear from some of the members of the smaller companies. We are not reaching them, as evidenced by the fact that we have not a large membership in the Section of the smaller companies, and I would like to hear from some of the companies other than U. S. Rubber, Fisk, Goodyear, and so on. Mr. Mears, of the Aetna Rubber Company, might have something to say, Mr. Schneider.

V. L. MEARS (Aetna Rubber Company, Cleveland, Ohio): I think it is a very good idea to have the foreman of each department held responsible for any accidents that occur after a machine has been turned over to him. Here is a loophole and caused this to occur in our plant a few weeks ago. We bought a new machine under the guarantee to do the job, and we set it up, checked it, and it had all the guards on, so we turned it over to the department.

The operator of the firm from whom the machine was bought came along and had to make a few adjustments, took several guards off. I walked past the machine two days later, it was running and all gears exposed. That foreman heard a few things, and hereafter the foreman in each department is going to be held responsible for guards taken off in his department.

J. E. CONGDON (U. S. Rubber Company, New Haven, Connecticut): I think we can offer many helpful suggestions to the makers of machinery. I have in mind the tuber machine. It has a large gear, and I know it was three or four years before we could get the makers to make a solid guard. A man could not stick his hand through the guard. It was pointed out to the manufacturer repeatedly that the design of the guard was wrong. That applies to a lot of the machinery.

CHAIRMAN SCHNEIDER: I think Mr. Congdon has brought up a very important point. The machinery manufacturers do not, in all cases, comply with the best safety requirements. In some cases they do not even comply with the codes of the various states. We know it is a tremendous task to get the machinery manufacturers to comply with our codes. Prices on machinery alter the construction of the machine, and very often when they comply, the guards are very weak in structure and practically useless. I have seen any number of them with only a small piece of tin over the face of the gears when they arrived at the plants. We hope that the engineering field, which I think is largely responsible for that, will

bring about a better condition with regard to the safeguarding of machinery before it enters the plant.

MR. MARTIN (State Department of Ohio): May I just say a word in connection with this phase of properly safeguarding your equipment that comes into your plant, new. The discussion has brought out the fact of the necessity of cooperation of the engineering, manufacturing and production departments. One vital factor has been overlooked, and that is your purchasing agent of the plant.

Now, if your purchasing agent specifies that the new equipment which is purchased and is to be placed in your plant must comply with the requirements of the code of Safety Appliances as specified in the state in which it is to be used, you will get your equipment properly safeguarded to conform to said code. But the trouble is that your purchasing agent asks for bids on a certain machine of various companies, and he does not specify that this machine must comply with the safety requirements of the codes in which state it is to be used. If that were included, you would get your machine equipped properly.

I have heard those stories time and time again. I get into plants where they make specific machines used in our home state, and I asked the manufacturer, "Why don't you manufacture these machines to conform with our code?" And he replied, "If I did, I would lose one-half of my business." So it is the purchasing agent who must be included in the cooperative line.

CHAIRMAN SCHNEIDER: It is true that the purchasing agent has a direct bearing on the purchase of machinery in regard to specifications. On the other hand, the safety engineer should see that those requirements are embodied in the quotation.

There is one point that may be debatable in that connection, that is, the quality of the guards and accessibility of the machine itself. While we might say that a manufacturer should comply with the requirements of a code, some other firm may have some particular reason for guarding that machine in a different manner from the manufacturer. It may be more convenient and may find some particular reason for mounting certain motors or some other added equipment to it which may make it better for the manufacturers to guard the machines themselves.

Any further discussion? If not, we will proceed with the program.

The next item on the program is the report of the Statistics Committee. Mr. Mansfield is unable to be here, so Mr. Kidney, of the Goodyear Tire & Rubber Co., will read the report.

Report of the Statistical Committee

We have often read statements regarding the number of industrial accidents and the economic losses due to them. Accident costs, operation of hospitals, compensation expenditures and loss in production all form a very important item in the cost of doing business. The everyday citizen may read in a paper or magazine that statistics show that over three million accidents, of which approximately 24,000 proved to be fatal, occurred last year in our industrial plants and mines.

The above figures to a certain extent may be a bit misleading to the average person who may not understand the methods of tabulation. Industrial accidents are not only applied to industrial plants, but to each and every gainful occupation. The word "accident" does not necessarily mean that an employee was seriously injured, but accidents as tabulated by the Sections of the National Safety Council, may be comparatively slight and of only two or three days' disability. For this reason we list accidents by frequency and severity.

Ten years ago it was almost an impossibility to get satisfactory accident

data from industrial concerns. Now we see a marked progress in the keeping of records, the tabulation of minor and major injuries, and a more friendly spirit of cooperation in the safety movement in the industry.

Some three years ago it was suggested that a more lengthy form should be used in tabulating accidents for the Rubber Section; a form whereby one could read how the accident occurred, the nature of injury and the cause of the accident. Such forms were made up and put in use. On account of the length of time it required for the completion of this form, we were unable to increase our list of reporting members and it seemed advisable to make a change to a form which would be a one page affair, with the necessary information to render a good report of our accident experience for the year. For the past year we have been using the regular printed form prepared and furnished by the Council, and in use by the majority of the other Sections.

In our summary report for the last year we have three divisions under the following headings: Footwear, Tires and Miscellaneous. We were able to get reports from 32 members as compared with 22 of the preceding year. This is an indication that the shorter form is more satisfactory. We are looking forward for a gain in the reporting of members for 1927.

Fewer Employees But More Hours Worked

The average number of employees in 1926 is somewhat lower than in 1925, which is no doubt due to more efficient methods of production, installation of conveyors, etc. The number of hours worked has increased considerably which may be due to a more steady business condition and less labor turnover in the Rubber Industry. There is a slight increase in temporary injuries amounting to 259, which of course has a tendency to increase our days lost. The percentage of frequency for 1925 was 29.15 which has increased to 30.09 in 1926. The percentage of severity also shows a rise from 1.11 in 1925 to 1.17 in 1926.

Taking into consideration the fact that the above figures include ten additional plants, some of which do not have a safety organization, we feel that the work of the Rubber Section has progressed in every respect. With the hearty cooperation of each member we can have a more complete report for 1927, which will be due after January 15, 1928.

Due to the vast difference in the products and working conditions in the different Sections of the Council, we can make no real comparison in the Sectional reports. For the benefit of those who have not received the annual report of the statistical division of the Safety Council, we have copied the following figures relating to severity:

Textile	.64
Rubber	1.17
Automotive	1.37
Power Press	1.39
Food	1.40
Packers and Tanners	1.75
Paper and Pulp	1.95
Chemical	2.28
Metals	2.44
Petroleum	2.47
Cement	3.97
Public Utilities	4.32

Woodworking	4.51
Construction	5.44
Quarry	7.04
Mining	8.47

S. MANSFIELD, Chairman.

MR. J. KIDNEY (Goodyear Tire & Rubber Co., Akron, Ohio): I am going to take this opportunity to talk a little safety myself. This is my first attendance at any Safety Congress, and I have been very much interested in it. I do feel, also (not wishing to brag), that we have the best organization in the country. In spite of that, our frequency still stays up, and I am going to try to talk with all the rubber men here in the hope of finding out what runs that frequency up. Having been on the job only three months, I get a lot of impressions that, maybe, you fellows who have been in it a long time do not get, and I have been listening with a great deal of interest to all that has been going on.

I think that the educational program of safety is the most important. I think it is more important than engineering or guards or anything else, and I think that we should have some discussion on that. I am not going to take up any more of your time.

Satisfaction With the Section Standing

CHAIRMAN SCHNEIDER: I think we all enjoyed the remarks of Mr. Kidney and the report of Mr. Mansfield. I know that Mr. Mansfield has given this job considerable thought and study, and he has also worked on the committee.

I do not believe that it will be necessary to discuss this further, with the exception of the fact that the gain from 22 to 32 reporting members, as mentioned yesterday, I think had some bearing on the increase in severity, for the reason that we feel that there have been a number of plants that do not have a full safety organization. At least, they are young in the field. I have reason to believe, myself, that that has a tendency to bring up our severity rate slightly.

I think, however, every one here should feel proud of the Rubber Section which according to the figures which the Council has compiled, ranks second highest of all the industries covering a period of over six billion hours. I think that is a very favorable comment and we should be proud of it.

J. KIDNEY (Goodyear Tire & Rubber Co., Akron, Ohio): I would like to ask what is the secret about some of the accident figures that some of the companies won't report.

MR. BECK: I am probably as much interested as any one in the question of statistics. I think that if we analyze our statistics properly we can get a lot out of them.

To answer Mr. Kidney's question, there are some companies that do not like to accept the standard of time losses for permanent disability. They do not like to say a death is responsible for six thousand days, the loss of an eye is responsible for so many thousand days. They like to feel that a death is no days lost, because the next day they put a man in his place. When you have factories figuring severity and frequency rates that way you cannot get very far. You have to have all factories using the same scale of time losses.

There are some factories that have a very good hospital, and a staff of doctors and nurses connected with their organizations. Those doctors and nurses like to feel they can get the man back on the job quicker than anybody else. For that reason, they feel they should be given credit. I do not agree with them.

I have been the one who opposed the complicated reports on statistics. If we are going to get more companies to come in on this question of statistics, we have

to make it simple, cannot give them a complicated form to fill out, and expect them to do it willingly. We have to start in a small way and get them interested.

To come back to the question of a large factory, when a man loses a finger, no infection sets in, and he only loses seventeen and one-half days, that is all they should be charged with. We charge the scale for the loss of that finger. A loss is exactly the same in Ohio as a loss in Massachusetts, Connecticut or any other state. The fact is that you are not going to get anywhere unless you agree that the loss of a finger is the loss of a finger, regardless of the state in which it takes place. That is the reason some of the factories have not come in with their reports.

Mr. Congdon asked me to say a word about the number of factories reporting. You stated there was an increase. Some of you may not know in the past the large companies have been reporting all their figures from all their plants as one severity rate and one frequency rate, and the National Safety Council is now trying to get United States Rubber Company, Fisk, Goodyear, Goodrich, and so forth to submit their figures for each unit, rather than for the company as a whole. Their idea being, of course, to show more factories and give a larger spread. I know in our company, where we have over 30 factories, you would probably not get the picture that you wanted if we gave you a severity rate of .75, because in our company we have all kinds of factories, making even hardware, regenerating, footwear, mechanical and tire. So I think our statistics should go farther, the rate for the industry, might break it down into groups, the groups that I mentioned might be a good break at first.

I feel that we should take these statistics more seriously and see if we cannot get something out of them. The only way I justify my existence is by my statistics. If I could not prove my work with statistics, I would feel I was not doing my job.

CHAIRMAN SCHNEIDER: We all have a big job ahead of us. The statistical field has only been scratched. I think the Statistics Committee has a life-size job ahead of them. The fact that we have 32 reporting companies instead of 22, last year, does not mean a great deal if we are not getting the meat out of it. It is getting the meat from these statistics that we require. It is true that they must be necessarily simple. We must have a standard method of reporting these figures.

The next item on the program will be "Health Hazards of Compounding Materials." We have with us today, Mr. Healy, of the Fisk Rubber Company, who has spent a great deal of time in the preparation of this paper. It gives me great pleasure to introduce Mr. Healy.

Compounding Materials Used in the Rubber Industry— Their Classification and Health Hazards

L. J. D. Healy, Fisk Rubber Company, Federal Division, Cudahy, Wis.

The object of this paper is to bring before this Section of the National Safety Council the nature of some work which the Health Hazards Committee is now engaged in carrying out to provide authentic data on the hazards and proper handling of compounding ingredients used in the rubber industry. With the rapid strides being made in safety work to safeguard the health and lives of the nation's workmen, we find that the more obscure type of hazards is being brought to light. The early endeavors of safety work were largely along the lines of mechanical safeguards to protect workmen against injury from exposed machinery. This was natural in view of the fact that accidents from this cause were usually violent and made rapid and deep impression upon the minds of victims and witnesses. The causes of such accidents as well as results were well defined. In many of the cases the

cause of accident was due to exposed machinery; in others it was carelessness or both. The remedy for exposed or poorly constructed machinery was apparent to both operative and employees and in most cases the hazard could be overcome by some protective mechanical device or guard.

The question of carelessness was a problem which required more thought and could be attacked only by a process of education, a process which required time for its accomplishment, but which, thanks to the intensive work of the National Safety Council, is making rapid headway.

Hand in hand with the elimination of mechanical hazards and the eradication of carelessness, we have had the development of sanitary protective measures. This is another process of education. An attempt to have the workman use his head to think before he acts, to take inventory of himself, to realize the value of his health and to protect his body against disease and injury. This is a slow process of education and evolution but has already borne much fruit as can be attested to by our accident and health statistics and by the adoption of intelligent compensation laws. The work of the National Safety Council becomes more and more a fight against ignorance and the proper education of both employer and employee.

The Obscure Hazard is Most Dangerous

The more obscure any hazard, the more insidious and dangerous it is, especially if it be of a type to slowly affect one's health. This slow insidious burrowing from within is a monster to be feared—its presence is often unknown until irreparable damage has been done or even death occurs. There are many hazards of the latter type still present today in our industrial processes. Many substances are in use which neither the manufacturer nor employee recognizes as being dangerous. This is especially true in smaller industries where technical advice or medical services are lacking. These substances are to be feared and rightly so inasmuch as contact with or improper handling of them may cause a slow breaking down of the body structure which cannot be corrected if allowed to continue for too long a period. How often have we witnessed a case where a man's health has been impaired in early life by some toxic compound, often to the point where disease has fastened its deadly grip upon his emaciated body. A life sacrificed to ignorance.

These are the problems to which we must also turn our attention. Much good work has been done but there is still more to do. It is a process of investigation and education. We must first ferret out these insidious substances and educate both employer and employee as to how to handle them with safety.

The rubber industry is one in which a great many and varied types of compounds are used. An inventory would probably reveal several hundred different compounds in use for compounding rubber, many of them in quite general use. Amongst this large number we know that some are very dangerous to the health of those handling them unless precautionary measures are taken. There are others about which comparatively little is generally known. Some manufacturers are apparently absolutely ignorant about the properties, toxic or otherwise, of many of the substances they are using. With the increasing use of organic substances for vulcanizing rubber there is an ever present danger of health hazard unless the toxic and irritating properties of these substances are known. There is a tendency for many manufacturers of chemicals to place rubber accelerators and compounding ingredients upon the market under fancy trade names. This may be done to disguise the true nature of the substance, especially if the latter has toxic properties. It is a practice to be discouraged unless the producer is

willing to state the exact chemical nature of the compound. If he is unwilling to do this, he should at least stand back of his product and guarantee it to be free from toxic and all other properties injurious to one's health.

The manufacture of rubber, while requiring heavy machinery and the use of many and varied chemicals, should be no more hazardous than any other line of manufacturing where heavy machinery is involved. In fact, it should be and can be made less hazardous than most lines of manufacturing if proper precautions are taken. The machinery used is mostly slow moving compared to many industries and is adaptable to being well protected to safeguard the operatives. The chemicals used can all be handled in a safe manner provided their toxic and chemical properties are understood and efficient methods of handling are employed. Many poisonous chemicals used in the past are fast being replaced with non-poisonous compounds and there is no reason why the manufacture of rubber goods cannot be carried out under the safest and most healthful of conditions.

To Stimulate Interest in the Industry's Poisons

It is with the hope of stimulating more interest along these lines that this paper has been prepared. Until very recently there has been an utter lack of definite data concerning many of the compounds used in the rubber industry. At best, information pertaining to nature of these compounds is widely scattered and in many cases very meager. In a few outstanding instances the ground has been very well covered especially in the handling of certain lead compounds and benzole. The splendid work done by the combined Rubber & Chemical Sections of the National Safety Council on Benzole is an excellent example of what can be done to educate the manufacturer in the proper handling of these chemicals so as to prevent injury to those using them.

This paper is more in the nature of a proposition for classifying and describing the nature of the various compounds used in rubber manufacture.

In preparing this paper the writer has endeavored to compile in a compact and correlated form such data as will be useful as a reference and which will indicate the hazards to be avoided in handling the materials used in the rubber industry. For this purpose the rubber compounds have been divided into four groups:

- 1—Accelerator and Dry Organic Compounds.
- 2—Dry Inorganic Compounds.
- 3—Gums, Resinous Materials and Waxes.
- 4—Liquids and Gases.

Each compound is classified alphabetically and cross indexed where different names are used for the same material. Under this grouping, each compound or chemical is described:

- 1st—As to its origin, identification and chemical characteristics.
- 2nd—Its general use in the industry, especially as to its use in the rubber industry.
- 3rd—Its health hazards in the rubber industry and any suggestions, if necessary to reduce or eliminate such hazards.

This material has been condensed as much as possible for quick reference work but is complete enough to show the chemical nature of these compounds and the care with which these should be handled to prevent an impairment of health. References are appended so that more detailed information may be obtained where necessary, especially in the case of the more toxic substances.

A considerable number of the organic accelerators under Group 1, and two in organic compounds of Group 2, have been completed and the data attached hereto. These will give a general idea of the way in which we propose to compile this data.

GROUP I

Organic Accelerators and Dry Organic Compounds

Aldehyde Ammonia
Alpha-naphthylamine
Anhydro-formaldehyde-aniline (See Methylene Aniline)
Anhydro-formaldehyde-paratoluidine (See Methylene paratoluidine)
Aniline
Beta-naphthylamine
Dimethylamine-dimethyl-dithiocarbamate
Diorthotolyl-guanidine
Diorthotolyl-thiourea
Diphenyl-guanidine
Diphenyl-thiourea—(See Thiocarbanilid)
Ethylidene Aniline
Formaniline—(See Methylene Aniline)
Formaldehyde-aniline—(See Methylene Aniline)
Heptaldehyde Aniline
Hexamethylene-tetramine
Lead oxidation product of dimethyl-dithio-carbamic acid
Methylene aniline
Methylene-dianilide—(See Methylene-diphenyl-diamine)
Para-phenylene-diamine
Methylene-ditolyl-diamine
Methylene-para-toluidine
Mercaptobenzothiazole
Ortho-toluidine
Para-nitroso-dimethylaniline
Para-phenylene-diamine
Para-toluidine
Phenyl-tolylguanidine
Piperidine-pentamethylene-dithiocarbamate
Quinoidine
Tetramethyl-thiuram-disulphide
Tetramethyl-thiuram-monosulphide
Thiocarbanilid
Toluidines—(See Ortho and Para Toluidine)
Triphenyl-guanidine
Zinc-butyl-Xanthate
Zinc-ethyl-Xanthate
Zinc-isopropyl-Xanthate
Zinc-oxidized salt of dimethyl-dithio-carbanic acid

GROUP II

Dry Inorganic Substances

Aluminum Flake
Ammonium Carbonate
Antimony—(See Antimony Sulphides)
Antimony Sulphides

Asbestine
 Asbestos
 Barium Dust—(See Barium Sulphate)
 Barium Sulphate
 Blank Fixe—(See Barium Sulphate)
 Barytes—(See Barium Sulphate)
 Beckton White—(See Lithopone)
 Blank Fixe—(See Barium Sulphate)
 Blue Lead—(See Lead Compounds)
 Cadmium Yellow
 Calcined Magnesia—(See Magnesium Oxide)
 Calcium Chloride
 Carbon Black
 Carbonate of Ammonia—(See Ammonium Carbonate)
 Carbonate of Magnesia—(See Magnesium Carbonate)
 Caustic Soda
 Chalk—(See Whiting)
 China Clay—(See Clays)
 Chrome Green
 Chrome Yellow
 Clays
 Crimson Antimony—(See Antimony Sulphides)
 Diatomaceous Earth—(See Infusorial Earth)
 Emery
 Fossil Flour—(See Infusorial Earth)
 French Chalk—(See Talc)
 Fuller's Earth
 Golden Antimony—(See Ant. Sulphide)
 Graphite
 Ground Glass
 Gypsum
 Hard Rubber Dust
 Heavy Magnesia—(See Magnesia Oxide)
 Hypo—(See Lead Compounds)
 Iron Oxide—(See Red Oxide)
 Infusorial Earth
 Kaolin—(See clays)
 Light Magnesia—(See Magnesia Carbonate)
 Lamp Black
 Lead Compounds
 Blue Lead
 Lead Thiosulphate
 Hypo
 Lead Oleate
 Lead Oxide
 Litharge
 White Lead—Sublimed
 White Lead—Basic
 Lime
 Litharge—(See Lead Compounds)
 Lithopone
 Magnesia Carbonate
 Magnesia Oxide
 Mica

Oxide of Magnesia—(See Mag. Oxide)
Oxide of Iron—(See Red Oxide)
Paris White—(See Whiting)
Plaster of Paris—(See Gypsum)
Plumbago—(See Graphite)
Pumice
Prussian Blue
Red Oxide
Red Ochre
Rotten Stone—(See Infusorial Earth)
Silica
Slate Flour
Sodium Hypo Sulphite
Soapstone—(See Talc)
Sulphur
Talc
Tripoli—(Infusorial Earth)
Ultra Marine Blue
Umbar
Venetian Red
Vermilion
Whiting
White Lead Basic—(See Lead Compounds)
White Lead Sublimed—(See Lead Compounds)
Yellow Ochre
Zinc—(See Zinc Oxide)
Zinc Oxide
Zinc Sulphide
Zinc Yellow

GROUP III

Gums, Oils, Resinous Materials and Waxes

Asphalt
Balsam—(See Canada Balsam)
Beeswax
Bitumen
Brown Sub
Burgundy Pitch
Canada Balsam
Carnauba Wax
Castor Oil—(Sub)
Ceresin
Coal Tar Pitch
Colophony
Corn Oil
Cotton Seed Oil
Degras
Gilsonite
Glucose
Glue
Guayule
Gutta Percha
Hardwood Pitch

Hydrolene
Lard Oil
Latex
Linseed Oil—(Sub)
Mineral Oils
Mineral Rubber
Montan Wax
Napthaline
Oil Substitutes
Organic Dyes
Ozokerite
Palm Oil
Paraffine Wax
Petrolatum
Pine Tar
Pine Tar Oil
Pitches
Pape Seed Oil
Rosin
Rosin Oil
Rubber
Shellac
Stearic Acid
White Substitute
Wood Tar
Wool Grease—(See Degras)

GROUP IV
Liquids and Gases

Liquids:

Acetic Acid
Alcohol
Ammonia
Benzole
Carbon Bisulphide
Carbon Tetra Chloride
Chloroform
Coal Tar Naptha
Ethylene-di-chloride
Gasoline
Glycerine
Sulphuric Chloride
Sulphuric Acid
Toluol or Toluene
Turpentine
Xylol

Gases:

Chlorine
Hydrogen Sulphide
Sulphur Chloride
Sulphur-di-oxide

Aldehyde Ammonia

Origin & Constitution:

Aldehyde Ammonia belongs to that class of compounds known as the amine-aldehyde group and has the formula C_2H_5O, NH_3 . It is prepared by the action of dry ammonia on acetaldehyde. It can be crystallized from an ethereal solution. When pure it is a colorless crystalline solid with a melting point of 70° - $80^{\circ}C$. It is quite stable in closed containers but rapidly turns brown and becomes resinous when exposed to the air. The commercial product varies from a fairly white powder to a dark brown viscous, resinous mass and is liable to show considerable variation in composition. On heating aldehyde ammonia, it readily decomposes into ammonia and acetaldehyde.

Uses:

Formerly Aldehyde Ammonia was quite extensively used as an accelerator for vulcanizing rubber. It was one of the early organic accelerators to replace aniline and gave quite satisfactory results although the commercial grades could not always be relied upon for uniformity. It belongs to the class of moderately powerful accelerators but is fast being supplanted by the more stable and powerful type of accelerators. From one-half to one per cent on the rubber is the amount ordinarily used for accelerating purposes. It is added to the rubber, during the mixing operation on the mills.

Health Hazards:

Aldehyde Ammonia gives off a small amount of fume and a disagreeable odor during the mixing and calendering operations. This odor is quite nauseating to some workers, but is one to which the operatives become accustomed. Where used, it is advisable to use suction hoods over mixing mills and calendars. At no other place in the factory is the odor noticeable and beyond this disagreeable odor in the mixing and calendering operations, no harmful effects of its use have been reported. (Hamilton P. 432). Its health hazard is not serious and no precaution need be taken other than to remove by suction the small amount of fume thrown off during the mixing and calendering operations.

Alpha-Naphthylamine

Origin & Constitution:

Alpha-Naphthylamine is a white crystalline powder having the composition $C_{10}H_7NH_2$ with the aniline radical in the alpha position. It has a melting point of $50^{\circ}C$ and a specific gravity of 1.223. Upon exposure to light and air it discolors, turning to a purplish gray. It is almost insoluble in water, but is readily soluble in alcohol, ether or aniline. It has a characteristic unpleasant odor.

Uses:

Alpha-Naphthylamine is used in the manufacture of synthetic organic compounds. It has been used in a small way as an accelerator for rubber goods. Its accelerating powers are comparatively weak and it finds but little application in the rubber industry due to its disagreeable odor.

Health Hazards:

Alpha-Naphthylamine is relatively non-poisonous, although it is capable of producing symptoms characteristic of Anino compounds. No serious cases of poisoning have been reported even in chemical industries where the substance is used in much larger quantities than in rubber manufacturing. (See Hamilton, 1924—P. 510.) For rubber work, small amounts equal to approximately 1 or 2 per cent of the weight of the rubber are used. This is weighed out in the Compound Room and thrown onto the mills with the other powders during

the mixing operations. Being a powder, it is easily handled and worked into the rubber. It is not used to any extent in the rubber trade today and its health hazard is very small.

Aniline

Origin & Constitution:

Aniline also known as Aniline Oil, when pure is a colorless oily liquid. Upon exposure to light and air, it turns to a reddish brown color. The commercial product is usually of a light brown color and has a characteristic aromatic odor. It has a formula $C_6H_5NH_2$ and is prepared by reducing nitro-benzene with nascent hydrogen. The latter is carried out by heating the nitro-benzene in the presence of iron filings and hydrochloric acid. The excess acid is then neutralized with milk of lime and the resulting product steam distilled.

The commercial product often contains impurities such as traces of water, nitrobenzene hydrocarbons and toluidines. It has a specific gravity of 1.027 and boiling point of $184^\circ C$.

Uses:

Aniline plays an important part in our chemical industry. It is one of the basic raw materials used in the synthesis of many chemical compounds, including many dyestuffs and organic rubber accelerators. It is probably best known in connection with the aniline dye industry. It was the first organic accelerator to be used commercially in the vulcanization of rubber and was used extensively for quite a number of years, being at its peak a decade ago. Its use in the rubber industry, however, has steadily fallen off the past ten years, due largely to its toxic properties, and the advent of more powerful and less toxic accelerators.

The use of Aniline brought about a revolution in the rubber industry, its use being the greatest improvement in vulcanizing rubber since the discovery of vulcanization by Goodyear.

Aniline is a relatively weak accelerator when compared with the accelerators of the present day. However, it has valuable properties as a softener in mixing and imparts excellent ageing properties to the finished goods. Were it not for its strongly toxic properties, its use would no doubt be very large even today.

Health Hazards:

Aniline is exceedingly toxic. It is a volatile poison, affecting the nervous system and acting destructively upon the red corpuscles. The poisoning may be absorbed through the skin by direct contact or from saturated clothing or inhalation of the vapor given off during mixing and calendering, and also by way of the digestive tract.

The first symptom of aniline is pallor, which soon changes to a striking bluish color, especially in the lips. There is usually severe headache and general weakness, and if the exposure to the fumes continues, loss of consciousness, which may be prolonged alarmingly. It is not necessary that the exposure to aniline fumes be long continued or intense for serious symptoms to ensue.

While comparatively few deaths from aniline poisoning have been reported in the rubber industry, there have been many serious and chronic cases. Where death has occurred, it has usually been through absorption of the poison through the skin, this occurring where the worker has had his clothes become saturated with the oil.

The oil is received in drums which are opened in the weighing room. Here the oil is weighed out in tins and carried to the mixing mills. The weigher is in danger of getting the oil on his hands or clothing. He should wear a rubber apron and rubber gloves. The latter should be kept clean both inside and out.

It is advisable to have a suction in order to draw vapors away from the weigher, since the oil is volatile at a room temperature. The oil is added to the rubber on the mixing mills by pouring it slowly onto the rubber as it is being masticated between the rolls. Considerable fuming occurs here, due to the heat of the rubber batch volatilizing the oil. The mill should be hooded and provided with powerful suction, since aniline fumes are heavy and are difficult to remove. Hence, the mills should be completely enclosed except for the space where the operator works. Under the best conditions, there is still danger of inhaling some of the fumes, as well as absorbing the aniline through the hands, while cutting the rubber on the mill.

At the warming and calendering operations, a great deal of fume arises and it is here where some of the most serious cases have been reported. The calender temperatures are relatively high, causing excessive volatilization of the accelerator. The calenders should be well hooded and provided with powerful suction. It is more difficult to hood the calenders than the mills, and for this reason calender operators are in considerable danger of exposure to the vapors.

The use of alcohol, even in moderation, increases very much the susceptibility to these fumes. Hot, muggy weather also increases the dangers of aniline poisoning.

The aniline is added only in small amounts to the rubber, usually in the proportions of from 1 to 3 per cent. Hence there is comparatively small danger of poisoning throughout the subsequent operations. If proper precautions are taken in weighing out and during milling and calendering operations, the hazards are reduced to a minimum, although they cannot entirely be overcome. It is for this reason largely that aniline is being fast replaced by the less toxic accelerators.

Because of the secrecy which formerly shrouded the rubber compounding processes, it was very difficult to properly diagnose the earlier cases of aniline poisoning. Aniline poisoning in rubber factories has been thoroughly studied during the past ten years and very complete data has been tabulated. This will not be dwelt further upon here, but complete data may be found in the following:

U. S. Bureau of Labor Statistics—Bulletin 179—Industry Poison Used in the Rubber Industry.

Hamilton—Industrial Poisons in the U. S., 1925.

Kober & Hayhurst—Industrial Health, 1924.

Beta Naphthylamine

Origin & Constitution:

Beta Naphthylamine is a white crystalline powder having a composition $C_{10}H_7NH_2$ with the aniline radical in the Beta position. It becomes brown upon exposure to light and air. It has a melting point of $112^{\circ}C.$ upon a specific gravity of 1.06. It dissolves in hot, but only sparingly in cold water.

Uses:

Beta Naphthylamine is used in the manufacture of synthetic organic compounds. It is also used to a small extent as a rubber accelerator. It is, however, only slightly stronger than aniline and suitable only for the dark colored goods, since light rubber goods are discolored by the use of this compound.

Health Hazards:

Beta Naphthylamine is relatively non-poisonous, although, as in the case of Alpha Naphthylamine it is capable of producing symptoms characteristic of amino compounds. According to Hamilton, men coming in contact with Beta Naphthylamine in chemical factories have been known to suffer from both cyanosis and micturition. No cases of poisoning have been noted in the rubber industry,

no doubt due to the small amount used and on account of but little danger of exposure.

The material is weighed out as a powder in the Compound Room and mixed with the other powders upon the mill. Only about 1 per cent is used. The powder has very little tendency to fly, and the health hazard, when used in the rubber work, is negligible. The material is no longer used to any extent in the rubber manufacture, having given way to the cheaper and more powerful accelerators.

Hamilton, 1925—P. 510.

Dimethylamine-Dimethyl-Dthiocarbamate

Origin & Constitution:

D. D. D. is a reaction product of dimethylamine and carbon disulphide. It is a white crystalline solid readily soluble in water and having the formula— $(CH_3)_2N.CS.SNH_2(CH_3)_2$. This accelerator belongs to the class known as ultra accelerators, which are very active at low temperatures.

Uses:

D. D. D. is used as an accelerator for vulcanizing rubber. It is one of the most active accelerators known, but requires a small amount of Zinc Oxide to promote the reaction. It is used in extremely small amounts, only a fraction of 1 per cent being required for vulcanization. Using larger amounts, vulcanization has been found to take place at room temperature over a period of several weeks.

This accelerator has attained only limited application in the rubber industry due to its very powerful action and the low temperature at which it works. The latter is too low for the usual milling and calendering operations. It may be added to the rubber in the solid form by means of a master batch or the salt may be dissolved in water and the solution used for soaking the rubber.

Health Hazards:

D. D. D. has been used to a very limited extent and to date no ill results have been reported. Its toxic properties are small and the material can be so handled in the form of master batches, that the health hazard should be negligible.

Di Ortho Tolyi Guanidine

Origin & Constitution:

D. O. T. G. is a white crystalline powder, having but slight odor, with a specific gravity of 1.10 and a melting point of 171° to 175°C. For rubber work it should be ground to approximately 200 mesh. It is slightly soluble in rubber, is quite stable when exposed to air and light, and does not readily volatilize. D. O. T. G. is insoluble in water and does not readily absorb moisture from the air. It is prepared by the action of ammonia upon di-ortho-tolyl-thiourea, in the presence of a lead compound and has the formula, $(CH_3.C_6H_4.NH)_2C:NH$.

Uses:

D. O. T. G. is used primarily as a rubber accelerator and is one of the most popular accelerators used at the present time in the manufacture of tires, tubes, mechanical and non-blooming rubber goods. It is one of the most active of the so-called high and medium temperature curing accelerators. D. O. T. G. is ordinarily used in the proportion of from $\frac{1}{4}$ to 1 per cent on the rubber, and at temperatures ranging from 270° to 320°F. The accelerator is practically odorless, does not readily volatilize during mixing and calendering operations and can be handled without danger of scorching the stocks. It is for this

reason, as well as its low curing cost, that this accelerator has become popular.

Health Hazards:

D. O. T. G. is weighed out in the compound room as a dry powder in small amounts, usually not over $\frac{1}{2}$ of 1 per cent on the rubber. It is practically odorless, does not absorb moisture and is non-poisonous and non-irritating to the skin. The powder is mixed on the mill with the other ingredients, being quickly absorbed by the rubber without fumes. It is one of the safest accelerators to use and no ill effects from its use have been reported.

Di Ortho Toly Thiourea

Origin & Constitution:

Di orthotolyl thiourea is a white crystalline powder having a specific gravity of 1.25 and a melting point of 144° to 148°C . The commercial salt may contain, as impurities, small amounts of mixed toluidines and aniline. It is slightly soluble in rubber and insoluble in water and does not take up the moisture readily from the air. Di orthotolyl thiourea is prepared by the action of carbon disulphide upon ortho-toluidine and has the formula $(\text{CH}_3\text{C}_6\text{H}_4\text{NH})_2\text{C}:\text{S}$.

Uses:

Di orthotolyl thiourea is used chiefly as a rubber accelerator, but its use is not very great except for a few special lines, such as rubber shoes, mechanical goods and specialties. It is very similar to Thiocarbanilid in its characteristics, being, however, somewhat more powerful. The presence of zinc oxide seems necessary for proper acceleration. This accelerator scorches on both mills and calenders at very low temperatures, and for this reason it is not practical for many purposes. It is a comparatively cheap accelerator and can be used for white goods to good advantage where scorching difficulties are not encountered.

Health Hazards:

Di orthotolyl thiourea being a dry, white powder, can be readily handled in the compound room without danger. It is weighed out in the usual manner in small amounts up to one or two per cent. During the mixing and calendering operations there is some decomposition resulting in vapors having a very pungent odor. Mills and calenders should be headed to remove these vapors. During vulcanization decomposition products are evolved in the form of obnoxious vapors which are objectionable to the operatives.

The same precautions should be taken here as noted on Thiocarbanilid. No serious hazards are involved with proper precaution.

Diphenylguanidine

Origin & Constitution:

Diphenylguanidine is a white crystalline powder, having a specific gravity of 1.13 and a melting point of 144° to 147°C . It is insoluble in water and does not readily take up water from the air. For rubber work, it should be ground to approximately 200 mesh. D. P. G. is slightly soluble in rubber, has no perceptible odor and is very stable when exposed to light and air. It is prepared by the action of an ammonium salt upon thiocarbanilide in the presence of a weak base such as zinc or lead oxide and has a formula $(\text{C}_6\text{H}_5\text{NH})_2\text{C}:\text{NH}$.

Uses:

D. P. G. is used largely as a rubber accelerator. It is a very active accelerator at ordinary curing temperatures, and is one of the most widely used at the present time. Until quite recently, it was probably the most widely used

of any of the accelerators. It is gradually being supplanted by lower temperature accelerators.

D. P. G. is an ideal accelerator for nearly all classes of rubber goods, including white and colored goods. It has no perceptible odor and does not volatilize during the milling and calendering operations, and is non-poisonous. It is used in the proportion of about $\frac{1}{2}$ of 1 per cent on the weight of the rubber and is especially well adapted for low sulphur and non-bloom stocks. It imparts good ageing qualities to rubber goods.

Health Hazards:

Being a dry, non-hygroscopic and non-irritating powder, D. P. G. can be easily handled without hazards. It is weighed out as a dry powder in the compound room in small amounts and is added to the rubber directly on the mixing mills. It does not readily fly or volatilize, does not fume and rapidly disperses into the rubber. Due to its non-toxic properties, it is a safe accelerator to use, and the health hazards are nil.

Ethylidene Aniline

Origin & Constitution:

Ethylidene Aniline is a brown, viscous, resinous material with a melting point of about 80°C. Commercial varieties vary in composition from a viscous liquid to a low melting resin. It is prepared by the action of acetaldehyde upon aniline. A number of resinous substances having various trade names, belong to this type of accelerator. They are reddish brown resins of low melting point and their activity depends largely upon the proportion of the reacting agents. Their general type of formulae are $(C_6H_5NH)_2:CH. CH_3$ or $(C_6H_5N:CH. CH_3)$.

These types of accelerators are very active in vulcanizing properties. They may be used with or without zinc, but are more active in the presence of zinc oxide. Furthermore, they are readily soluble in rubber and disperse easily during the mixing and aiding in the softening action. They are insoluble in water, do not take up moisture from the air and are quite stable upon storage. They have no objectionable odor.

Uses:

Ethylidene Aniline and resinous accelerators of this type are used extensively as rubber accelerators. They impart very desirable properties to rubber and may be used in all types of rubber compounds with the exception of white and highly colored stocks which are somewhat darkened.

Various types of these accelerators are sold under different trade names and are very popular with the rubber trade.

Health Hazards:

Ethylidene Aniline, whether in liquid or resinous form, is added directly to the rubber mix or put up in the form of master batches. The material is soluble in rubber and disperses quickly without decomposition and with but slight volatilization. A slight odor is given off during the mixing and calendering, but is not offensive or toxic. Hoods over mills and calenders are desirable but not necessary. The material is non-poisonous and as far as we have been able to discover has produced no dermatitis.

Heptaldehyde Aniline

Origin & Constitution:

Heptaldehyde is a brownish liquid accelerator prepared by condensing heptaldehyde with aniline. It is a powerful accelerator and especially adapted to high-gum stocks. Carbon Black, Clays and certain acid oils have a negative

influence upon it. It has a slight odor and incorporates readily with the rubber. It has the formula $(C_6H_5N:CH.C_6H_5CH_2)$.

Uses:

Heptaldehyde Aniline is used primarily as a rubber accelerator. It is a very active liquid accelerator, giving excellent results with gum stocks. It also has a softening action upon the rubber, which is beneficial for many purposes.

Health Hazards:

Heptaldehyde is classed as non-toxic and no ill effects from its use have been reported. It is often diluted with an inactive oil such as mineral oil to better mixing conditions and aid in dispersing the accelerator uniformly. The accelerator is weighed out in the form of a liquid and incorporated with the rubber at the mixing mills by slowly pouring the liquid over the rubber. It does not fume or produce obnoxious odors and can be handled with safety. It is advisable to handle all liquid accelerators in the compound room with rubber gloves. The latter must be kept clean inside and out.

Hexamethylene Tetramine

Origin & Constitution:

Hexa is a white, odorless, crystalline powder. For rubber work, material should be ground very fine to pass a 160 mesh. It has a specific gravity of 1.20 and is soluble in water. It is a stable product, but should be stored in airtight containers until ready for use to prevent taking on of moisture. Hexa has no definite melting point, as it decomposes with heat. It is prepared by the action of ammonia on formaldehyde and has the formula $(CH_2)_6N_4$. The exact arrangement of the groups is somewhat in question.

Uses:

Hexa is used extensively in medicine, in the manufacture of synthetic resins, for gas masks, and as a rubber accelerator. Up to a few years ago, it was one of the most widely used accelerators in the rubber trade and is still in quite general use. It is an excellent accelerator and produces stocks of high tensile strength and great resiliency. It has a tendency, however, to produce a disagreeable skin rash, which has caused it to lose its popularity as an accelerator. As a result, the use of Hexa has greatly fallen off in favor of more powerful and more easily handled accelerators.

Health Hazards:

Hexa is a dry, white powder, easily handled in the compound room without trouble or hazard. It is weighed out from sealed containers in the usual manner and is added directly to the rubber on the mixing mills, where it readily disperses in the rubber without odor or fume. While perfectly safe to handle from the toxic standpoint, Hexa does cause a troublesome dermatitis with some individuals. This takes the form of a disagreeable rash (sometimes called "rubber itch"). It very seldom causes trouble, either to the weighers or mixers, but is more likely to develop among those operatives who handle the warm, raw stock subsequent to the mixing operation, such as among the warmers, calender operators and sometimes the tire builders. The rash usually begins on the wrists, extends up the forearms, sometimes extending to the face and neck, and in a few cases spreading quite generally over the body. In some ways it resembles ivy poisoning and is inclined to itch violently, especially at night. The rash is not obstinate, however, and disappears in a few days with change of occupation.

Some individuals are immune to attack, while others are very susceptible. Hot, muggy weather and profuse sweating are conducive to this rash. Accord-

ing to Shepard & Krall, the rash is probably caused by the water soluble Hexa entering the skin, where it is first decomposed and then oxidized in part to formic acid, and the latter being the real cause of the rash. A saturated solution of bicarbonate of soda is recommended as a curative treatment. The severity and frequency of Hexa cases are largely proportional to the amount of Hexa which is used in the rubber stocks. Where only very small quantities (say under one-half of 1 per cent), are used, very little trouble is usually experienced. Due, however, to this disagreeable feature of Hexa, it is fast losing ground as a rubber accelerator.

For further reference on Hexamethylene Tetramine see Shepard & Krall, *Journal of the Ind. Hyg.*, 1920-21, 2, 33.
Also Kratz *L. R. World*, 1917—57, 146.
Also Hamilton, 432-434-524-528.

Methylene Aniline

Origin & Constitution:

Methylene Aniline, also called formanilin, formaldehyde aniline and anhydro formaldehyde aniline, is a white powder having a melting point of about 133° to 137°C., and a specific gravity of 1.14. It is prepared by the action of formaldehyde on aniline. Two products are formed, depending upon whether one or two molecules of aniline enter into the reaction. If one molecule of aniline is involved, methylene aniline is formed having the formula $(C_6H_5N:CH_2)$. If two molecules of aniline enter the reaction methylene-diphenyldiamine is formed, having the formula $(C_6H_5NH)_2CH_2$. Methylene aniline is only very slightly soluble in water and does not take up moisture readily from the air. It is very soluble in rubber. For proper dispersion it should be ground to about 100 mesh. It is fairly stable, although it turns brown when exposed to air and light, due to slight oxidation. It should be stored in closed containers.

Uses:

Methylene Aniline is prepared for use in the rubber trade as an accelerator and as a softener. It is a mild accelerator, being slightly more powerful than aniline and requires about 2 per cent upon the rubber for use as an accelerator. Zinc Oxide is desirable, but not necessary for proper acceleration.

Methylene Aniline probably finds its greatest use as a softener, and secondary accelerator in conjunction with the more powerful accelerators, especially of the guanidine types. It has a softening effect upon rubber and decreases the scorching tendency when used with the more powerful accelerators. Commercial Methylene Aniline often contains traces of uncombined aniline or formaldehyde.

Health Hazards:

Methylene Aniline is weighed out in the compound room as a powder and mixed directly on the mills in the usual manner. The powder does not fly and no special precautions need be taken in weighing out, since the material is non-toxic if pure. It is advisable, however, for the weighers to refrain from handling the material with the bare hands, since the commercial product invariably contains traces of aniline.

During the mixing and calendering operations, some volatilization takes place, producing a pungent odor and causing irritation to eyes and respiratory organs. Mills and calenders should accordingly be hooded with suction to remove these vapors. The material is not poisonous, except as traces of impurities, such as aniline or formaldehyde are present. It has been claimed that susceptible persons have contracted slight dermatitis, probably due to the presence of formaldehyde. Such cases, however, are not general and the material can be used with safety, provided precautions noted above are taken.

Methylene Diphenyldiamine

Origin & Constitution:

Methylene diphenyldiamine, also called methylene dianilid, is formed when two molecules of aniline react with formaldehyde, and has the formula $(C_6H_5NH)_2CH_2$. It is a yellowish, white, mealy compound, being rather difficult to grind, due to the fact that it has a tendency to roll up into a ball. It should, however, pass a 20 mesh screen, and be free from hard lumps. It turns brown upon exposure to the air and light and is inclined to cake if stored in a warm place. It should be kept in sealed containers and stored in a cool room. It has a specific gravity of 1.15 and a melting point of approximately 45° to $60^\circ C$. It is soluble in water, does not absorb moisture readily from the air and is very soluble in rubber. It disperses very readily in the rubber, giving a decidedly softening action.

Uses:

It is used both as an accelerator for rubber and as a softener in conjunction with other accelerators. It has relatively mild accelerating properties, being only slightly greater than aniline and about equal to methylene aniline. Its greatest use is as a softener for rubber and has an anti-scorching ingredient in connection with the use of more powerful accelerators.

Health Hazards:

Methylene diphenyldiamine is weighed out as a dry powder in the compound room and added directly to the rubber during the mixing operation. It does not fly and is easily handled without danger. The commercial product usually contains traces of aniline, and weighers should therefore avoid handling the material with bare hands.

During the mixing and calendering operations, considerable vapors are given off which are irritating to the eyes of those not accustomed to its use. The vapors, while quite irritating, are not seriously poisonous. Traces of aniline and formaldehyde may be present, and the mills and calenders should be hooded with suction to remove the vapors. Applying the precautions noted above, the material can be handled with safety.

Mercapti-Benzo-Thiazol

Origin & Constitution:

Mercapti-Benzo-thiazol is a yellow, amorphous powder, having a melting point of 174° to $179^\circ C$. It has a sweetish odor and a somewhat bitter taste. The material is prepared commercially by heating aniline, sulphur and carbon disulphide under pressure. The reaction product may be dissolved out in caustic and precipitated in an acid solution. It has the formula $C_6H_4 \begin{smallmatrix} N \\ S \end{smallmatrix} C_2SH$.

Uses:

Mercapti-benzo-thiazol is prepared primarily for use as a rubber accelerator. It is one of the very powerful low-temperature accelerators, working best at temperature of about 260° to $270^\circ F$. It requires the presence of a small amount of zinc oxide for proper activation. It is a very stable accelerator and has but slight odor. It also imparts good aging properties and gives excellent cures at low temperatures. For these reasons this type of accelerator is becoming very popular at the present time. It works well in most all types of rubber goods.

Health Hazards:

Mercapti-benzo-thiazol is a dry amorphous powder, has but slight odor and is classed as being non-toxic. It is easily handled in the compounding and milling departments. Only very small amounts are used, averaging less than one-half

of 1 per cent on the rubber. It can be weighed directly into the rubber or preferably put up in the form of a master batch. The substance does not fume on mills or calenders and can be easily handled without disagreeable effects. No cases of skin irritation or poisoning have been reported and the material may be handled with safety.

Ortho Toluidine

Origin & Constitution:

Ortho Toluidine is a colorless to yellow, thick refractive liquid which turns to a reddish brown upon exposure to air. It has a boiling point of 198°C . and a specific gravity of 1.01. It has the general formula $\text{CH}_3\text{C}_6\text{H}_4\text{NH}_2$ with the methyl and amino groups in the ortho position.

Uses:

Ortho Toluidine is used in the manufacture of dyes, intermediates, various chemicals and rubber accelerators. It is a weak accelerator and finds but little application in the rubber trade directly as an accelerator. It is, however, used quite extensively in the manufacture of other accelerators.

Health Hazards:

Ortho Toluidine is poisonous and should be treated with the same care as aniline. Operatives must not be allowed to get the oil on their flesh and mills and calenders should be hooded. Its toxic properties are quite similar to aniline, causing some cyanosis and affects the nervous system. Its use in actual rubber work is nil, since more powerful and non-poisonous accelerators are available. In such factories, however, where it is used to prepare other accelerators, due care should be exercised in its handling. (See Hamilton 506.)

Para Phenylene Diamine

Origin & Constitution:

Para Phenylene diamine is a colorless, crystalline powder which readily turns grayish-brown upon exposure to air. It has a melting point of 1.40°C . and a boiling point of 287°C . Its specific gravity is 1.14 and it has the formula $\text{C}_6\text{H}_4(\text{NH}_2)_2$. For rubber work the material should be ground very fine and be free from lumps. It is a rather difficult substance to grind and should be examined carefully for hard, crystalline particles.

Para Phenylene diamine is soluble in alcohol, ether and water. It takes up the moisture readily and is quickly oxidized upon exposure to air, and for this reason must be stored in sealed containers.

Uses:

Para Phenylene diamine is used extensively in the dye industry for dyeing hair and furs. It is also an excellent and powerful rubber accelerator, imparting very desirable properties to rubber goods. It cannot be used for white or light colored goods, since it discolors the same. It would be a very popular accelerator but for the fact that it is decidedly poisonous. It has been used for many classes of rubber goods, including soft cures, semi-hard and hard rubber compounds, but due to its toxicity it finds but little application in the rubber industry at the present time.

Health Hazards:

Para Phenylene diamine is decidedly poisonous and should be handled with extreme care when used for rubber work. In the compounding room the operatives weighing it out should wear rubber gloves and respirators. The powder is soluble in water and if it comes in contact with the hands it will partially dissolve in the perspiration and discolor the flesh badly. It is also conducive to dermatitis and in the case of some individuals causes bronchial asthma. (See Curt Gerdon, Zentral f. Gewerbeyg, 1920, VIII—183.)

C. W. T. D.

Since the material is unstable in air it must be incorporated with the rubber immediately upon opening the sealed containers. There is slight fuming during the mixing and calendering operations, and both mills and calenders should be hooded, since the fumes are injurious to the eyes and respiratory organs.

In spite of its poisonous properties, it has been used successfully in rubber work with no serious results. It requires careful supervision, however. The writer has found that by breaking the seal of the container and immediately submerging the dry powder under oil in an enclosed mixer, the material can be incorporated with rubber without danger of oxidation or handling on the part of the operatives. Using this method of mixing, a suction at the calenders or tubers reduces the hazards to a negligible point. Unless properly equipped to handle this material, the rubber manufacturer should shun its use.

For Toxicity (See Olson J. A. M. A.—1916—66—864). Hamilton 528.)

Para Toluidine

Origin & Constitution:

Para Toluidine is a white, crystalline substance, having a specific gravity of 0.973 and a melting point of 45°C. The material has a flaky appearance, the crystals being in the form of leaflets. When exposed to the air, it turns yellow and then brown. It has a burning taste and a characteristic odor quite similar to aniline.

Para Toluidine is one of the three toluidines, all having the general formula ($\text{CH}_3\text{C}_6\text{H}_4\text{NH}_2$), and being homologues of aniline. They are prepared by the reduction of nitrotoluene in the same way as aniline is obtained from nitro benzene. The crude product consists of about 35 per cent of para toluidine, 63 per cent of ortho toluidine and 2 per cent meta toluidine. The para and ortho are the only ones used in the rubber industry.

Uses:

The toluidines are used in the manufacture of various chemicals, dyes and intermediates, including accelerators for the rubber trade. Para toluidine was formerly used quite extensively as a rubber accelerator. It is considerably more active than aniline and imparts desirable qualities to the rubber. It is, however, no longer used to any extent on account of its toxic properties and comparatively weak accelerating power.

Health Hazards:

Para toluidine is decidedly toxic and similar to aniline in many of its effects. It is weighed out in the compound room as a powder and care must be exercised to prevent workmen from handling it with their bare hands. Rubber gloves should be used. It can be handled safely in this department with reasonable precautions. In the milling and calendering departments, however, it gives off toxic vapors. Mills and calenders should be hooded with suction. According to Treitenfeld (Stuttgart, 1911,790), toluidines have an effect upon the central nervous system and cause some cyanosis, but to a lesser extent than aniline. (Also see Hamilton, 491-497-506 for toxicity.)

Considerable hazard is present in connection with the use of para toluidine and it can readily be replaced with other non-toxic accelerators.

Piperidine Pentamethylene Dithiocarbamate

Origin & Constitution:

Piperidine Pentamethylene Dithiocarbamate is a white, crystalline substance readily soluble in water and having the formula ($\text{C}_6\text{H}_{10}\text{N}.\text{CS}.\text{SH}.\text{NH} \text{C}_6\text{H}_{10}$). It is formed by the reaction of piperidine and Carbon di sulphide. It also

forms a zinc salt having the composition $(C_4H_8N.CSS)_2Zn$, which is insoluble in water. Both the piperidine and zinc salt are very powerful accelerators, belonging to the class known as the ultra accelerators and are active in low temperatures.

Uses:

Piperidine Pentamethylene Dithiocarbamate and its zinc salt have been prepared for use as powerful, low-temperature accelerators. They have acquired only limited application, due to their extreme activity and susceptibility to scorching.

Health Hazards:

Piperidine Pentamethylene Dithiocarbamate has been used to a very limited extent and to date no ill results have been reported. From its general use, its toxic properties should be negligible, although no definite information has been obtained on this matter.

Thiocarbanilid

Origin & Constitution:

Thiocarbanilid is a white crystalline salt having a specific gravity of 1.29, and a melting point of 152° to 154°C. The commercial salt usually contains as impurities small amounts of aniline, triphenylguanidine or sulphur. It is quite stable, not being seriously affected by light or air. Thiocarbanilid is slightly soluble in rubber, but insoluble in water, and has no tendency to absorb water from the air. It is prepared by the action of carbon disulphide upon aniline and has a formula $(C_6H_5NH)_2C:S$.

Uses:

Thiovarbanilid is used chiefly as a rubber accelerator and in the manufacture of Diphenylguanidine. It is one of the oldest organic accelerators, following closely upon the use of aniline, and has probably been the most widely used accelerator covering the past 12 years. It replaced aniline in many factories, due to its less toxic properties. Its most serious disadvantage is its decided tendency to scorch during the mixing and calendering. It is only a mild accelerator and its use has greatly fallen off in recent years in favor of more active accelerators. Thiocarbanilid requires the presence of zinc oxide for proper acceleration, but it cannot be used to advantage in the presence of lead salts. It still finds a limited use in mechanical goods, shoe stocks and colored goods. It leaves a residual mustard oil odor in the finished goods, which is undesirable for some classes of goods.

Health Hazards:

Thiocarbanilid is a dry, hygroscopic powder, non-poisonous and non-irritating and can be handled, readily, in the compound room without danger. It is weighed out in the usual manner and mixed on the mills with the other ingredients. It readily incorporates with the rubber during mixing. However, during both mixing and calendering operations, the heat often causes slight decomposition in phenyl mustard oil, which is irritating to the eyes and mucous membrane. Mills and calenders should be hooded to remove any fumes or odors.

During vulcanization, the thiocarbanilid decomposes and liberates toxic gases which are very offensive and irritating to the operators opening the molds. Eyes and mucous membrane are usually affected. These gases, liberated during curing are largely phenyl mustard gas and some free aniline, both of which are toxic. (Hamilton, Page 525).

The amount of aniline fumes formed is usually small and the phenyl mustard oil causes only slight cyanosis. The obnoxious and irritating affects upon the operators, however, are such as to warrant attention. Cooling of molds where

possible and proper ventilation will help these conditions. Other accelerators are available and should be used in such press rooms where workmen cannot be properly protected from the fumes.

SUGGESTION OF HOW GROUP II WILL BE TREATED

Mica

Origin & Constitution:

The name "Mica" includes a number of closely related mineral substances characterized by the ease with which they split into thin laminae that are flexible and somewhat elastic.

All Micas are complex silicates, containing aluminum and potassium, generally with magnesium, but rarely with calcium. Lithium and iron are also sometimes present in certain deposits of Mica. The micas of commerce come mostly from India, United States and Canada. Large sheets of sufficient purity to be profitably worked are of rather limited occurrence. They are usually found in veins of pegmatite or giant granite where the constituents crystallize on a large scale. The two commonest varieties of Mica are Muscovite and Phlogopite. The former is the variety common in the United States and is a potash mica $H_2K Al_3 (SiO_4)_3$, and the latter is found largely in Canada and is a magnesian mica $H_2K Al Mg_3 (SiO_4)_3$.

The general analyses of micas will run about as follows:

Silica Di-oxide	40 to 46%
Aluminum Di-oxide	20 to 35%
Iron Oxide	Trace to 11%
Magnesia Oxide	Trace to 25%
Potassium	8 to 10%
Water	3 to 5%

Chemically speaking, the micas are very inert. The rubber manufacturer is interested only in the ground product. Color, state of fineness and absence of grit are the prime requisites for rubber use. The specific gravity should run approximately 3.00, and the product should be ground sufficiently fine to pass a 160 mesh sieve. It should also be free from grit and free silica. A satisfactory mica for rubber work should show only a slight loss upon ignition (about 4 to 5%) and be very slightly soluble in dilute acids (not over 5 to 7%).

Uses:

Mica is used primarily for windows and lining of stoves and furnaces, for ornamentation of wall papers, for heat insulating mixtures, in electric insulating materials and in the rubber industry as a dusting powder and dry lubricant. In the rubber industry mica is used in the ground form. It is usually of a fairly pure variety being the waste from the industries mentioned above. The waste material is screened dry, ground wet, settled clear of water and dried in pans at 100 lbs. steam pressure. The dried material is then bolted over wire and silk and packed in bags. Properly prepared, it should be fairly light in color, have a silvery sheen and be free from silica and gritty material. In the rubber industry mica is used but very little in compounding, but it is used largely as a mold lubricant and for dusting purposes. It is also used to a considerable extent in making a paint for painting the inside of tire casings to prevent chafing of the tube. In the latter case, it is usually mixed with either water or a very dilute rubber cement.

Health Hazards:

Due to its inert nature, mica is not a poison. Taken internally, even in

considerable amounts, it would have but a slight affect, due to its insolubility. Its chief hazard would be as a mechanical irritant. Considerable dust is raised during some of the dusting operations, due to the fineness and light gravity of the substance.

Upon being inhaled, no harm would result from swallowing, but irritation of the respiratory tracts might be possible.

Rhinitis or bronchitis constitute the most common result of inhaling dusts of this type. All dusts in excess tend to lower the resistive power of the lungs against tuberculosis, but it is only in the cases of gritty dusts where serious results have been encountered. Mica should not be classed with dusts containing silica. A good mica is soft compared to silica and is not gritty. It does not cause silicosis.

Much more care is exercised now-a-days than formerly in all dusting operations, both for cleanliness and for saving of material and with due precautions to prevent unnecessary dust and adequate ventilation, mica should cease to be a hazard in the rubber industry.

SUGGESTION OF HOW GROUP II WILL BE TREATED

Talc

Origin and Constitution:

Talc often referred to as "Soapstone," "Potstone," "French Chalk," etc., is a hydrous magnesium silicate of the formula $H_2Mg_3Si_4O_{10}$. It is characterized by an extreme softness of touch and has a peculiar greasy or soapy feel.

Talc never occurs as distinct crystals but only as folia or scales which possess a perfect micaceous cleavage, and which have a pearly to silvery luster on their surfaces. The folia are flexible. Talc is extremely soft and can be readily scratched with the fingernail. It is considered probably the softest of the common mineral substances used in the rubber trade. Talc is found widely distributed through the United States, England and Bavaria. The term "Steatite" is restricted to the compact, massive variety of talc. Soapstone and Potstone are more impure forms of Steatite, in which the talc is probably in combination with more or less soft minerals and produces soapstone of darker shades of color. The color of the good grade of foliated talc is silvery white or often a delicate shade of green. The material used for the rubber trade is the natural product, pulverized and air-floated.

The general analyses of talcs run as follows:

Silica di-oxide	45% to 62%
Aluminum (Oxide)	Trace to 9%
Magnesia (Oxide)	25% to 35%
Water	4% to 8%

The chemical analysis of talc is of secondary importance to the rubber manufacturer. The color, state of fineness, softness and absence of grit are the prime requisites for use in the rubber trade. The specific gravity should run approximately 2.60, and the product should be so ground that 99½% will pass a 200 mesh sieve. On the other hand, the talc should not be too fine for dusting purposes, otherwise the dust scatters too readily. Material should be free from grit and free silica should be absolutely smooth to the touch with no indication of harshness.

Chemically speaking, talc is very inert. It is only slightly soluble in dilute acids and shows a loss upon ignition of only about 6%.

Uses:

Powdered talc is used largely for preparing toilet powders and as a dry lubricant, for foundry facings, for adulterating soap, in the manufacture of

paper and paints, as a non-conducting material for steam and hot water pipe covers, in the production of electrical insulating materials and in the manufacture of rubber goods.

Its principal uses in the rubber industry are as a dusting powder and as an imbedding medium for rubber goods during the vulcanizing process. To a limited extent it is used in the manufacture of gaskets and in acid-proof stocks.

Health Hazards:

Due to its inert nature, talc is not a poison in the toxic sense. Taken internally in small amounts, it would have no serious effect due to its insolubility. Its chief hazard would be as a mechanical irritant, and the latter would be slight, due to the smoothness of the particules and absence of grit. Upon being inhaled, no harm would result from swallowing, but some irritation of the respiratory tracts might be possible where large amounts are present in the air. Due, however, to the smoothness of the particules and absence of cutting surfaces, it is doubtful if any lacerations of the respiratory mucosa would be produced.

Certain workmen are subject to rhinitis or bronchitis as the result of inhaling dust of this type. All dusts tend to lower the resistive power of the lungs against diseases but danger of this sort from talc is small in comparison to the dangers of gritty and abrasive dusts.

With modern methods of rubber manufacture, much less soapstone is used in comparison to what was used a few years ago. This is due to a determined effort on the part of the rubber manufacturers to keep down the dust as much as possible, inasmuch as excessive dust often results in defective goods. The campaign for sanitation and cleanliness in factories has also contributed to the effort to eliminate dusting operation wherever possible. The extreme, fine dust probably of five microns or less, can be reduced if necessary by air floatation, where extreme exposure to fine dust might be encountered. Where reasonable care is exercised and adequate ventilation installed, there is no serious health hazard from talc in the rubber industry.

Commendation For a Valuable Piece of Work

CHAIRMAN SCHNEIDER: There is no doubt but what Mr. Healy has contributed a very valuable paper to us. I think this can be used for reference, and as he so stated, even though it is preliminary, it is very valuable as it is, and I think we owe him a very deep debt of gratitude for his work in this connection.

We will now proceed with the discussion by Dr. Shirley, of the Hood Rubber Company.

DR. J. NEWTON SHIRLEY (Hood Rubber Company, Watertown, Massachusetts): I prepared what I considered a slight discussion of this paper, but I don't know that I will go ahead with it.

We should be most thankful to Mr. Healy for the paper he has prepared. In starting a preparation for a discussion, I thought that in the course of two or three days I might collect information to adequately pull this paper to pieces, if I could. I found, after trying for three days, that I had very little. Information available in reference work is practically nothing. All of these compounds have been used, some have shown toxic systems, but there is very little information in medical literature regarding their use in the rubber industry.

I believe Mr. Healy deserves a most hearty offering of thanks for what he has done. The other day I was called to a meeting, a conference of certain doctors in the rubber industry. They had looked at his list and said, "Are these all hazardous?" I said, "No, possibly five substances, we feel, are, perhaps, injurious to

the life of the individual, and possibly a dozen more which will produce certain re-actions."

The most toxic, of course, is aniline, and this is a hazard for the mill men and calender men, as well. Its replacement by other substances is desirable, and usually possible. If not, the worker should be protected by rubber gloves and apron in handling and exhaust ventilation should be installed on mills and calenders. It is fairly treacherous.

Associated with aniline are certain other aniline derivatives, reasonably safe except for traces of aniline which are present at times. These are Thiocarbanilid, Di Ortho Tolyl Thiourea, Ethylidene Aniline, Heptaldehyde Aniline, Methylene Aniline and Methylene Diphenyldiamine.

These may readily be handled by the master batch method, and thus the slight contamination becomes negligible, provided the weigher and master batch mixer are protected by gloves, while handling the accelerator. Right here it must be stated that the proper use of gloves demands that they be kept clean, especially inside, lest a part of the accelerator get in and become more hazardous through confinement and perspiration.

Certain para groups tend to be sources of danger. Para-nitroso-dimethylaniline, Para-phenylene-diamine and Para-toluidine. All these have had occasion to produce symptoms, more especially in the rubber than chemical industry. Further than that, I did not plan to discuss his paper. I felt it was most complete.

I have prepared a little paper on other substances. I attempted to make this as practical as possible from the viewpoint of the general safety man.

Compounding Ingredients and Their Health Hazards

J. Newton Shirley, M. D., Hood Rubber Company, Watertown, Mass.

Mr. Healy has given a very complete resume of the common organic accelerators, and their common uses and dangers.

I think we have been very fortunate in having so capable a chemist as Mr. Healy in preparing this work for us. Of course there are on the market many trade preparations which are merely forms of those noted and the derivatives of them. I feel that the manufacturers have endeavored to avoid known toxic substances. Some may be detected by color, but most are not distinguishable except by delicate tests. As you have noticed, most of these substances are used in relatively small amounts and the hazards are thus largely confined to the compound weigher handling them directly.

I have chosen to mention the other substances used and their general hazards we meet in the compounding and mixing rooms, rather than attempt to discuss further a paper which I feel is most complete.

I will attempt to be as practical as possible and present these as they may come up to the general safety man.

The first is, of course, Lead—most commonly used in form of the yellow or orange oxide, litharge.

We first meet this friend in the opening of the kegs, which is practically always accompanied by considerable dust. I have never seen a workman use care here. The end is smashed in with a bar and of course the blow carries wood into the powder, causing a fair amount of dust to rise. This keg may be emptied into a bin or the weighing out may be done direct from the keg, probably this is the safer way because of less dust.

The weighing process may be well safeguarded by the proper use of respirator masks and, if possible, by an exhaust hood placed at the rear of the weighing stand

or table. The compound weigher handling litharge should be particularly careful.

His respirator will protect him from the dust if he will use it and cleanliness of person before eating and after work will keep him free from any dangerous amount of lead. One company rotates the compound weigher on this work so that any one man is not on lead oftener than once a month. This weighing may be done into a batch pan or scale pan and put directly into the large batch pan, thus contaminating all the dust with lead, or into a small paper bag, keeping the batch free of lead until this substance is added directly on the mill by the mixer. Several companies are using a "master batch" for their lead compounds; this exposes only the litharge weigher and the mixer, mixing the master batch to the dust. This is quite a task in a large plant where several kegs of litharge are used in the course of a day. After the batch pan containing litharge with other substances reaches the mill practically all lead hazards disappear if the mill is properly hooded. I have heard it said that if master batches are used for lead, no exhaust hood is necessary. This is not true.

We then immediately reach the question of other dusty compounds and fumes from such substances as may break down on the mill. Lead once added to compound and worked in becomes less hazardous but is still capable of producing symptoms if handled carelessly. I once heard it said that the whiting used in dusting stock in bins can pick up enough lead from the stock to become quite a material hazard. Personally, I feel that some other source of lead must exist.

General Rules for the Compound Room

The general rules to observe for lead in the Compound Room are:

1. Handle lead with as little dust raising as possible.
2. Protect weigher with a respirator of proper type.
3. Exhaust the dust away from the weigher if reasonably possible.
4. Rotate compound weighers where possible.
5. Require strict hygiene on the part of the workers by
 - a. Clean clothes furnished by employer daily.
 - b. Shower bath after day's work.
 - c. Careful cleaning of hands and face before eating.
 - d. Lunch room should be provided.
6. Institute periodic medical examinations of these men every month. The mixers and floormen handling the batch pans on the mills should be required to take a shower after the day's work and wash carefully before eating. Medical check-up of mixers and floormen should be done occasionally, but I feel that once every two months is sufficient unless some suggestive findings are noted. It has been my experience that a group of mixers examined in the late winter, when the windows and doors have been shut and the exhaust systems on the mills are functioning properly, show a better blood picture than in the late summer when the doors and windows are open and the cross currents of air are interfering with the exhaust hoods over the mills.

The question of the type and thoroughness of the medical examination may be asked. I believe the man should be fairly carefully looked over. Leading questions attempting to bring out symptoms of absorption should be asked; such as indigestion, diarrhoea, constipation, cramps or colic, tired feeling, uneasiness, loss of weight or loss of color. We should then note the general appearance, color, condition of mouth, especially gums for lead line and tongue for coating from constipation. Then note heart and lungs. In any case where a suggestive story is obtained or suspicious signs are noted, further study to rule out lead should be done.

As for laboratory work, I believe a hemoglobin test should always be made and a smear for stippling taken in every case where there is a suggestive symptom or the hemoglobin is low. A positive diagnosis is made on the finding of a lowered

hemoglobin and stippling with suggestive symptoms and exposure. We are constantly told that stippling is found in only 65 to 70 per cent of positive cases. Therefore the absence of stippling should not cause a diagnosis of lead poisoning to be passed up. This brings up a very important question: is lead absorption a better term than lead poisoning?

The body is capable of ingesting and excreting lead up to a fairly definite amount. Anything above this is stored in the various organs of the body and will give rise to gradually increasing symptoms. This is so-called lead absorption and I believe that all cases in our industry should not get beyond this level; detection and transfer will keep these men on the job without any loss of time or pay, as a rule. At times you will see a case where a man becomes the victim of an acute infection such as "grippe," in which the increased body metabolism with elevated temperature will free a part of this stored lead in sufficient quantities to cause acute symptoms, usually noted only as a slow convalescence from the illness.

Problems For the Workers in Lead

We have yet to determine just how much effect this continued exposure to small amounts of lead may have on later developments in body pathology. It has been stated that in towns where work in lead is the major industry, (1) the presence of a higher percentage of hypertension, arterio-sclerosis and chronic nephritis and chronic heart conditions are noted in late middle life. But I believe that all those men were exposed to more marked doses of lead than men in the Rubber industry. It may also be true that the result of lack of precautions at earlier dates may influence the figures.

Should tobacco be chewed by workers in lead? This is a serious problem. You will find most foremen telling their workers to chew, and perhaps rightly. As the entrance of lead is largely through the digestive tract, any procedure causing the collecting of dust in saliva and expectoration may be very important in cases where proper ventilation removing the dust is not possible. But remember the plug of tobacco soon becomes covered with lead and other compounds.

Zinc has become a very important ingredient in connection with organic accelerators, as several will not function except in the presence of zinc. Recent investigations have shown that "metal fume fever" may also come from the inhalation of a sufficient quantity of zinc in the form of fine dust, usually zinc oxide.

Zinc oxide taken into the body in sufficient quantities (2) produces general malaise and chills accompanied by an elevation of temperature. This is followed by a leucocytosis and an apparent immunity to zinc after the first twenty-four hours. This reaction is dependent upon the inhalation of a sufficient amount of fine zinc oxide dust. It is doubtful if the worker in the ordinary compound room would have a sufficient amount to produce symptoms, but this may be covered up by the fact that a new man on the job develops his immunity unnoticed and the older worker has no symptoms, and shows no signs. We have no information which shows any physical evidence of permanent changes in the body. Adequate ventilation on mills should remove the hazard here and care in handling zinc in compound room should remove all hazard there.

Lime—Hydrated lime is used to a limited extent in compounding. This is essentially harmless as it rarely contains any lime other than the hydrate or carbonate. The dust does produce a conjunctivitis if it enters the eye in any appreciable amount and is irritating to the mucous membranes of the nose and throat. The drying effect on the hands and exposed skin may be quite annoying to some workers. Absorption into the body is not great and will produce no harmful effects; I am tempted to say it may be beneficial to many workers.

Carbonate of lime or whiting is used in large quantities as a filler and for certain qualities it produces in the finished product it is used in great quantities

as a dusting powder. The exposure to the dust by workers is great, but I can see no hazard. In fact, there is evidence to show that the original stone cutters (3) working in limestone knew nothing about stone mason's disease nor a process now known as silicosis with tuberculosis. This did not appear until they used mill-stone or hard sandstone which contain quantities of free silica.

Magnesia appears in the form of silicate in talc, soapstone and asbestos, and also as the oxide and carbonate. This is used largely as a filler and dusting powder. The material is usually very fine and has a rather low Sp. Gr. 2.2 to 2.7 and will fly rather easily, causing a rather high percentage of dust in and about the mill room and storage bins. Workers exposed to this dust are apparently not affected to any appreciable extent. The ordinary product contains a small amount of free silica and theoretically should show evidence of changes in the lungs if exposure is carried on for a period of years. This does not seem to appear. The dust will produce symptoms in those individuals who are affected with faulty nasal passage, causing a mild chronic rhinitis, due to the drying of the nasal secretions and will require a change from this type of work. Men suffering from chronic bronchitis will also find work of this nature undesirable. The absorption of magnesia is essentially nil and we have no evidence of poisoning.

Any Possibility of Silicosis Worthy of Note

Aluminum is used in the form of silicates largely as fillers. We have aluminum flake, a silicate and oxide compound; clay, largely an aluminum silicate; mica, the complex silicate of aluminum; potassium and magnesia with occasionally calcium; pumice stone; silicate of aluminum, potassium, magnesia, calcium, iron and sodium. These all may contain small amounts of free silica, but the quantity is relatively low. It might be said here that with the increasing incrimination of dust with reference to destructive changes in the lungs, that any possibility of silicosis is worthy of note. It seems that a recent case of pneumoconiosis (4) was judged as occupational in which the exposure was to substances containing very small amounts of free silica, if any. Reference is made to definite cases of silicosis (5) occurring in workers making brick from clear sand or essentially pure silica, while a neighboring community manufactured brick from a sand containing 16 per cent clay or organic matter showed essentially no changes. Did the organic matter or clay reduce the effect of silica, or was the free silica in the rust much less? If clay will decrease the effect of silica then we in the compound room may feel safe, as the percentage of free silica in material used is comparatively small.

Barium is used both as the carbonate and the sulfate. It is in both cases very fine, but not particularly dusty. It is essentially non-absorbable and thus non-toxic. We consider that there is no hazard to health.

At times rather large quantities of infusorial earth or Stoughton's earth are used as fillers. This is a fine white to pinkish or brownish powder. Sp. Gr. 1.66 to 1.95. The best grades are very nearly pure silica and thus we must consider a slight risk from the silica. If it takes 12 to 15 years to produce definite changes in the lungs from free silica in South African gold mining districts, (6) how long will it take to produce similar changes in our compound rooms where the dust concentration is much less? It is undoubtedly true that the size of the particles of dust are capable of producing symptoms eventually, if the exposure is sufficiently great. Many dusty substances are used for coloring. We will first mention

Carbon Black. This is one of the most objectionable substances used in compounding. It is practically entirely a pure carbon product as used today, and no known hazard is reported insofar as ingestion is concerned. Taken into the lungs it of itself is harmless. Externally it is a very dirty, oily substance to handle, and a worker can rarely get cleaned up after his day's work even with a warm shower

bath. It may contribute to the formation of disturbances of hair follicles, but no definite information is at present available to substantiate this.

A few companies are supplying their carbon-black workers with a thin soap paste which is applied before going to work and readily comes off later with a warm shower bath. This removes the objectionable factor to the worker.

Red Oxide of Iron is largely used for red colors. This dust is fairly finely divided and will fly in ordinary handling. I can see no danger other than the quantity of dust inhaled. I believe this is essentially negative.

Antimony is used as the Golden Sulphuret for golden yellow. Antimony pentasulfide—for red colors. Its use has been closely associated with both lead and arsenic; as a result the symptoms supposed to be due to antimony poisoning may be caused in part by lead or arsenic, but we accept the following as definite symptoms. It is irritating to the skin and may cause a form of eczema or dermatitis. It first appears as vesicles and pustules and may even ulcerate. It is doubtful if such could occur in our industry with ordinary use. It is irritating to the mucous membranes, producing mucous discharges from the nose and small ulcerations about the mouth and with marked gastro-intestinal symptoms, loss of appetite, abdominal distress, cramps and diarrhoea. It is doubtful if absorption causes any central nervous system lesions. I believe that the use of antimony is much less than formerly because of the fear of poisoning and production of dyes which are less toxic and will readily give satisfactory results in much smaller quantities. The precautions necessary are: care in weighing out compound and cleanliness in hygiene of worker.

Care in Handling Is Sufficient Protection

Chromium is used in three colors, all of which may be a source of symptoms. Chrome Blue, a chromate of potash; Chrome Green, a sesquioxide of chromium; and Chrome Yellow, usually the chromate of lead. Chromate of zinc and strontium may be used. Chromate of lead is probably the most toxic, because of the possibility of lead poisoning, but the others are capable of producing an irritation of the mucous membranes and ulcerations. No definite internal poisoning has been made out. Therefore care in handling the relatively small amount of chromium used in the ordinary plant would seem to be sufficient protection.

Cadmium Sulphide is used for yellow in rubber to a limited extent. Cadmium is capable of producing irritation of the mucous membranes and a gastritis, but since the cost has limited its use in rubber, it is not considered a serious hazard. It must depend upon absorption.

Yellow Ocher sometimes used, but it is not a hazard. It is a combination of iron oxides in clay.

Certain amounts of so-called mineral rubbers are used in compounding. These are bituminous substances, all having some amount of plasticity. I have been unable to find any reference to toxicity, and consider them harmless.

Various oils are used as rubber softeners. Most oils are vegetable oils, but we find a few mineral oils. I have failed to find any reference to toxic symptoms due to oils. They are naturally soothing to the skin, but may produce skin rashes if contaminated with pathogenic bacteria.

Kerosene is considered an oil and produces a fairly marked erythema to the skin of some people, but this may well be set aside.

A few acids are used in the rubber industry, but very few in compounding. I am going to mention Stearic and Oleic acids for a reference (?) is made to their use in connection with litharge. It seemed that the fatty acid-lead compound produced marked skin changes when used. If this is to be used, gloves to protect the worker should be furnished.

We next come to the resins and pitches. These are essentially semi-solids and practically free from health hazards. This group contains tar and we are hearing a lot about the possibility of skin cancer from tar. I feel we are essentially free from this because of the relatively small amount used and the fact that it is neither in fine particles nor sufficiently hot to give off fumes.

We last come to what is probably a fairly dangerous group of materials—solvents. These have been very adequately considered in recent meetings and I feel that as their use is elsewhere than in the compound room, mention should not be made here other than to say that there have been five cases of chronic benzol poisoning treated at the Massachusetts General Hospital in Boston during the year 1927. We are thankful that none were in the rubber industry, but one is attributed to the use of Goodyear's Wringfoot Cement. (8) (B. M. & S. J., Vol. 197, No. 8). This warrants our careful attention to all our processes using benzol.

Reference was made to certain coloring materials. Today many aniline dyes are coming into use. Insofar as I know, these will introduce no appreciable hazard to the workers. The quantities used are relatively small and care in handling by the worker is all that is necessary.

In general it must be said that the question of health hazard is inversely proportional to the following factors:

1. Plant—planning and department layout.
2. Plant—cleanliness, sanitation and ventilation.
3. Employee protection: 1. protecting clothing; 2. washing facilities—showers, etc. 3. employee education.

Lest you misinterpret the purpose of this paper, it should be said that all substances listed are not Health Hazards. In fact, there are less than half a dozen substances used which are capable of jeopardizing an individual's life. This list was compiled for the purpose of making available a source of information which might account for certain symptoms and skin rashes which at times will occur in rubber workers. Early diagnosis and protecting of the employee will result in less lost time from work and fewer controversies over cases which may be considered of industrial origin. The industry today is essentially free from lost time caused from substances used because we have attempted to avoid known toxic substances and protect the worker wherever it has been possible.

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6. Journal Industrial Hygiene—Vol. IX, No. 4, Page 109.
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CHAIRMAN SCHNEIDER: There is no doubt but what we are highly indebted to Dr. Shirley for his splendid report and discussion of Mr. Healy's paper. As he so states, he gave the committee a copy of the paper and they pronounced it a very efficient piece of work. I have reason to believe that Dr. Shirley had quite a task to discuss Mr. Healy's paper. However, the matter is open for discussion now, and we would be very glad to hear from any one who would like to ask any questions in regard to these papers.

E. W. BECK (United States Rubber Company, New York City): I had the pleasure of reading Mr. Healy's paper before the meeting, and I think both Mr. Healy and Dr. Shirley have made an excellent contribution.

I would like to make a motion that they continue with their work, together with one other suggestion. I happen to know that the Correlating Committee of the National Safety Council is desirous of tying in the work of the different industrial sections, so as to have joint sessions. Probably you remember several years ago, when our good friend, Charles Durand, was president, that we did have two or three joint sessions with the Chemical Section. This is a subject that might well take on a discussion with the Chemical Section. I know that our organization has a chemical factory and our research checkers are doing excellent work in reducing the hazards, and I would like to see the committee enlarged and strengthened by a representative of the Chemical Section, working with these two men from this Section.

They have gone one step farther than Mr. Durand did with his excellent paper on "Health Hazards in the Rubber Industry," by covering other factors in the handling and contents of the compounds. If that meets with your approval, I would like to make that as a motion.

CHAIRMAN SCHNEIDER: Will you restate your motion, as briefly as possible, Mr. Beck?

Correlating the Work of Two Sections

MR. BECK: My motion is, in view of the wish of the National Safety Council, to correlate the work of one section with that of another section, and inasmuch as the work of this committee is tied in with the work of the Chemical Section, that this Rubber Section ask the Chemical Section to appoint a member of their Section to work with the two gentlemen who have presented their papers this morning, and continue the work further with the object of having a safety practice pamphlet on the hazards of rubber compound accelerators and other material, and next year have a report from that committee.

CHAIRMAN SCHNEIDER: You have heard the motion. What is your pleasure? I would like to hear from Mr. Healy, first, as to his attitude.

MR. HEALY: Personally, I would be very pleased to work with this committee, Dr. Shirley and myself and this other member from the Chemical Section, and I think it would work out very satisfactorily. I would be very glad to do anything I could.

CHAIRMAN SCHNEIDER: I would like to hear from Dr. Shirley as to his part of the contribution.

DR. SHIRLEY: I have hardly anything to say. It has been largely a question of Mr. Healy's contribution so far. I do not know whether Mr. Healy has contact with the Chemical Section or not. I thought, perhaps, he might have.

MR. HEALY: No, I have not.

DR. SHIRLEY: In other words, it will be necessary to get a third member from them. Personally, I feel Mr. Healy is doing very well in the preparation of the work. In fact, I feel very few can reach the same point of efficiency. I second the motion.

(Motion carried.)

J. KIDNEY (Goodyear Tire & Rubber Company, Akron, Ohio): I would like to ask Dr. Shirley a question. Of course, anything is liable to happen in Boston. Is there any publicity on the fellow who died?

DR. SHIRLEY: I had a talk with Dr. Manlin the other day, and I think he could give you a copy of it. I believe it is the week of August 25 or thereabouts.

that it appears in black and white. As far as I know, it has not reached much publicity outside of that. I did go to the State Hospital and tried to get further information.

C. L. HUNGERFORD (The Firestone Tire and Rubber Company, Akron, Ohio): When I approached the mysterious chamber of our chief chemist with Mr. Healy's paper he was very glad to review it. There was only one question that he brought up at the time and it was to this effect: Has the degree of toxicity been determined by actual experiment on animals, rather than finding it among human beings?

MR. HEALY: I would prefer to refer that to Dr. Shirley to answer, as I think it should be answered from the medical side rather than from the technical side.

DR. SHIRLEY: I am sorry to say I feel that it has all been obtained from references either in chemical papers, medical papers, or some experiences of that sort on human individuals.

MR. HUNGERFORD: This was just a wonderful example of what we meet with in our plant. Somebody will come from the compound room and say they have a poisoning pigment they are using because they had a nose-bleed or something. I will ask the Chemical Department about it, and they will say, "We don't know, you had better ask the doctor." I will ask the doctor and he will write to the chemist and ask him for a complete analysis, and then peruse the different elements and see what he can find. I think it is a wonderful example of what vital importance the result of the work of Mr. Healy and Dr. Shirley will mean to the rubber industry.

Tests Made Upon Animals Are Encouraged

MR. BECK: Mr. Chairman, talking on that subject further, our research laboratory always conducts a test on mice in all these materials mentioned, and I have even gone down there to see the test. It is not a very difficult thing to make such a test, is very interesting to a layman to watch this test being made, very conclusive evidence, and I would suggest that those companies that are large enough to have research laboratories encourage the running of tests on animals.

CHAIRMAN SCHNEIDER: I would like to ask the Doctor whether that presents a true picture of the toxicity as in human beings?

DR. SHIRLEY: I feel that it is a fair measure of the toxicity. It is the only method that we have.

MR. KIDNEY: We have this experience on some lead press operations: We will examine the man and find some absorption and sometimes the man might get suspicious and be examined by an outside physician, and he tells the man that he has lead poisoning. When is it dangerous?

DR. SHIRLEY: It is a delicate question. I think if we have any worker with suggestive symptoms and any evidence to back it up, we should remove that worker from exposure to that. It is doubtful if he is disabled.

R. A. BULLOCK (Corduoy Fire Company, Grand Rapids, Michigan): We had a case of analine poisoning in the early part of the summer. I would like to ask Dr. Shirley whether analine poisoning comes from absorption or ventilation.

DR. SHIRLEY: It may be both, or either.

MR. HEALY: My observation is that I think I have seen the worst cases from absorption, that is, from actually handling it. Of course, you get it both ways, through handling it.

MR. HUNGERFORD: I just have one suggestion which might be of interest. We had a certain compound which was used in amounts of 25 pounds to a master batch. We had complaints from men in the compounding room and our findings were that it was not poisonous, but that it tasted bad, smelled bad, so we arranged with the purchasing department, and the manufacturer of this certain substance is now sending this compound to us in 25 pound paper bags and it is not touched. It is

broken open and put directly on to the mill, and it is a fine way of removing any contact at all. It has not only resulted in the elimination of complaints but in the actual saving of dollars and cents to the company.

MR. BECK: We were buying in bulk and found that by buying in bags it was easier handled and removed the hazard. The purchasing department was a great boon in that.

CHAIRMAN SCHNEIDER: I think we can readily agree that it is a comparatively safe method and leaves the purchasing department open again to cooperate with us on these problems. A good many plants that I know of bag their material.

Is there any further discussion? If not, we will proceed to the next subject, which is "Safety Kinks in the Rubber Industry," by E. R. Lawler, U. S. Rubber Company, Hartford Plant, Hartford, Connecticut.

(At this point Mr. Lawler showed a group of lantern slides which illustrated various ingenious safety kinks of value in the industry.)

CHAIRMAN SCHNEIDER: We are certainly indebted to Mr. Lawler. I know he has worked hard in preparing those slides; also, the members who contributed to this cause. The Council is making every available slide in the film, and these can be secured from the Council direct. If you wish any information, get in touch with your Section and the Council. They will be glad to supply you. Even a machine will be placed at your disposal at a very nominal fee for rental.

I am now going to ask Mr. Quirk to tell us about the Safety Contest conducted by his company.

Outline of an Interesting Plant Contest

M. A. QUIRK (U. S. Rubber Company, Detroit, Mich.): I was not responsible for this contest, but I might give you a resume of how it was handled. Safety contests had always been conducted, but up to last year it was thought that, perhaps, a little more interest could be stimulated if a contest was held among all the plants, that is, conducted in sort of a written way.

The central safety committee decided to conduct a contest with the 30 plants and the contest was based on the percentage of improvement over the previous years, and the written contest.

The men were asked to write what they thought these two men were talking about, this party on the right talking to the man on the left, and on the reverse side, what the man on the right was saying to the man on the left. A committee of judges were appointed: Walter Kingston, President, Arthur Young and a Mr. Scott were the deciding judges on the best written contest.

Out of the 30,000 employees in the U. S. Rubber Company, 87 per cent replied to these blanks, as well as the Hartford Plant. And this contest showed at the end of six months a 42 per cent improvement over the previous years, and we feel that safety contests are an added advantage to stimulate interest in safety work.

We find that safety contests have materially reduced our accidents in the U. S. Rubber Company. The first prize was \$75 in gold; second prize, \$20 in gold, and third prize, \$5 in gold. After the prizes were issued a booklet was printed by the company and sent out to all plants. I have that booklet here, showing the pictures of all the men who sent in replies and winners. Here are the pictures of the judges and the winners in this folder, and they were sent out to 30,000 employees, as well as a message from our President, Mr. Seiger, right after the contest.

CHAIRMAN SCHNEIDER: Before proceeding with the motion pictures, I think it opportune that every one here be acquainted with the officers of their Section.

Heretofore, a good many of us have been strangers to one another. We are all working, as a Section, for the common good of our industry and I think we ought to know who our officers are. I take great pleasure in introducing Mr. Salisbury, our new chairman.

R. C. SALISBURY (The Fisk Rubber Company, Cudahy, Wisconsin): I appreciate this honor very much, and am particularly fortunate in having selected for me a group of men who will make my chairmanship over this Section a very marked success.

There is considerable to be done in the Section, and I know with the cooperation of the balance of the Executive Committee that we will render a very good service. I shall endeavor to serve you to the best of my ability.

CHAIRMAN SCHNEIDER: I would like to ask that the officers rise and give their names and affiliations while they are here.

(The following men arose:)

M. A. Quirk, U. S. Rubber Company, Detroit Plant.

E. R. Lawler, U. S. Rubber Company, Hartford Plant.

C. L. Hungerford, The Firestone Tire and Rubber Company, Akron, Ohio.

H. W. Low, The Miller Rubber Company, Akron, Ohio.

R. H. Cochran, Kelly-Springfield Tire Company, Cumberland, Maryland.

Dr. J. Newton Shirley, Hood Rubber Company, Watertown, Massachusetts.

MR. MARTIN (State Department of Ohio): I would like to move that a rising vote of thanks be given the retiring chairman and officers for the year 1926-1927, for the very good work they have done in the accident prevention line in the past year. (Amended to read rising vote to chairmen.)

(Motion put by Mr. Salisbury and carried.)

CHAIRMAN SCHNEIDER: I cannot say very much. I think my heart is pretty full. I have received wonderful cooperation from every one of the officers, and I feel highly gratified for the reason that I know every one has had his heart and soul in the work. I have benefited by my association, and in retiring, I leave my best wishes with the succeeding officers.

J. E. CONGDON (U. S. Rubber Company, New Haven, Connecticut): You will recall a year ago that we had a meeting of the Code Committee and there were some changes made in the Code. Since that time, we have received unanimous approval of the Code by all members of the Rubber Section, National Safety Council. It has been approved by the American Engineering Standards Committee.

The Code has been published by the U. S. Department of Labor, which Mr. Beck will give out. If you have any criticism or suggestion to make kindly send them in to the secretary, as this has been approved unanimously. When you want to find out whether a mill is properly guarded, look at the Code and study that carefully. You will probably see some difference in opinion.

I might say in publishing this Code that Mr. Beck, as secretary, sent a typewritten sheet to the Department of Labor, but credit was not given to Mr. Leveridge, as Mr. Leveridge as chairman of the sub-committee, has since died.

Additional copies of this publication may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents per copy. When making your request ask for Bulletin No. 447—"Safety Code for Rubber Mills & Calenders."

ADJOURNMENT.

SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL



Steam Railroad Section

New Section Officers

Chairman. E. R. COTT, The Hocking Valley Railway Company, Columbus, Ohio.
Vice-Chairman, J. E. LONG, The Delaware and Hudson Company, Albany, N. Y.
Secretary, C. F. LARSON, The Missouri Pacific Railroad Company, St. Louis, Mo.
Past Chairman, J. D. WHITE, Illinois Central System, Chicago, Ill.
Accident Causes and Remedies Committee Chairman, T. H. CARROW, The Pennsylvania Railroad Company, Philadelphia, Pa.
Poster Committee Chairman, L. G. BENTLEY, Chesapeake and Ohio Railroad Company, Richmond, Va.
Publicity Committee Chairman, A. B. HOFF, Erie Railroad Company, New York City.
Prevention Highway Crossing Accidents Committee Chairman, C. T. BAILEY, Oregon Short Line Railroad Company, Salt Lake City, Utah.
Public Relations Committee Chairman, J. L. WALSH, Missouri-Kansas-Texas Lines, Dallas, Texas.
Program Committee Chairman, D. G. PHILLIPS, Wabash Railway Company, St. Louis, Mo.
Special Committee Chairman on Present and Future Activities of the Section, T. P. BRENNAN, The Long Island Railroad Company, New York City.
Membership Committee Chairman, A. V. ROHWEDER, Duluth, Missabe and Northern Railway, Duluth, Minn.
Engineering Committee Chairman, W. L. ROLLER, The Hocking Valley Railway Company, Columbus, Ohio.

Retiring Officers

Chairman, J. D. WHITE, Illinois Central System, Chicago, Ill.; *Vice-Chairman,* E. R. COTT, The Hocking Valley Railway Co., Columbus, Ohio; *Secretary,* J. E. LONG, The Delaware & Hudson Co., Albany. *Committee Chairmen:* *Program,* C. F. LARSON, Missouri Pacific Railroad Co., St. Louis, Mo.; *Membership,* FRED W. MITCHELL, New York, New Haven & Hartford Railroad, New Haven, Conn.; *Poster,* HARRY GUILBERT, The Pullman Co., Pullman, Chicago, Ill.; *Accident Causes and Remedies,* THOMAS H. CARROW, The Pennsylvania Railroad Co., Philadelphia, Pa.; *Publicity,* D. G. PHILLIPS, Wabash Railway Co., St. Louis, Mo.; *Prevention of Highway Crossing Accidents,* C. E. HILL, New York Central Lines, New York City; *Public Relations (U. S.),* E. R. SCOVILLE, The Baltimore & Ohio Railroad Co., Baltimore, Md.; *Public Relations (Canada),* W. A. BOOTH, Canadian National Railways, Montreal, P. Q. Canada; *Train Service Accidents,* C. T. BAILEY, Oregon Short Line Railroad Co., Salt Lake City, Utah; *Engineering Representative,* F. HARTENSTEIN,

Lehigh Valley Railroad Co., Bethlehem, Pa.; *Executive Committee*, The OFFICERS and L. G. BENTLEY, Chesapeake & Ohio Railroad Co., Richmond, Va.; ISAIAH HALE, The Atchison, Topeka & Santa Fe Railway System, Topeka, Kan.; H. A. ROWE, The Delaware, Lackawanna & Western R. R. Co., New York City; A. V. ROHWEDER, Duluth, Missabe & Northern R. R. Co., Duluth, Minn.; ROBERT SCOTT, Atlantic Coast Line R. R., Wilmington, N. C.

Tuesday, September 27, 1927

J. D. WHITE, Chairman

Superintendent of Safety, Illinois Central System, Chicago, Ill.

The first session of the Steam Railroad Section of the National Safety Council was called to order at nine thirty-five o'clock by the chairman, J. D. White, superintendent of safety, Illinois Central System, Chicago.

CHAIRMAN WHITE: It is appropriate that we open our meeting by giving thanks to Almighty God for the many blessings we have enjoyed the past year, and I will ask our good friend, Mr. L. F. Shedd of the Chicago, Rock Island and Pacific Railway, to offer up our thanksgiving and invoke divine blessings upon us and upon our work.

MR. SHEDD: The Lord is in His Holy Temple. Let all the earth keep silent. Almighty and everliving God, Maker of Heaven, earth, the sea and all that in them is, immortal, immaculate and immutable, Thou to whom Almighty only applies, into Thy presence we come this morning with grateful hearts and with thanksgiving upon our lips for this added privilege of again meeting with this great body of Christian railroad men, assembled here to do those things that we trust Thine approval and Thine aid and assistance might lead us to do, something more for humanity and to raise the standard of our fellow beings.

We are not unmindful that Thou hast dealt mercifully with us. We thank Thee for it all. We thank Thee for the privilege of meeting. We thank Thee that Thou hast spared our health and strength and our fortunes and those of our families and those dependent upon us that we might come here together. And while we enjoy all of these things and open our hearts in grateful thanksgiving to Thee, let us stop just a moment to pause and think of those dear fellows, those lovely companions, those God-fearing men about whom Thou hast thrown a mantle in Thy great and Holy way. Thy wonders to perform. They are afflicted, we know not why, but we pray, our Heavenly Father, that Thou wilt lighten their burdens. Some of them may come back, we trust they all may, but we especially pray that Thou wilt be with them, guide them, love them and bless them. We are glad to see that some of those who have been absent have come back, and while we are mindful that Thou hast done much for us, we hope that Thou wilt do a great deal for them.

It is a privilege, dear Father in Heaven, to meet here, called together that we may do something for the safety of our fellow men.

We thank Thee for it all. We ask that Thou wilt be with us in our deliberations. Give us wisdom in our counsels and give us valor and determination in our field of endeavor to overcome those things that rend and seek only to tear down, to destroy and to degrade.

Be with us as we are assembled here. Go with us when we go to our homes, and at last save us for that place in the sky, give us a habitation in that house not made by hands but eternal in the Heavens.

We ask it in the name, for the sake of Thy dear Son, Jesus Christ our Lord and Savior. Amen.

CHAIRMAN WHITE: We have with us this morning the Missouri Pacific Diamond Jubilee Quartet. This quartet has a splendid reputation for high class entertainment, being in great demand for radio singing and on the Orpheum Circuit. I am sure we are all going to enjoy and appreciate their presence here with us during our meetings.

I will ask these men to come forward and give us some songs.
(Selections by the Missouri Pacific Diamond Jubilee Quartet.)

Opening Address

J. D. White, Superintendent of Safety, Illinois Central System, Chicago

It is most gratifying to the officers and committee men to have such a representative gathering here this morning. I extend to you all cordial greetings and a hearty welcome. With your cooperation we can make our part in the Sixteenth Annual Safety Congress an outstanding success.

Our program is replete with well-known speakers, and I know every member of this Section appreciates having them with us. Their presence here proves that they are devoted to the safety movement. After listening to what they have to say, we shall be better prepared to go back to our work and continue the promotion of safety with more skill and enthusiasm than ever before.

If there are any announcements any one wishes to make during the sessions, I shall be glad to accommodate him if he will give his name to the secretary. I may say, in passing, that I am going to try to carry out our program on time both in starting and in closing.

As chairman of this Section and as a representative of a railroad which is earnestly engaged in seeking to reduce hazards and promote safety practices, I am deeply interested in safety work. I consider it a privilege to be engaged in such work because, in my opinion, the conservation of human life and well being is one of the most worth-while activities to which one's efforts could be devoted, and I am always glad of opportunities to participate in furthering the cause of safety.

It affords me genuine pleasure, therefore, to be present at this Congress. Such gatherings are a most effective means for the dissemination of information on safety matters, and I am confident that much benefit will be derived from the several sessions. Moreover, I want you to know that I heartily appreciate the compliment of being elected to serve as your chairman the past year. I have done my best to be worthy of the honor, and I am going to do my best to give my successor the same loyal, enthusiastic support which you have accorded me and for which I am deeply grateful. It has been a most pleasing experience for me to have been so closely associated with you men, most of whom I know personally and am proud to call my friends, and I want to express my sincere thanks to the entire membership of the Steam Railroad Section for the cooperation and the assistance they have extended the officers and the chairmen of the various committees.

We men assembled here, representing the safety departments of various railroads, have an important duty to perform—one that demands from us the best of our hearts and minds. It is for the purpose of better fitting ourselves for our tasks that we meet in these conferences to exchange ideas and discuss our problems so that all may have the benefit of our individual experiences and viewpoints.

The promotion of safety offers a broad field for activity. Changes in equipment and in methods of operation are constantly being put into effect by the

railroads, and not infrequently these changes give rise to new safety problems to tax our ingenuity. It is often the case that such problems can be solved satisfactorily by some small adjustment of practice which though simple in its application is highly important in its results. I want to urge that we cooperate fully among ourselves for reciprocal benefits along this line. If any railroad puts into effect a plan for preventing accidents which proves effective, the safety officers of other railroads ought to be fully advised of the details of the plan so they can take steps to obtain its adoption on their respective railroads. The promotion of safety is an undertaking common to all railroads, and it will be of material benefit to us all if we pool our information concerning the best ways to further this undertaking.

The value of safety work is conclusively evidenced by the steady increase in the safety of steam railway operation that is reflected in the statistics compiled by the Interstate Commerce Commission and other organizations. In spite of the gratifying results already accomplished, however, there is yet plenty of room for improvement. So long as preventable accidents occur, no matter how infrequently, we must continue to strive for the attainment of perfection. There is a twofold incentive for us to do this; good safety work results not only in safeguarding life and limb, which is the primary consideration of humanity, but it results also in greater efficiency among employees, more favorable public sentiment toward the railroads, and, as a corollary of these other factors, improved railway earnings.

Many Broad Reasons For Interest in Safety

For this reason, I want to suggest that in promoting safety work among railway employees we should not confine our arguments exclusively to its benefits to the individual concerned. We must endeavor to get the employees sold on the idea that regard for safety precautions is both a duty they owe to themselves and their families and an essential part of the loyalty and efficiency expected of them by the railroads as part of their employment. When we have succeeded in getting railway employees to understand and to accept enthusiastically this idea of their dual obligation to practice safety, we shall have advanced a long way in the prevention of accidents on the railroads.

I think there is a close relation between discipline and personal injuries. We all know something of the difficulties involved in the administration of discipline. I believe the best, if not the only way, to overcome these difficulties is for us to strive to bring about a more general understanding among employees that the proper administration of discipline is always of benefit to themselves. In other words, it should be impressed upon employees the fact that discipline is imposed not so much for the purpose of punishing the guilty party for his past derelictions as for the purpose of emphasizing the necessity of correcting carelessness and unsafe practices, which offer the hazard of accidents and which often jeopardize the safety of others as well as the guilty person. Seen in this light, discipline really is a form of protection for the careful workers against recklessness and disregard for rules on the part of fellow employees who might be disposed to take chances in their work unless restrained by the prospect of incurring disciplinary penalties for so doing. It is part of our job to bring about a general sentiment among employees in favor of the proper administration of discipline in their own interests.

Employees are now being disciplined for instances of carelessness or indifference which result in train accidents, damage to equipment in yards and other similar losses to the railroads. However, I believe that not enough care is being taken to apply discipline in cases where personal injuries or risks which might cause personal injuries alone are concerned.

In passing over such cases without disciplinary action it is frequently said, "This man has had his lesson and will never be guilty of such conduct again." That argument has force when applied to men who have honestly tried to comply with the railroad's rules and regulations and have simply made an error of judgment. But the men I have particularly in mind when I refer to the need for more frequent disciplinary action are the reckless chance-takers and the frequent violators of rules and instructions which are intended to procure their own safety and the safety of their fellow workers. Let us withdraw lenience from such men and impose disciplinary action as often as they violate safety and other rules, and either they will leave the service voluntarily or they will be forced out by the accumulation of disciplinary penalties, or else they will change their ways and become careful workmen.

While supervisory officers should always be careful that discipline never works an injustice, I believe that when it is rigorously applied to employees who are careless of the safety of themselves or of others our personal injuries will quickly take a downward trend.

Wise Selection of Employees Promotes Safe Operations

We must not overlook the fact that by the wise selection of men for employment, our division officers can do a great deal to promote progress of safety work. Care must be exercised when employing men to give the preference at all times to men who apparently can be relied upon to carry out their duties in a safe, painstaking, efficient way and to endeavor to follow out the rules and instructions under which they are to work. In order to maintain a high standard among our employees by recruiting men of this type only, there must be close cooperation between the employing officer and the examining physician so as to exclude at the outset men who are physically, morally, mentally or temperamentally unfit for the safety requirements of railway service.

I also want to refer to the foreman. He is the man to follow the new men taken into service and teach them in the beginning the requirements of safety. He should make them understand they are on probation to meet the requirements for safe operation.

The foreman is the medium of communication between the management and workmen and his attitude toward safety is that by which the official is judged by the men: If safety is to become a habit, naturally this attitude of mind must first be with the supervising forces whose duty it is to arouse and maintain the enthusiasm of their men. Operations of any kind without safety are inefficient and if properly stressed, all ambitious foreman will guard against accidents which betray their inefficiency.

Often the excuse is given that increase in accidents is due to increase in business, but we should not accept explanations of this character because in my opinion the handling of a heavier business with a smaller number of fatalities is a barometer of railway efficiency, and that is the very thing our managements are striving to accomplish. Therefore, we should make it plain that a foreman who is lukewarm on the subject of safety is a liability and if in our opinion we are burdened with any such men on our respective railroads we should not hesitate to make it known to their superiors.

There are certain classes of railway accidents which chiefly affect persons who are not employed by the railroads and consequently are not subject to their control. I refer to accidents to trespassers and to persons on public crossings, especially to automobile accidents at highway crossings. I am sure that all of us are keenly conscious of the awful toll of life and limb being enacted by such accidents and are mindful of the importance of doing everything possible to solve the problem they present.

The railroads are making strenuous efforts and are spending thousands of dollars to reduce the number of accidents of these classes, but in order to prevent them entirely we must have the whole-hearted support and cooperation of the public. Our people in general need to be aroused to widespread realization of the fact that they can utterly overcome all hazard of such accidents by a proper regard for their own safety. I believe the continuation of our efforts through publicity and education with the encouragement of suitable legislation will be efficacious in bringing about this sense of personal responsibility on the part of the public and thereby enable us to make progress in diminishing the frequency of these accidents.

In order not to take up too much time, I have tried only to indicate in bare outline the more important scope of the work, as I see it, which confronts the Steam Railroad Section of the National Safety Council. It is work that both humane and economic consideration require shall be accomplished as quickly and as thoroughly as possible. So far as the railroads are concerned, it must be admitted that we have had and are continuing to have too many preventable accidents. A study of the reports shows that the great majority of such accidents are due to causes which could be remedied by a proper attitude toward safety on the part of our employees. Therein lies both our opportunity and our responsibility for service which will greatly benefit the railroads, their employees and the public generally. Consequently, I hold out to you the ideal, which I firmly believe can be realized, of the complete elimination of preventable accidents on our railroads. I know I speak for every member of our gathering in saying that our best efforts will continue to be devoted toward the attainment of this goal.

Various Reports of Committees

ROBERT SCOTT (Atlantic Coast Line, Wilmington, N. C.): Before you proceed, Mr. Chairman, with the program, may I have just a word here? Fellow members of the Steam Railroad Section, we have been meeting for a good many years and we have listened to some wonderful messages from the presiding officer. It seems to me, however, that never in all these years have we had such a straightforward, such a conscientious, such a message with a real punch in it as Mr. White has given us today. I think, gentlemen, in view of the difficulties under which our chairman has been laboring during the past year, we ought to show our deepest gratitude for this wonderful message that has reached the heart of every man here. While it may be rather early in our session to start with rising votes of thanks, I cannot refrain from asking you to show your appreciation to Mr. White for this wonderful message, and I ask you all to rise.

(A rising vote of thanks was extended to Mr. White.)

CHAIRMAN WHITE: I now come to the reports of committees. The first upon whom I shall call for a report is Mr. Larson, chairman of the Program Committee. I am sure he will give us an idea of the proper way to go about getting up a program for a meeting of this kind, and also will furnish us a forecast of the good things the meeting has in store for us. I take pleasure in introducing to you Mr. Larson.

C. F. LARSON (Missouri Pacific Railroad, St. Louis, Mo.): The only report that I can make is simply to place in your hands the finished product of about one year's hard labor on the part of the chairman and his co-workers. We have endeavored in our labors to present to this organization a worth while program. As you see it printed in this pamphlet and as you will hear it unfolded as the various speakers will appear before you, you may think that it is a very easy matter to prepare such a program, that all you have to do is to suggest to some person whom you want to speak or prepare a paper and he quickly jumps at the opportunity; but that is not

true, my dear friends, with my committee. We have worked diligently, we have sought speakers of note in our organization, and all I have to say now in conclusion is that as this program unfolds itself it is open to commendation or condemnation as you may see fit. I do hope that we have given you a program that will enlighten you and instruct you on the principles of safety.

CHAIRMAN WHITE: I am not going to call on our good secretary for his report just yet, but I am going to ask him to announce the appointment of the Committee on Resolutions.

Committee on Resolutions Appointed

SECRETARY LONG: I suggest that Mr. L. G. Bentley, of the Chesapeake & Ohio Railway, Mr. L. F. Shedd of the Rock Island, Mr. N. L. Satchell, of the New York Ontario & Western, and Mr. M. T. Fulton, of the Kansas City Southern, be asked to serve as the Resolutions Committee for this Section.

CHAIRMAN WHITE: We all know that when we cast around for new memberships we are attacking a difficult proposition, because this same casting has been going on for several years. We are fortunate, however, to have as chairman of the Membership Committee a man who has been successful in this casting, as several of us know what the chairman of the committee did in casting last year for wall-eyed pole. This man is none other than our genial friend and co-worker, Fred W. Mitchell of the New York, New Haven & Hartford.

Report of the Committee on Membership

Your Membership Committee communicated with all Class I railroads, not members of the Safety Section, making special effort with those formerly members (Southern Pacific, Northern Pacific, C. M. & St. P., Great Northern, and D. & R. G. W.).

October 1, 1926, there were 100 members. Four railroads, viz., Millstead Railroad, Cumberland & Manchester Railroad, Spokane, Portland & Seattle Railway and Texas Pacific Railway and one individual member discontinued their memberships. As a result of efforts made, six railroads applied for membership, viz., Panama Railroad, New Orleans, Great Northern, Lake Superior & Ishpeming, Mississippi Central, Spokane International Railroad and Per Marquette. Summarized, we began with 100 members, lost five, gained six, and on September 22, 1927, we had 101 members.

Much credit is due Mr. W. A. McGonagle, president of the Duluth, Missabe & Northern, for his very active part of our endeavor.

Automobilists and Others—Take Heed

CHAIRMAN WHITE: You have heard the report of the Membership Committee. What is your pleasure?

CHARLES E. HILL (New York Central Lines, New York, N. Y.): I move its adoption, with thanks.

(The motion was seconded and carried.)

CHAIRMAN WHITE: Next we will have the report of the chairman of the Committee on Prevention of Highway Crossing Accidents. Charlie Hill, like our famous Herbert Rowe, needs no introduction. He has been talking on this subject for several years, and if automobile drivers would follow his advice, many casualties would be avoided. In common with all the rest of us, I have been looking forward to his report with much interest and pleasure.

Report of Committee on Prevention of Highway Crossing Accidents

Your chairman begs leave to submit the following report:

During the past year, through the auspices of the local safety councils, working in conjunction with the National Safety Council, there were distributed 27,000 copies of the American Railway Association crossing poster. This number, doubtless, is quite low, from the fact that in many instances orders were transmitted by the local council, and we have no tabulation covering these shipments. The local councils, however, in the main, have been quite active in making distribution of these posters, and other literature in connection with our Careful Crossing Campaign, among the citizens and the industries in their particular localities.

The National Safety Council has issued a large size poster entitled "Let the Train Pass"—a facsimile of this poster appearing in the September issue of the NATIONAL SAFETY NEWS. This poster is used as a follow-up of other activities along these lines.

The May issue of the NATIONAL SAFETY NEWS gave prominent display to an article on the 1927 Careful Crossing Campaign prepared by Mr. H. A. Rowe, chairman of a similar committee of the Safety Section of the American Railway Association.

The National Safety Council has a mat service that is sent to more than 225 daily papers in various cities. The press service also goes to all of the leading press syndicates, to news associations, daily papers, trade, technical, and class periodicals throughout the nation. Through this medium references from time to time have been made as to the necessity of carefulness at grade crossings along with other public hazards.

Through the medium of the radio—which service covers approximately 80 different broadcasting stations—this vital subject is also touched upon occasionally.

Public Safety, which is a magazine that has been published monthly starting the early part of this year, and is sent to all officers, superintendents of police, motor organizations, and others who are in any manner interested in public safety, has given space also to the subject of safety at railroad highway crossings.

Carefulness at grade crossings is also covered in the various school publications in our local council activities. In fact, it is quite generally included in all our educational work as one of the important hazards to be avoided.

The foregoing very briefly outlines the scope of the work that has been done by the National Safety Council and local safety councils in cooperation with our committee. In addition, your chairman is also a member of the committee on Prevention of Highway Crossing Accidents of the Safety Section of the American Railway Association, and has worked in conjunction with Mr. Rowe as chairman of that committee, and in this manner many of the duties that would ordinarily be assumed by the committee of which I am chairman are handled by the A. R. A. Committee and in this respect there is no duplication of the work.

Your chairman has individually spoken to a large number of public bodies, and has in all instances not failed to stress the importance of the crossing problem. Our remedy lies almost entirely in the cooperation that we may hope to obtain from the motoring public, and this feature has been stressed wherever occasion permits. We have also, the same as all other railroads, been following many channels which would serve to create a better understanding as to the

causes of this character of accidents, and the methods that can be employed to prevent them.

Based upon reports to the Interstate Commerce Commission covering the first five months of this year as compared with the same period of 1926, there was an increase of eight deaths and a decrease of 120 injuries. There was also a decrease of 37 accidents during the 1927 period. Mr. Rowe has canvassed ten of the principal railroads located geographically in various parts of the United States, and obtained information showing the number of deaths and injuries during the first six months of this year as compared with the same period of 1926, and based upon the information he has secured, on these ten railroads during the 1927 period there was a reduction of 19 deaths and also a reduction of 190 injuries, which means a reduction of a little more than 4 per cent in the number of deaths and 12 per cent in the number of injuries. When we take into consideration the continued increase in the number of automobiles, together with the increased mileage of improved highways, which eventually means a vast increase in the volume of traffic on such highways and over railroad crossings, we can take courage in the fact that even though the decrease in casualties has been slight, that we have, at least, brought about a check in what had been an increase previous to the time that our special campaigns became effective. Your chairman merely wants to suggest that every railroad in the country make liberal use of the safety material that is supplied by the Safety Section of the American Railway Association and that they individually continue to do all they can to educate the public as to the crossing hazard, at the same time impress upon the traveling public the realization of their responsibility so that if this is assumed, the hazard of passing over railway tracks at grade will be materially lessened and the number of accidents, of course, will be greatly diminished.

Charles E. Hill, Chairman.

CHAIRMAN WHITE: You have heard the report of the Committee on Prevention of Highway Crossing Accidents. What is your pleasure?

(A motion was regularly made, seconded and carried that the report be accepted.)

CHAIRMAN WHITE: Next comes the report of the chairman of the Committee on Publicity. We all know Duff Phillips. I don't think he will be up here very long until you know he is connected with the Wabash Railroad, and he is about one of the best advertisers the railroad has. I take great pleasure in presenting Mr. Phillips.

Report of the Committee on Publicity

D. G. PHILLIPS (Wabash Railway, St. Louis, Mo.): As chairman of the Publicity Committee during the last year I have tried to make public some of the doings of the railroads through the newspapers and by other means. I think I have learned something about publicity during the last year. I am going to tell you what I think I learned.

In the first place, I found out that a general item or a general report would receive very little recognition from newspapers. If I wrote and told them what the railroads as a whole were doing, I didn't get anywhere with it; but if I would single out some railroad, say the Wabash, for instance, and write and tell them what the Wabash had done, I had no difficulty in getting those articles printed from coast to coast. I tried it, and I know it is true, because the articles were returned to me from the Atlantic and Pacific Coasts. It caused me to think a while. I found out that the kind of publicity that spurs you and spurs me to action is when some fellow stands up and says, "My road has done this, or my road has done that." We hear that. But if I were to get up here and say, "The railroads as a whole have done this or done that," we would all sit here and pay very little attention to it.

A statement has been made recently that the railroads as a whole are reducing the number of crossing accidents. Of course, that is good publicity. We were all interested in it; but when a railroad came out, as the Southern Pacific did—I hate to mention any other railroad, but I will—and stated they reduced the number of fatalities in eight months from eight to two, that was the publicity that attracted our attention, and many of us, I know, wrote to that railroad to find out just what they had been doing to make that kind of reduction.

I know that Mr. Hale has made some very caustic comments on fellows tooting their own horn; but after all, it is this horn-tooting business that makes you and me jump out of the road of the automobile; and when I begin to think on the Wabash (I will name them) that we are making a good record in our mechanical department, and I hear Johnnie Long over here on the Delaware & Hudson tooting his horn, I don't know whether it is just ahead or just behind me—it certainly makes the men on the Wabash move.

It is these identical statements, publicity, if you please, that causes each one of us to know just where we stand.

Just one more illustration and then that long speech I said I wouldn't make is over. A railroad (I mustn't mention any names, you know, longer than the Wabash) reports to me that they have only had three fatalities among employees in eight months. There is some publicity for you. We thought we were making a wonderful record in fatalities. I have to tell you, no matter what you think about it, that we have killed six in eleven months, and we were pretty well satisfied; but, gentlemen, when I heard that statement yesterday that this other railroad (Warfel is connected with it) had only killed three men in eight months, I heard a horn toot, and I am going back on the Wabash and tell them we haven't started yet. Let's let the other fellow know what we are doing on the railroad—that is if it is something good—then you have got publicity that is going to make every one of us do something for safety.

CHAIRMAN WHITE: You have heard the report of Mr. Phillips. What is your pleasure?

ROBERT SCOTT (Atlantic Coast Line, Wilmington, N. C.): I move it be received with thanks.

(The motion was seconded and carried.)

CHAIRMAN WHITE: I am certainly very much pleased with the attendance here this morning. It seems to me this is the biggest crowd that I have seen at any of our opening meetings since I have belonged to this Section.

Our next report is that of the Public Relations Committee, to be made by our good friend, Mr. E. R. Scoville of the Baltimore & Ohio, and Mr. W. A. Booth of the Canadian National. Both of these gentlemen represent big railroads and I am very much pleased to present them this morning to you for their reports.

Report of the Committee on Public Relations

Your committee begs to report that a number of railroads have organized committees which perform the same duties as public relations committees, while they may not all be given titles as such.

The plan usually followed is to establish a committee composed of employees in each county, through which the railroad operates. The work performed by these committees is to keep the public informed as to matters pertaining to policy, shipping or difficulties under which the railroads are laboring, which the public can assist in minimizing, etc., and from information gathered it is thought that the personnel, organization and functions of these committees are along the same lines as those on the railroad which I have the honor of representing.

During the year 1923 these public relations committees were organized in each county through which the railroad operates. The membership of each of the committees was about ten and composed of employees located in the county. In those counties where division headquarters were located the division superintendent, and in other counties the local attorneys, were selected to act as the chairmen. The members of the committees were local agents, trainmen, if any located in the county, track foremen or other employees that were suitable and available. There are 158 of these committees with a total membership of 1,415. They are called together once each month. The reason for the organization of those committees was that at that time there was a feeling of unrest and questions in which both the public and the railroads were vitally interested. Information intended for the public was sent to these committees in order that they might be in position to discuss it intelligently at every opportunity and to address chambers of commerce, civic clubs, churches and schools on the subjects of interest. The matter of greatest importance was settled during the Presidential election in 1924. However, as there were other matters of importance, such as a proposed amendment to the Transportation Act, it was decided to continue the activities of these committees, so that at this time they are given any subjects in which both the public and the railroads are interested. At present, they are being kept posted on loss and damage, proper packing of shipments, etc., and also highway crossing accidents, and these subjects are now being discussed by them as the principal topics. However, they at all times cultivate the proper mental attitude toward the railroad, and to assure them of the desire to serve them promptly and properly and to be considered a good neighbor and one to be called upon for assistance in times of disasters by flood, fire or other similar emergencies—in other words, to look upon the railroads as a friend and not as a heartless corporation which it is not and never has been. They also discuss these matters with other employees with whom they come in contact and to urge upon them the importance of passing the information to the public with whom they work or deal and to personally advertise the service of the company by whom they are employed, in the hope that where the service afforded is equal to or better than that of other roads in the vicinity, they may travel or ship over the railroad which gives them employment.

In all of our dealings with the public, we wish to impress upon it the "will to please."

The above is a brief outline of the organization and duties of a public relations committee.

Respectfully submitted,

E. R. Scoville, Chairman.

The B & O Pageant in Baltimore

MR. SCOVILLE: Mr. Chairman, while I am here I should like to make a little announcement. I don't want to advertise the Baltimore & Ohio Railroad, but as many of you know, the Baltimore & Ohio is celebrating this year its centennial. They have been working on a pageant or exposition. At this time and continuing until October 8 they are having a pageant each day at a suburb of Baltimore. It starts from earliest history of transportation, and leads on up to the latest locomotives. Not only the Baltimore & Ohio itself, but a number of other railroads have assisted by sending to that exposition the oldest and the latest locomotives they have.

The Baltimore & Ohio have rebuilt completely from the first locomotive that was built in the United States on up, each successive engine has been built there and is operating under its own steam at each one of these pageants.

Any of you gentlemen who can do so should not miss seeing this. It was the greatest thrill of my life to see those old engines operating under their own steam on that circular track. If you can come to see it, do so. It is free for anybody to come and see.

W. A. BOOTH (Canadian National Railroad): Mr. President, Ladies and Gentlemen: I am very glad to take the cue from our friend Charlie Hill to come before the pulpit.

We in Canada rather take our tip from the rules laid down by this Congress, and in so far as our work is concerned I don't know that I could do anything better than just dwell a few minutes on a little skit that we got up a short time ago in connection with some brackets that were placed on each corner of these motor cars that run along the railroads.

I have had inquiries from Mexico, Alaska and everywhere else. We are pleased to give you any information today or during the Congress. It has come in for a wonderful lot of publicity. Not boastingly do I say it, but it is a bracket that is well worth trying out.

Ten Radio Stations Used in Canada

In our work on the Canadian National Railways, we use ten different radio stations and get our talks over the radio.

We have with us today a few of our notorious Canadian characters. Shall I mention W. H. Jones of fame? He should be here this morning. We have George Kell. Everybody knows Kell. He handles a part of the American business, as well as the central region running from Chicago to Quebec City. Then we have Bill Kauk this year. He is a newcomer. He comes from Nova Scotia. He is a most outstanding character. He stands about six feet high and weighs as much as Bill.

I don't know that I have anything more to say in so far as this Public Relations Committee is concerned, except that we work hand-in-glove with our dear friend Mr. White and his committee.

I am delighted to be with you again. This audience at an opening session speaks very highly for you.

(A motion was regularly made, seconded and carried, that the report of the Public Relations Committee be accepted.)

CHAIRMAN WHITE: I understand that our attendance at this time is 347 on the opening morning of our session.

We now come to the report of a committee that has been added to the committees during the past year. I am going to make the suggestion that everyone in this room take note of the report, because it has to do with a subject that deeply concerns all of us. I am confident the very efficient chairman has given a lot of time and study to it. I take great pleasure in presenting Mr. C. T. Bailey, of the Oregon Short Line of Salt Lake City, who is chairman of the Committee on Train Service Accidents.

MR. BAILEY: Before going into the report of the Train Service Accident Committee, I should like to direct your attention to the chart that is before you outlining the causes of train service accidents with their resultant injuries. Statistical data shown covers a spread of seven years, which should present a fairly representative picture.

It will be noted that the totals at the bottom of the chart do not include highway grade crossing accidents. However, they are tabulated as one of the causes on the chart. I wish to direct, also, your particular attention to the increasing percentage of highway grade crossing accidents as to the whole that have mounted from 11.35 per cent in 1920 to 19.22 per cent in 1926. It is true that the percentage of increase in registered motor vehicles for the same period is largely in excess of these per-

centages and is some encouragement to carry on an intensive campaign continually against this type of accident.

As the report is read, clause by clause, your committee suggests that safety officers visualize the conditions on their respective railroads and leave this conference with the determination to carry on a campaign for a reduction in accidents attributable to the causes outlined.

Report of the Committee on Train Service Accidents

C. T. Bailey, Chief Safety Agent, Oregon Short Line Railroad,
Salt Lake City, Utah

CLASS		1920	1921	1922	1923	1924	1925	1926	Total
Coupling or uncoupling locomotives or cars	Killed	151	78	81	103	72	64	64	613
	Injured	2,450	1,540	1,498	1,954	1,592	1,538	1,591	12,163
	T. Cas'l.	2,601	1,618	1,579	2,057	1,664	1,602	1,655	12,776
	%	4.56	4.13	3.64	3.95	3.71	3.57	3.52	3.89
Coupling or uncoupling air or st. hose or safety chs.	Killed	34	27	16	27	21	19	20	164
	Injured	590	378	393	520	430	452	455	3,218
	T. Cas'l.	624	405	409	547	451	471	475	3,382
	%	1.09	1.04	.94	1.05	1.00	1.05	1.01	1.03
Operating Locomotives	Killed	31	14	23	31	20	14	11	144
	Injured	9,426	5,732	6,187	8,043	5,877	5,458	5,697	46,420
	T. Cas'l.	9,457	5,746	6,210	8,074	5,897	5,472	5,708	46,564
	%	16.57	14.69	14.33	15.49	13.13	12.20	12.13	14.18
Operating hand brakes	Killed	50	22	37	24	34	33	29	220
	Injured	2,592	1,623	1,987	2,571	2,042	2,219	2,474	15,518
	T. Cas'l.	2,642	1,645	2,024	2,595	2,076	2,262	2,503	15,747
	%	4.63	4.20	4.67	4.98	4.62	5.05	5.32	4.79
Operating switches	Killed	2	2	1	1	3	3	---	12
	Injured	1,453	847	916	1,084	1,050	930	1,142	7,422
	T. Cas'l.	1,455	849	917	1,085	1,053	933	1,142	7,434
	%	2.55	2.17	2.12	2.08	2.35	2.08	2.43	2.26
Coming in contact with fixed structures	Killed	90	51	45	49	37	38	52	365
	Injured	1,329	809	746	873	746	745	680	5,928
	T. Cas'l.	1,419	863	791	922	783	783	732	6,293
	%	2.43	2.21	1.83	1.77	1.74	1.75	1.56	1.91
Getting on or off cars or locomotives	Killed	171	120	123	147	138	120	114	933
	Injured	10,241	6,926	7,673	9,651	8,012	8,167	8,532	59,202
	T. Cas'l.	10,412	7,046	7,796	9,798	8,150	8,287	8,646	60,135
	%	18.24	18.01	17.99	18.79	18.14	18.43	18.38	18.31
Highway grade crossing	Killed	1,690	1,596	1,698	2,114	1,983	2,039	2,340	13,460
	Injured	4,789	4,652	5,095	6,059	6,198	6,309	6,703	39,805
	T. Cas'l.	6,479	6,248	6,793	8,173	8,181	8,348	9,043	53,265
	%	11.35	15.97	15.68	15.68	18.21	18.62	19.22	16.22
Struck or run over elsewhere	Killed	1,024	585	658	805	650	665	794	5,181
	Injured	1,498	978	1,073	1,251	1,120	1,112	1,208	8,245
	T. Cas'l.	2,522	1,563	1,736	2,056	1,770	1,777	2,002	13,426
	%	4.42	3.99	4.01	3.94	3.94	3.96	4.26	4.09
Miscellaneous	Killed	550	299	370	482	373	399	378	2,851
	Injured	18,918	12,344	14,708	16,338	14,523	14,509	14,757	106,597
	T. Cas'l.	19,468	13,143	15,078	16,820	14,896	14,908	15,135	109,448
	%	34.11	33.59	34.79	32.27	33.16	33.24	32.17	33.32
TOTAL	Killed	3,793	2,797	3,052	3,783	3,331	3,394	3,802	23,952
	Injured	53,286	36,329	40,281	48,344	41,590	41,449	43,239	304,518
(100%)	T. Cas'l.	57,079	39,126	43,333	52,127	44,921	44,843	47,041	328,470
Total Casualties Net **		50,600	32,878	36,540	43,954	36,740	36,495	37,938	275,205

**Exclusive of Highway Grade Crossing Casualties.

The Train Service Accident Committee, as composed at the last Steam Railroad Section of the National Safety Council, has reviewed the Train Service Accident records of the American railroads, studied the causes contributing to such accidents and beg to submit the following report.

Train Service Accidents, as are no doubt understood by all, are those accidents that arise in connection with the operation or movement of trains, loco-

motives or cars that result in reportable casualties to persons, but not in damage to equipment or other railroad property in excess of \$150.00. Train Service Accidents are divided into ten major causes which will be treated separately as they are tabulated by Interstate Commerce Commission reports. A study of Train Service Accidents forcibly impresses one with the enormity of the problem confronting a committee in making an adequate recommendation to control such accidents. The recommendations embodied in the following report should be given serious consideration by all operating officers, and such means taken to correct as local conditions warrant.

Coupling or Uncoupling Locomotives or Cars

During the period 1920 to 1926, inclusive, records indicate that there were 1,613 persons killed and 12,163 injured, which were directly or indirectly attributable to this cause. Of the total reportable casualties listed as Train Service Accidents, 3.89 per cent are chargeable to this cause covering the 7 year period, 1920 to 1926. Of all the causes for this particular class of accidents, approximately 75 per cent were chargeable to the following practices:

1. **Adjusting coupler.**

Unexpected movement of cars due to slack.

This type of injury can be avoided by adjusting couplers on that part of train or cut of cars from which end a slack movement will naturally start.

2. **Adjusting coupler.**

Unexpected movement of cars due to other causes.

A better understanding between train and enginemen as to the work to be performed will tend to reduce accidents attributable to this cause.

3. **Adjusting coupler when cars are nearing each other.**

Strict observance of rules forbidding employees from going between moving cars for the purpose of adjusting couplers.

4. **Adjusting coupler with foot on moving cars.**

Trainmasters, yardmasters and conductors should supervise the work and insist on strict compliance with the rule forbidding adjusting coupler with foot while cars are moving. A strict rule prohibiting this practice and supervision for its enforcement will stop this type of accident.

5. **Part of coupler falling out, striking person while adjusting coupler.**

Close inspection by department charged with the responsibility for proper maintenance of operating parts of couplers should be consistently required.

6. **Uncoupling without uncoupling lever.**

Proper inspection of lift levers and lock pins, making it unnecessary to lift lock pin by hand and where necessary to uncouple cars in this manner cars should be stopped before going between them for such an operation and care used in uncoupling cars in this manner.

7. **Manipulation of uncoupling lever.**

Employees performing this class of service should take all precaution possible to safeguard the position they occupy while manipulating uncoupling levers and be prepared for any slack action in cuts of cars that would tend to result in jerking employees from cars they are riding.

8. **Coming in contact with objects, material or locomotives while coupling or uncoupling.**

Strict adherence to maintaining proper side clearance of all material and the enforcement of the rules requiring proper clearance of locomotives and cars on adjacent tracks will materially assist in reducing accidents attributable to this cause.

9. Stumbling, slipping or falling.

Proper maintenance of grounds, walks, runways, etc., where pin pulling is done in yards. A liberal use of salt, sand, cinders, etc., to prevent slipping in freezing weather.

A consistent campaign of education among all train service employees and the strict supervision by supervising officers to see that rules covering all subjects above mentioned are adhered to will contribute largely to a reduction of accidents due to coupling or uncoupling locomotives or cars.

Coupling or Uncoupling Air or Steam Hose or Safety Chains

There was a total of 164 persons killed and 3,218 injured during the period 1920 to 1926, inclusive, which constitutes 1.03 per cent of the total number of Train Service Accidents.

The practice of attempting to manipulate air or steam hose, angle cocks or safety chains while cars are moving should be absolutely prohibited. Care should also be taken to see that angle cocks are properly turned in air hose manipulations and care exercised in parting hose to see that sudden release of air will not cause injury. Where it is known that steam hose have to be manipulated by car forces or others, and in large terminals or any other point, steam pressure should be shut off and pipes and hose drained before attempting such operations. Care and understanding as between employees engaged in these operations will eliminate to a large degree this type of accident.

Operating Locomotives

During the 7 year period, 1920 to 1926, inclusive, there occurred 144 deaths and 46,420 reportable injuries chargeable to this cause, which constitutes 14.18 per cent of all Train Service Accidents.

The hazards incident to operating locomotives are many, which emphasizes the necessity for employing men in this class of service qualified physically and mentally to sense these hazards and be prepared to protect against any unnecessary risks. I. C. C. tabulations indicate that the following are some of the prominent causes of injuries in this class of service:

Levers slipping off shaking grates or while dumping ash pans.

Slipping or falling, or striking hands or body against other parts of locomotive or objects while shoveling coal.

Slipping or falling, or striking hands or body against other parts of locomotive or objects while shoveling coal.

Using other fire tools.

Unexpected movement of locomotive, causing slipping or falling while operating water plugs.

Operating reversing apparatus.

Careless handling of squirt hose valves.

Slipping or falling on locomotive or tender, not otherwise classified.

Struck by locomotives or cars on adjacent tracks.

Unexpected movement of locomotive or tender.

Coal falling from overload tanks of engines onto employees and others on the right-of-way, in roundhouses and other places.

Employees being injured by escaping steam and hot water when testing fire fighting apparatus on locomotives so equipped at terminals. (If locomotive injectors are properly operated by enginemen, injuries of this kind can be avoided).

Slipping and falling from engines as a result of snow and ice accumulating

on side steps and footboards, which should be kept free from snow and ice by applying salt or sand.

These are some of the prominent causes of injuries to employees engaged in operating locomotives, which are largely contributed to by the failure of the employee to protect against the hazards incident to the particular operation engaged in. A very small percentage of these accidents can be charged to defective equipment, which fact indicates that a consistent course of instruction and education by road foremen of engines, district foremen, traveling engineers and firemen is necessary to bring about an improvement. Employees in this class of service should be instructed to make inspections of tools they are required to use and to see that they are in first class condition, particularly so with grate shaking bars to see that proper fit is obtained over shaker lugs.

On the Union Pacific System, a unit of which I have the honor to represent, a plan of holding progressive examinations for firemen is effective. All firemen are required to pass these examinations from time to time. These examinations cover many subjects pertinent to the duties of locomotive firemen, such as mechanical efficiency, air brakes, fuel conservation and safety. Under the subject "Safety", the examiner usually deals with the many safe practices that will prevent injury and the necessity for careful examination of tools and other appurtenances to see that they are in safe condition for use. These men are being trained in the matter of safety from the time they enter service until having passed final examinations and are thoroughly conversant with the safety rules and regulations.

Operating Hand Brakes

During the period 1920 to 1926, inclusive, there were 229 persons killed and 15,518 injured while engaged in operating hand brakes, which constitutes 4.79 per cent of all Train Service Accidents.

Injuries caused while engaged in operating hand brakes are about evenly divided as between defective conditions and unsafe practices. The following list indicates some of the prominent causes for accidents occurring to employees engaged in this operation:

Brake chains or bolts breaking or giving way.

Brake chains kinking, twisting, overlapping or too long.

Broken, loose, or defective brake shaft or brake wheel.

Defect in or failure of pawl or ratchet.

The slipping of brake club in brake wheel or struck by brake club when wheel flew around.

The sudden stopping, starting, lurch, or jerk of train while engaged in setting or releasing brakes.

Slipping or falling, or losing hold while engaged in setting or releasing brakes.

Employees engaged in the operating of hand brakes must be alert to the unexpected movement of train or cars they are employed upon. It is advisable for them to be conversant with the switching movements contemplated and effect a plan of team work as between members of the crew to perform the work efficiently and safely. Approximately 75 per cent of accidents occurring to employees while engaged in operating hand brakes occurred to yard service employees. Congested switching terminals with the risk incident to such congestion makes it imperative that this class of employee should be given special attention by supervising officers in their employment and assignment to this class of service. Proper maintenance and frequent inspection by mechanical department employees placed with that responsibility should be effective to see

that no defects exist in air or hand brake appurtenances, and when such defects are noted cars should be carded or chalk marked where plainly visible by operatives, indicating nature of defect and immediate steps taken to see that cars so marked are placed for repairs.

Accidents to Employees While Operating Switches

During the years 1920 to 1926, inclusive, there were 12 killed and 7,422 injured while operating switches. This constitutes 2.26 per cent of all Train Service Accidents and were charged to the following causes:

Switchstand levers flying up.

Switch lever or ball falling on or catching hand, foot or other part of the body.

Slipping or falling on ice or snow on tracks or elsewhere.

Caught between locomotive or car and switch lever or stand.

Struck by locomotive or cars while operating switches.

Foot, hand, or other part of body caught in or by mechanism of switch.

Injuries occurring due to these causes can be largely traced to the carelessness of the individual. Employees engaged in the class of service requiring the operating of switches should be cautioned by supervisors to the risk incident to these operations and advised against undue haste in manipulating switches and to take proper position while engaged in throwing switches. Maintenance of Way department should make frequent checks of switchstand mechanism to see that switchstands are in proper condition and that walks or runways around switches are kept in good condition and as free from ice and snow or other obstructions as possible. Care should be exercised by employees operating ground throw switches to keep their feet and hands free from coming in contact with ball of switch lever when being thrown in either direction. Injuries occurring due to this cause can be rightly charged to the human element, and employees engaged in the class of service requiring the operation of switches should be constantly warned by supervisor against indulging in any unsafe practice while manipulating switches.

Coming in Contact With Fixed Structures

Interstate Commerce Commission tabulations indicate that for the years 1920 to 1926, inclusive, there were 365 persons killed and 5,928 injured, caused by coming in contact with fixed structures above or at side of track. This type of injury comprises an average of 1.91 per cent of all Train Service Accidents.

Many of the structures which contribute to this type of accident are: water, oil and mail cranes, coal chutes, stock chutes, cattle guards and other fences, side and overhead bridges, tunnels, retaining walls, overhead wires, poles, platforms and other buildings. Responsibility for accidents of this kind may be grouped (a) presense of the objects, and (b) fault of the employee to take cognizance of its presence.

It is doubtful whether any structures over which the railroad has control are now being built with insufficient clearances. In most states the railroad or utility commissions have specified standard clearances and maintain inspection to see that new structures do comply with their rules and that old structures where feasible are moved or cut back to provide greater safety; although this is unnecessary due to the whole-hearted efforts on the part of the railroads to see that no accident hazards that can be removed are permitted to remain.

It is also true that in most states the commission's regulations or legislation requires the placing of signs where ample clearance does not exist, and even

where this is not required by law warning signs have been placed by the railroads.

But even after the taking of these precautions there is something else necessary to prevent the occurrence of accidents due to fixed structures alongside of and above tracks. This is that men working on and about trains and engines be constantly alert with their minds focused on their whereabouts and the things they are doing. With the number of fixed structures that are a hazard constantly decreasing, and with no additional hazards of this nature being added, with warning signs being placed where required, the remedy seems to lie with the men themselves. They must keep posted as to where these hazards exist and be alert to avoid contact with them.

Getting On or Off Locomotives or Cars

This cause of accident is one of the most prolific causes of accidents coming under I. C. C. tabulations. There were 933 persons killed and 59,202 injured during the years 1920 to 1926, inclusive, which contributes 18.31 per cent of all Train Service Accidents.

Many conditions and practices are the causes of such accidents. Among some of the most prominent items of these contributing causes are:

- Missing or losing hold of hand hold or grab irons, stirrups, footboards.
- Slipping or falling due to ice or snow on ground or on locomotives or cars, or while train is starting or stopping.
- Striking or being struck by locomotives or cars on adjacent tracks.
- Sudden starting, stopping, lurch or jerk of locomotive, car or train.
- Jumping from equipment in anticipation of an accident.

Stumbling, tripping or slipping in their many forms are the largest items under this cause. Ice and snow on the ground, as well as stones, rubbish and other loose refuse, cause a good proportion of this type of accidents, and emphasize the necessity for Maintenance of Way Department constantly being on the alert to improve these conditions. In other words, good housekeeping will help. Trainmen should exercise exceptional care in alighting from trains or cars. Education of employees to the hazards involved in this operation is very necessary. Supervisory forces should be on the alert for any unsafe practice indulged in by employees, and corrective measures taken to see that such practices are not repeated. Interest of train and engine crews should be maintained in matters of this kind.

A plan evolved on one of our large railroad systems on portions of their territory appears to have been effective. A series of letters were sent to conductors, devoting the first three letters to the number of accidents occurring to all trainmen on railroads, after which one letter was devoted to each of the causes of Train Service Accidents, endeavoring to impress upon the conductor his duty along accident prevention lines and soliciting his aid in sustaining interest among trainmen on his division and educating the members of his crew in the safe performance of their duties, as well as warning them of the hazards existing on their division. These letters were sent to all active conductors at periods of 25 to 30 days, were each typed separately and signed personally by the superintendent. In many instances, the letters were placed in caboose cars and were a constant safety reminder to all members of the crew.

Supervisory forces should keep constantly before train and enginemen the hazards in connection with getting on or off locomotives or cars and impress upon them the necessity for exceptional care in performing this duty. This type of accident is largely within the control of the employees themselves to carefully guard against the hazards incident in getting on or off locomotives or cars.

Highway Grade Crossing Accidents

This type of accident which comes under the general classification of Train Service Accidents, and which constitutes 16.22 per cent of all Train Service Accidents covering the years 1920 to 1926, inclusive, is one that has been efficiently dealt with through activities of the Highway Grade Crossing Accident Prevention Committee of the Safety Section, American Railway Association, with the able assistance of a like committee in the National Safety Council, and your committee urges your fullest support to recommendations and activities of the afore mentioned committee. Any attempt on the part of this committee to supplement the reports emanating from such authentic sources is deemed inadvisable.

Struck or Run Over by Cars or Locomotives at Places Other Than at Highway Grade Crossings

During the period 1920 to 1926, inclusive, there were 5,181 persons killed and 8,245 injured, or 4.09 per cent of all Train Service Accidents are classified under this heading. These accidents are occurring to:

- Persons walking along tracks.
- Private crossings.
- Crossing tracks not at crossings.
- While working on or about tracks.

In congested terminals where employees are required to pass through yards, either open track level crossings or viaduct or subways should be maintained. Stringent rule, where these conditions prevail, should be enforced requiring employees to use them at all times. Train and enginemen going to and from trains in checking cars or other duties in large terminals should be constantly alert to cars or locomotives moving on adjacent tracks. Sufficient room between track centers should be maintained to provide safety for employees required to work between tracks. Where regular assigned foot walks through yards are maintained, sufficient distance should be cut in strings of cars to permit safe passageway, and positive instructions should be issued to switching crews to guard against closing up these crossings without having a man stationed at the crossing to warn employees. Car inspectors and repairmen should be cautioned constantly of the hazards in connection with their duties and not crawl over or under cars at other than designated points where crossings are provided unless positive blue flag protection has been provided. Supervisory forces should see to it that employees understand and comply with such instructions.

Miscellaneous Train Service Accidents Not Elsewhere Classified

Under this heading it is found that during the years 1920 to 1926, inclusive, there occurred 2,851 fatal injuries and 106,597 non-fatal injuries, which constitutes one-third of all Train Service Accidents.

It is apparent in analyzing the many causes of accidents that have been listed under this heading that sufficient analysis by reporting agencies has not been developed.

A thorough investigation should be developed on every injury resulting in a reportable casualty and sufficient detailed information furnished in such investigation so that employees required to make reports of accidents and their classification would not be left in doubt as to which group such accidents should be classified.

An attempt to recommend adequate measures to prevent the class of accidents coming under this heading would be extremely difficult. Your committee

realizes that the list of causes of Miscellaneous Train Service Accidents is available to all lines through I. C. C. Bulletins and suggests that safety officers review the accidents classified under the many causes outlined in such bulletins for the purpose of utilizing such information to conduct any plan of instruction or education necessary to cover local conditions. A careful study of the causes of Train Service Accidents as classified by I. C. C. Bulletins should be the guide by which safety officers could conduct a campaign of education among employees to overcome such accidents. Taking the whole Train Service Accident classification and analyzing the many causes of such accidents, it is apparent that the failure of the human element is by far the greatest contributing cause, which obviously indicates that a more intensive plan of education and instruction be carried on by the railroads.

Train Service Accidents should be discussed at safety and staff meetings and the contributing cause given serious consideration by supervising officers to remedy if possible. Where safety rules are effective and investigation develops responsibility rests with an employee, disciplinary action of some kind should be seriously considered. Unless and until carelessness on the part of train service employees, which causes accidents, is severely dealt with, educational efforts will be of no avail.

In conclusion, I wish to take this opportunity of thanking my colleagues on this committee for their very able assistance and advice, and hope this report will be the starting point of an intensive campaign among all safety officers of the American railroads in an effort to reduce personal injuries coming under the classification of Train Service Accidents.

CHAIRMAN WHITE: I am sure that all members of this Section appreciate the very thorough manner in which Chairman Bailey has gone into this subject. I think it is of great interest to everyone in this room to carry back to his railroad and try to put it over. What is your pleasure on this report?

MR. HILL: I move the report be accepted with thanks for the very able work. (The motion was seconded and carried.)

CHAIRMAN WHITE: We are now going to have the report of the chairman of the Committee on Accident Causes and Remedies, to be made by Mr. Tom Carrow. It is unnecessary that I say anything about Tom Carrow, because we all know him and love him. We also know that a meeting without Tom Carrow would not be complete.

Report of Committee on Accident Causes and Remedies

**T. H. Carrow, Superintendent of Safety, The Pennsylvania Railroad,
Philadelphia, Pa.**

I have sat here this morning and I have literally seen the children of my imagination take off their swaddling clothes and put on long pants. I think it will not be necessary or probably it would not be advisable for me to continue after this term as chairman of the Committee on Statistics, because I can see that the thing I have dreamed about all these years is coming to pass. This chart is the first comprehensive exposition of the Interstate Commerce Commission statistics that I have ever listened to, and I have no doubt that other railroad men, taking the cue of our esteemed friend, C. T. Bailey, will go and do likewise.

While I am making this observation, I want to make an additional one, and that is, the engineers of the railroad have always developed their facts and figures before they undertook to carry on a project. In safety work we have depended almost exclusively upon generalities. The time has come for the development and the application of specific information, such as has been presented here this morning.

It is difficult for me to make a report in the common acceptance of the word. It seems to me that the function of a statistician, or what more properly may be called an actuary, would be the crystallization of the thought and the effort, the knowledge, the information, that is developed from year to year.

I trust that I shall be able to do that this morning, speaking under the caption, "Education for Safety."

It is a great world in which we live, and a wonderful world, but, my friends, it is not the world in which we who have reached the meridian of life were born. The changes that have taken place are almost unbelievable.

We have the same instincts, the same faculties, the same aspirations, the same ambitions, and the same ideals, but the whole structure of human society provides new and additional means for giving them play.

Modern Life Is Kaleidoscopic

The whole fabric of human experience is woven from different thread today compared with our childhood. It is of a different texture, and it has a different coloring.

We lead what might be called a panoramic existence. We see things on the go, and we go while we see. Twice daily we are presented with graphic outline of what is going on throughout the entire civilized world, and even into the jungles of Africa and other foreign countries.

From supper time until bedtime we hear the best in music, literature, sermons, and we are literally flooded with oceans of jazz, razz and blazz.

We devour the news on the trains, in the homes, in the clubs, on the street cars; indeed the daily newspaper is as essential to our mental digestion as our breakfast food is to our physical digestion.

There is no end of subject matter. There is production and distribution, immigration and foreign relations, tariff and war debts, political corruption, burdensome taxation, railway transportation and motor transportation, inland waterways, bootlegging and prohibition. Down in Philadelphia the other day a boat hove into the dock with \$2,000,000 worth of liquor, a boat valued at a million dollars, and nobody knew what it was. Think of a problem like that being introduced into our life today.

Then we have the extension of the highways, trans-Atlantic aviation, Tunney and Dempsey, Lindbergh, Chamberlain and Byrd, the suicide wave, Rudolph Valentino, Teapot Dome, numberless highway accidents, low necks and high skirts, the new Ford car, and a multiplicity of other things that attract our attention day in and day out. And last but not least we have the continuous report of railway, street and highway accidents, the one subject that never ceases to be of interest, the one subject that never ceases to appear in any issue of any metropolitan paper which you may look at on any day.

Of all these subjects, accidents lead in the frequency of appearance and volume of space occupied in the newspaper, notwithstanding the fact that our good friend Lindbergh occupied 27,000 columns of space the first four days after he arrived in this country.

Why is it that accidents are of more interest, appear more constantly, more frequently than any other subject? Because they are of the greatest importance and lead in human interest, because the loss of life is the supreme tragedy of life, and well do we know it, because every year, 90,000 people meet an untimely death in this country, and because every year 4,000,000 are maimed or otherwise injured.

And the tragedy of it is that three-quarters of them are preventable. We walk across the streets in the midst of moving vehicles without looking in either direction. We get on and off trolley cars without regard to whether the car is moving fast or slowly or whether it is still, and as a result we are crushed under the wheels. Our children play on the railroad tracks as if they were public parks.

Machines are operated without guards provided for the purpose, and our hands are mutilated. Eye-hazardous work is performed without goggles. The result: we lose sight, which is the finest blessing that we enjoy as a physical being. We cross with our automobiles at intersections at high speed without looking in either direction and pay the toll in untold numbers of deaths.

As my friend Herbert Rowe would say, we approach highway crossings, although the shimmer of the rail is in sight, without paying the slightest attention to the danger involved and we also pay the penalty, often with death.

What is the antecedent of all of this casualty list? As I said before, we are living in a different world. Beginning about the middle of the last century, or sometime previous to that, somebody discovered that we could move with steam, and from that date on the whole genius of the human race has been directed toward the development of machinery and electricity and the application of steam; and comparatively little attention has been paid to the question of developing our minds to ward against the dangers that thus develop.

When the engineers of the United States of America devote as much attention to the human element as we so often say, when we begin to study psychologically, physiologically and otherwise, the problem of getting the mind adjusted to this present civilization, as to mechanical detail, we will then be as safe as our forefathers were in their rural communities.

Figures Prove the Value of Safety Education

How do we know that safety education will work? How can we prove it? We can prove it by cold figures, and the railroads, my friends, stand out as a shining example of safety education. The railroads have been constantly developing a set of operating rules whose purpose was primarily directed toward the prevention of accidents. In our later days we know that personal injuries have been prevented on a corresponding scale, injuries to employees, which is the important part of my report. I received the statistics Saturday morning before I left my office, from my good friend down at the Interstate Commerce Commission. Injuries to employees, dropped from 24 casualties per million man-hours in the first six months of 1926 to 20 casualties in 1927. And 50 or more of the best railroads in the country have a better record than that.

In order that you may carry this home with you, you tell your boys that in 1926 the casualty rate, to be exact, was 24.32 as compared with 20.33 in 1927. That represents roughly a reduction of 17 per cent in casualties to employees.

How was that brought about? By safety education, cooperation, persuasion and training, by intelligent effort directed toward the prevention of accidents to employees.

Now I want to illustrate how we fail, lamentably fail, in the direction where we should have made the most progress. Back in 1915 and previous to that year, 5,000 people were killed and 5,000 were injured as trespassers on the railroads of the United States. Last year, and previous to that for two or three years, that number had been cut 50 per cent. Instead of a total of 5,000 fatalities, we had only 2,500; but the first six months of this year shows an increase of 160 killed and 176 injured, while trespassing on the railroad tracks. I will venture to say that 80 per cent of that increase was made up of little children who didn't appreciate the danger with which they were confronted.

Collisions on our railroads decreased 13 per cent in the last six months. Deaths from collisions decreased 51 per cent, and injuries decreased 17 per cent.

I have something to say that will tickle you all; it will demonstrate that Deff Phillips was right when he said, Toot your own horn. Toot it like hell and then toot it some more, because if you toot it right and you have it harmonize with all the music and symphonies of human society, you will get an audience. What am

I going to tell you? I am going to tell you that highway grade crossing accidents for the last six months in our country (I got the figures before I left my office), show a decrease of four-tenths of one per cent in the number killed and seven per cent in the number injured, notwithstanding an increase of 2,000,000 automobiles, an increase in the popularity of touring and an increase, I am certain, of 25 per cent in the average mileage per car.

What are the antecedents of that magnificent record? It started back in Boston in 1921 when the Committee on the Prevention of Grade Crossing Accidents was appointed. And it was continued through the efficiency and capable effort of our friend Rowe until this present day, through the divisions along all the railroads that have solicited cooperation of the newspapers which have and always will publish matters of human interest.

The Modern Newspaper Has Great Influence

On our own line in Williamsport, Pa., a town of 50,000 people, for 30 consecutive days the editor carried a block advertisement to prevent highway crossing accidents. If there ever was an illustration of influencing the public mind, it has been in the careful crossing campaigns, in the persistent and unrelenting effort that the railroads have put forth to prevent highway crossing accidents. I don't think that I exaggerate in saying that we have no more than scraped the surface. I am sure that Mr. Rowe would say that. In 1928, if we put our shoulders to the wheel, we can even accomplish 15 or 20 per cent more than we have thus far accomplished.

The United States Steel Corporation, the Bethlehem Steel Corporation, the International Harvester Company, the wood pulp companies, the cement companies, and many others that I could mention have all made remarkable reductions, and they have made reductions not only in their accident frequency but in the cost of accidents.

The cities of the United States where organized safety has been in effect for some time, show marked reductions. In Detroit, I recall, a year after the Safety Council was inaugurated, they cut the fatalities to children in half. On the highways, it is true, as almost any citizen could point out, there is an awful lot of carelessness, but anybody who has the eye to see can determine that a very large proportion of the people who drive automobiles are careful and cautious. You see the signs on the roads, there is everywhere evidence that public safety is being felt all over the United States of America. Witness the Hoover Conference. My friend, Mr. Singleton, of the Indianapolis Public Utilities Commission is here, a man who is devoting his untiring efforts to cautioning and educating the people of Indiana to use greater care. Public education along safety lines is not any more in the experimental stage, it is beyond that, it is a positive fact.

I could tell you something about my own railroad, but I would rather not count my chickens before they are hatched, and besides, pride goeth before a fall. Maybe somebody else will tell you that some later day.

I want to conclude, however, with the reasons for safety effort. What are the reasons? If you were to go to your boss and tell him that you want to put a spur at some place, you want to put an extra track in a yard, you want to have more cars in a train, you want to get a larger locomotive to replace the little one that you already have—why do you want it? If he is an intelligent manager he makes you produce the evidence. Well, the time has come when we safety men ought to take this question of ours right out of the realm of uncertainty and put it on the rock foundation of specific figures. Why? What are the reasons for better safety on American railroads, for more safety on the American highways, for greater safety in the American industries? I will mention the first one: It is economic. No investment in time and effort will bring such marvelous returns as a scientific accident prevention campaign. You are glad to invest your few dollars in a

reputable stock company to get six per cent; for every dollar that you properly invest in safety you will get a dollar back.

First of all, safety is economic and if you have no other reason for it, the economic reason is sufficient.

What is the second reason? Reputation. Character is what a man is, but reputation is what a railroad is. It is what the people think a railroad is that it is. But people think of a railroad based on its performance and the railroad that puts forth a good performance can't help being high in the estimation of the people. Reputation, friends, is a mighty fine thing to have when you want to get something that is right and reasonable put over with the public. The public will go along with you, the public is nearly always with you if they understand you and if you can present your proposition to them in the proper light. But, believe me, you have got to come clean and you have got to have some reason for going to them and asking them to do the thing that you want them to do.

So reputation among the other things is a reason for safety.

Human Happiness Is the Final Goal

Now I come to the end of the reasons, and the end of my talk. There is one other thing to me that transcends in importance every other reason for safety. I so often state it that it is becoming an obsession with me. I think it, I write it, I talk it, and I sleep it. I want to contribute a little to the sum total of human happiness. I know that you want to do it, and of all the fields of human endeavor there is not one that compares to safety in proportion to the amount that you can contribute to human happiness. Happiness, my friends, is the greatest thing in the world. It is the thing that you begin to seek from the time you are born until you die, and unless you are physically qualified to be happy you don't know what happiness is. A maimed man, a man who is debilitated from any cause, is not happy; and oh, think of the thousands of people who are leading miserable lives because they were involved in preventable accidents, accidents that could be prevented. Isn't it a beautiful prospect to think that instead of a hundred thousand accidents on the American railroads in 1926, we can have 50,000 in 1928 or 1929? If there were no other object in safety, if there were nothing else than merely to make this a better world to live in and our railroads better upon which to travel, that alone would be sufficient for me to carry on.

There is one other point that impresses me as being wonderfully attractive to work to, and that is, our job is never done. You can work out a scheme right here in your imagination this moment that will be bearing fruit for ten years to come. As long as we are subject to natural law, as long as we have moving equipment operated by human beings, we will have a certain minimum of accidents, but until we reach the position where we continuously do everything that is reasonable and right to be done, we can never reach that irreducible minimum. And my friends, that is a tremendously big job. We can't do it with a flash in the pan, we have to formulate principles and continuously apply those principles from year to year. We must be actuated by the philosophy contained in those lines that I have so often repeated to you:

Heights of great men reached and kept
Were not attained by sudden flight,
But they while their companions slept
Were toiling upward in the night.

CHAIRMAN WHITE: I am going to ask my friend Mr. Robert Scott to tell us what we will do about this wonderful talk made by Tom Carrow.

ROBERT SCOTT (Atlantic Coast Line, Wilmington, N. C.): Mr. Chairman, you perhaps know something about the friendship that has existed between Mr. Carrow and myself a good many years. I fear that if I should undertake to tell you what

to do with that report it might embarrass Mr. Carrow and it might embarrass me. Therefore, I am going to ask you to call upon Mr. Hale to respond to Mr. Carrow's address on this subject.

ISAIAH HALE (Santa Fe Railway, Topeka, Kansas): That is the time dishonored practice of passing the buck. I really don't know. I have before used the expression, I am tempted to use it again, it is futile to attempt to paint the lily. Tom always has something worth while, and if on my recurring visits to this and the A. R. A. Convention I did nothing else but get the inspiration which I do from Tom Carrow's irrespressibility and enthusiasm, I would be well paid for coming. I have nothing to say for his report because it speaks for itself. He has said something that you and I should await in its published form and sit down and give very serious thought to. That you will do it I feel very sure. For one I feel very greatly indebted to Mr. Carrow as I have so many times before for the inspiration he again gives me. He is a magneto. He always has a shock with him.

CHAIRMAN WHITE: I want to say just a word about our secretary. You all know our secretary, and I want to tell you he has been a real secretary. If it were not for the fact that we want to use him for bigger and higher things, I would be in favor of making him permanent secretary of this Section.

I am now going to call on John Long to make a brief report as secretary of the Steam Railroad Section. Mr. John Long, superintendent of safety, the Delaware & Hudson Company, Albany, N. Y., will make his report.

Report of the Secretary

SECRETARY LONG: A speaker yesterday said that the grossest flattery was good enough for her. I am a bit embarrassed this morning because, being an old railroad man, I am not accustomed to having nice things said about me. Ordinarily, if we do our work, that is what we are paid for. If we don't do our work—well, there are ladies present, but you know what happens.

I do not believe you need a report from your Secretary. I have been making that report to you for the last twelve months. However, complying with the wishes of our honored chairman, it might be well to say that during the year I attended most of the Executive Committee meetings, and at such meetings that it was impossible for me to attend, the Secretary's work was very ably handled by my good friend and your vice-chairman, Mr. Cott.

I want you all to know how much I have enjoyed working with you during the past year. It has been a real pleasure, and it has been an especial pleasure to work with our beloved chairman and vice-chairman and the other members of the Executive Committee.

I have endeavored during the year to get out to you worth while news letters to the best of my ability. During the year I have succeeded in getting a number of letters to you which I hope you have enjoyed and profited by.

The credit, my friends, for these letters, is not due to your secretary, but rather to the fine cooperation of the many members of this Section who have sent in interesting news notes.

I have endeavored from time to time in these letters to express my grateful appreciation for this assistance, and today I want again to thank all of you for the very fine support which you have given me.

In conclusion, I want to urge upon each and every one of you to send to the new secretary, whoever he may be, any items of interest, any successful method of putting over your work, any unusual safety methods that you employ, so that at the end of this coming year he will be able to express his gratitude to each and every one of you.

CHAIRMAN WHITE: I believe this completes all the committee reports.

Before I pass on, I want to ask Mr. Hartenstien of the Lehigh Valley, who is our engineering representative, if he has any report or any remarks he wishes to make.

FRED HARTENSTIEN (Lehigh Valley Railroad, Bethlehem, Pa.): I very much regret to announce that I have not taken any part in the activities of the Engineering Committee from the sole fact that I have not had the time. I believe they have a meeting here on Thursday afternoon which I intend to attend, but I have not had the time to devote to the action of the Engineering Committee and I beg to be excused from making any further remarks.

CHAIRMAN WHITE: You all understand that our Executive Committee for the past year embraces some of the past presidents for this Section, including Mr. Bentley of the C. & O., Mr. Hale of the Santa Fe, Mr. Rowe of the D. L. & W., Mr. Rohweder of the D. M. & N., and Mr. Scott of the A. C. L.. All are due grateful thanks from me for their helpfulness when I needed assistance and called on any of them.

We now come to another interesting part of our program. It is a safety playlet by our good friend Mr. Cott of the Hocking Valley. While I have never had the pleasure of seeing this playlet, yet I have heard that it is up to the standard and is something that we will all enjoy. You all know Emerson Cott. He has a reputation, among other things, of having the most costly, the best fishing outfit of any member of this Section, and catches the fewest fish of any member.

While Mr. Cott is getting ready for his playlet, I am going to ask the Missouri Pacific Quartet to give us a song.

EMERSON COTT: I hope you folks will bear with me for a moment. I will give you a word of explanation of what I am going to try to do. I have heard, as you have, a great many safety men make safety talks. During a series of two years' rallies, while we had many able speakers, some ten or eleven (I was one of them so there were eleven), I learned that after all was said and done there was considerable duplication in what safety men said in safety talks. A certain amount of statistics, a certain amount of what we might call sob stuff, appeals to the ladies present, etc. It seemed to me that we needed some new method, perhaps, of introducing the safety idea to railway employees. So out of that thought was born a safety playlet. The use of the safety playlet in introducing the safety problem is not new. But it is, however, difficult to arrange a cast and train them and to carry out the plan that you have in mind. It takes time and money. I am going to try to do what some of you can no doubt do better than myself. I do not pose as an actor, but those of you who do have dramatic ability can take this germ of an idea that I am going to give you today and perhaps can use it on your own lines. I give it to you for what it may be worth. It is not a finished product, but there are possibilities, I believe, in it. Our paraphernalia here is not complete. You will have to use your imagination a little bit. I am going to try to take several characters and I hope and trust you will like it.

Safety Playlet

E. R. Cott, Supervisor of Safety,
Hocking Valley Railroad Company, Columbus, Ohio.

ACT I

Hello, Mother. I will not be home tonight.

Put in some new lights down here in the yard and I am going out to see how they work and then I am going up to the safety rally.

What's that? (*Lighting a cigar.*) That isn't fair. I got to eat over to the

greasy spoon. Save that chicken until tomorrow night. How are the kiddies? To school all right? Fine. I will be home as early as I can, Mother. Good-bye.

(Calls party on telephone.) George, what is the matter down in that yard? Can't you handle cars down there? Now listen, George. You have got the bottle neck down there, now get out and get into the game, get right behind those boys. Stir up their interest. Tell them we need that room. We need tracks down there . . . That's the way. Go right after them. You work with those men and they will work with you. Now you give us some room in ten and eleven. We are going to have to have . . . Look out for that manifest . . . All right, all right . . . Thanks. You will do it.

(Rises and greets visitor.) Hello, John. How are you, sir? I am glad to see you. Sit down . . . Well, yes, I suppose I ought to feel good over my promotion to trainmaster, and I do; but there is a lot of responsibility with this job that makes a man lay awake nights and think about it. I have got a good many men whom I am responsible for. My actions make or break them and one has to weigh his actions . . . Yes, I know, we all appreciate it, and I am not trying to get out of it, but at the same time I realize my responsibility, and I am going to try to live up to it.

Thanks, thanks, come again.

(Telephone rings.) Hello. Now listen. We have got to have better inspection in this yard. Too many penalty defects getting by those men. You know what our accident record is here, and if we have any more trouble of this kind we are going to lose it. I want you to get out among your men and teach them the importance of 100 per cent inspection in this yard—100 per cent inspection. Nothing else will do here. That is right, that is right. You follow that up. What is your night man doing? Is he staying in the shanty or getting out among the men? You get that night foreman out. That is where we are having a little trouble. Watch that blue flag. I have got a report (I will send it down to you) on 14 last night. They failed to put up blue flags. I know it is not my responsibility if my men get in there, but that doesn't make any difference; it is an accident. That's right, that's right, get the night foreman out and get an explanation on this blue flag last night on 14.

What's that? Well, I'll call him for you. I'll call him.

(Calls another party.) Supervisor there? Harry, I was just talking to the general car foreman and he tells me your men are not getting these drawbars out of the yard like they should. They have got a hook down here. Every man should come in in the morning and they know where those drawbars are. If our men are failing to report them I want to know it. I will take the proper steps. But in the meantime you get out and get on it. Come on, we have all got to work together up here. Yes, sir; yes, sir; down 27 and 19 and 11. Yes, had a car man stumble over one of them last night. He is not hurt bad. He will be back to work all right today. He has the right kind of spirit in him. Somebody else would have been off five or six days with a reportable accident. In the meantime you fellows want to prevent anything happening like that last night. All right.

(Calls somebody else.) What is that delay on 97? Well, now, listen; why don't your men find defective bells and headlights before they get them out? That's what they are down there for. No, we are not going to run any engines out without good bells and electric lights, but find them in the first place. We have got to account for this delay. All right, all right, thanks.

ACT II

Yes, sir, come in. What is your name? I. B. Newman?

Well, I see, young man, the doctor has passed you. You still think you want to go to work on this railroad?

Young man, you never had any previous experience, did you? I am not going to preach and talk to you a great deal, but there are a few words that I want to say to you, as a new man going to work in my territory. I want to tell you in the first place that we have got good clean men working on this railroad, and that is the only kind we want here and it is the only kind we are going to keep.

Another thing, we have a safety record on this division, of which I am train-master, of which we are proud. There isn't any accident about our safety record. It is because you and the men you are going to work with and the foremen and the supervisors and the engineers and all the people on this division have been proud of that record and have worked to maintain it. I want you to learn something about safety as you go out on this job, and I am going to send a conductor to you who will talk safety to you, the man I am going to put you to work with.

I want you to listen to what he says and take his advice. Just a minute.

(Exits. Re-enters as conductor.)

Hello. Are you the new fellow that is going to work? Uhuh. Ever had any experience? Fireman? What is the idea of going to work on a railroad? Oh, want to be president? Well, what is your name? That is a good name, I. B. Newman. Now listen, buddy, you are going out to work for me. The old man sends all new fellows out on my crew. Now, I want to tell you, we got a crew that you are going out with, and it does the work. Believe me, we handle cars. But I want to tell you one thing, that the crew that I be runnin' ain't had an accident for four years, and we ain't going to start having any right now. Now listen, kid, don't go out there and try to hit the ball. I am not going to step on your tail, I want you to come along as fast as you can, but don't be trying to do tricks.

You watch me and the other boys in the crew and get on to what they are doing and do what they do, and if you don't know it, don't guess. And if you don't know what switch to throw, find out, or by God leave 'em alone. I had one fellow that didn't know what to do so he did something and I came pretty near breakin' my record. Keep your feet and fingers away from drawbars. They got couplers on 'em. The men fought for 20 years to get 'em and half of 'em don't know how to use 'em, after they fought 20 years to get 'em.

Don't think that you don't have to do anything. You do. But you use the noodle while you are doing it. That's all there is to this game. Come along.

ACT III

Get the house for me. Hello, I'll not be home tonight. Naw, naw, can't get home for supper. Yard's shot to hell, everything else wrong on the road. No, no, no, send the kids to the movies and g'wan yourself. No, I'm not going to any safety rally. That's where this dumb bunch of men we got ought to go. If you'd see these reports on my desk! I'll be home when I get home. All right, good-bye, good-bye, good-bye!

For heaven's sake, what is the matter with that yardmaster down there?

(Calls yardmaster on telephone.)

Hello down there, George, what are you doing, sittin' on your tail down there all the time? How do you expect me to run a yard down there and you balling everything up? Now you get down there and get 11 and 14 out. You get on the tail of those men! You got the bottle neck of this yard, damn it, and your men got to come across or I'll put somebody down there that can do it. That's the idea! You get out there. I'm not coming down there and run your yard for you, that's why I got you down there. If you can't deliver the goods I'll find somebody else in this yard that can. Naw, I'm not going to talk any more about it.

(Calls roundhouse.)

Give me the roundhouse. Say, what's the matter with 97 engine? Bell missin'?

Who in the hell cares whether they got a bell missin' or not? Don't nobody miss a bell these days? Get that engine out and get it on the train, you got twenty minutes delay now. Never mind the bell, never mind the bell! Make your light test, make your light test.

Huh. Look at that. (*Calls operator.*) Get the car foreman for me. Say, what do your men do down there after they put up the blue flag, play ring around the rosey? Don't they ever inspect them? Do they put up those blue flags and forget them? Aw, I heard there was one that wasn't up; thank God we had one man that inspected a train and didn't spend all his time puttin' up a blue flag. We have got to get trains out. Get your night man out. Never mind the blue flag so much. I know you got safety inspectors. Yes, I know, you've always got them. They come and they go. Oh yes, they write a letter. Don't worry about letters, let's get the trains out. Nobody is going to kick as long as we have performance in this yard. You get that night foreman out and find out what those fellows are doing. Inspect cars instead of putting up blue flags. For God's sake, don't forget to take 'em down if they do put 'em up.

Yes, what's that? You weren't through with me? Some drawbars in the yard, huh? Well, your men have got eyes, haven't they? Oh, well, they have lanterns at night. Whadayou want, to wet-nurse all these guys? Pretty soon we will have to have a helper for every man to go around and look for him.

(*Calls supervisor.*)

Oh, Harry, some bird fell over a drawbar last night; please pick it up, yes. Uhuh. By God, I like to see drawbars in the yard. I think we are doing business. If a man can't get one around here once in a while I don't think they are moving any engines. Pick it up. We gotta keep 'em satisfied. Yes, uhuh.

(*Enter new employee.*)

Well, who are you? Oh, Newman. What's your initials? I. B. Newman. Doctor's passed you? Young man, I think you had better stayed on the farm. You know when you work in this yard and on this division, young man, you hit the ball. I am one man that demands performance. And I get it! And I am going to have it! (*Lighting a cigarette*)

Now if you want to work I got a job for you. If you want to come around here and have a whole lot of esthetic dancing in this yard you are in the wrong place. I was raised in the old schools; do or die. Some of 'em do and some of 'em die.

I got a conductor out here you are going to work for. I'll send him in and let him talk to you. (*Exits.*)

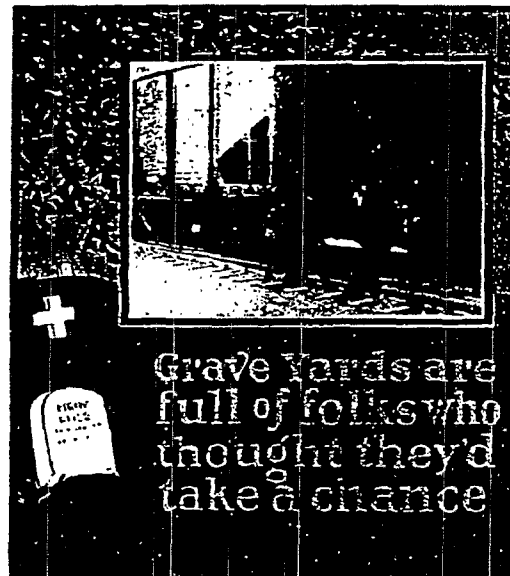
ACT IV

(*Enters as conductor, taking a chew of tobacco.*) Hello. (*Puts the trainmaster's cigarettes in his pocket. Expectorates.*) You the new guy that's going to work, huh? Had any experience? Farmer! By God, the old man must think I am runnin' a kindergarten. Wonder where he's gittin' all these guys, farmer guys. I suppose you think you'll be runnin' a railroad 'fore long, eh? I don't know what he sent me in here for. But they ain't much for me to tell you kid, but to git out here in the yard and hit the ball.

Yes, yes: well never mind, you don't get this stuff out o' books. You git in here and go to work and you will know a hell of a lot more about it after while. They ain't anything I can tell you but keep your eyes open and follow me. I know how to handle cars and I know how to handle you. But one thing, you are working for an old man and you either hit the ball or the ball hits you. Now, you might as well learn that to start with, and you ain't going to be president o' this railroad in three weeks, either. You come on out here and I'll give you a job and we will go to work, and when I say work I mean it.

ACT V

Henry. Bring in those newspapers, will you? Thank you. Send Newman in. Newman, sit down a minute. Newman, you have made a good man. I am pleased to tell you that, beginning tomorrow morning, you are taking the conductor's rate on this road. You have learned the game. In the first place you started right. You started with the right kind of a man. You kept your eyes open. You have kept your body and your mind clean. You have learned the game. You are the kind of a man that we are proud of on this railroad. You have been free from injury, and that is an index to a man's character, to some extent, on the railroad. And it is an important thing. Newman, because of this fact: that it doesn't make any difference how capable a man may be, what his possibilities are, what he



may mean to this railroad and can be to this railroad, if his chances are cut off with an accident. The money we have spent and the time we have spent in training that man and making him of value to the railroad is wasted.

You have got a future. I have seen your work on the safety committee and I am going to see you are back there again. I have liked your work. You are connected up with the organization in a good way. That is the kind of men we want in the organization. Generally speaking, that is the kind of men we have in the organization. We want men of your character and type active workers in the organization.

I want to thank you for what you have done and bring this good news to you, and you go out and keep up the game as you have before. Good-bye, Newman.

ACT VI

Ohum. Tried to beat the train. It can't be done. Another nice one. (*Answers telephone.*) Well, hello. What's that? My God! Wait a minute! Wait a minute!

Henry! Call the ambulance and get hold of the doc on the 'phone, quick. Yep. Down yard C. Right up by the hump crossin'.

Now tell me about it. What in the hell did he mean by going in there? Ugh! By God, it's nobody's fault but his own; nobody's fault but his own; I'm not going to shed any tears about it. All right, I have called the ambulance. Go ahead, yes, yes. (*Hangs up receiver.*) Well, I suppose every passenger train in the next ten hours will vomit safety inspectors. They will want to hold me responsible. What have I got to do with men on this railroad? By God, they got eyes the same as I have; they got feet the same as I have; they got brains the same as I have. I hire 'em and fire 'em; I can't nurse 'em out in the yard. Oh, there will be the usual inquiry and a fatal—thank God, it isn't that, but they will all be here, and I will have to sit around here and look sweet.

(*Telephone rings.*)

Hello. What was that? All right. Henry, never mind that ambulance and the doctor. Get me that fellow's address, will you? Well, I gave him a job, that's what he wanted. That's all I can do about it. Get me Mrs. I. B. Newman at 426 Rose Avenue, Bay City. Make it snappy.

That is all part of the game. Some do and some don't. Hello, this Mrs. Newman? This is Mr. Noman of the XYZ. Mrs. Newman, we had a little accident in our yard today. Yes, your son. Yes. Your son is dead. Yes.

MR. COTT: Gentlemen, we have heard a lot about safety and perhaps not so much about efficiency. You saw two trainmasters, you saw two conductors. Which of those four men were the better railroad men? Who of the four were the better producers? Who of the four did the most work and did it safely and efficiently? And following that, of the four who were the better, safety men? Safety is a by-product. It is a thing you cannot order. It is a thing you cannot achieve, it is the product of the character of the man. And with efficiency and the milk of human kindness and interest that every man should have in his heart for his fellows, along with that and as a product, comes safety. Stress efficiency, stress production, stress kindness, and if you can accomplish those things safety is the result that will follow.

CHAIRMAN WHITE: I am quite sure you all enjoyed Mr. Cott's playlet. I want to say, from my experience out on the road, that there is more truth in that than poetry.

I want to express my appreciation to the ladies and gentlemen for their good attention and the large attendance here this morning.

ADJOURNMENT

Wednesday, September 28, 1927.

The meeting convened at nine-ten o'clock, with the chairman, J. D. White, presiding.

CHAIRMAN WHITE: We now come to that part of our program well and happily known as executives' day; and it means a great deal to all of us in this section.

The gentlemen on our program are so well-known that it is scarcely necessary for me to mention anything but their names when introducing them.

I do not believe any greater compliment could be paid to the Steam Railroad Section than to have these gentlemen come here and talk to us about safety. We all know that safety must start at the top and go all the way down to the bottom.

I exceedingly appreciate the compliment they have paid to us by coming here, and I consider ourselves honored in having them with us. They have all had many years experience in railroad matters generally, and I am sure what they have to say to us will encourage us to such a degree that we will all go home to our respective railroads with more vim, more energy to promote safety among our people than ever before.

The first gentleman on the program, whom it gives me a great deal of pleasure to introduce, is Mr. L. C. Fritch, vice-president of operation, Chicago, Rock Island and Pacific Railway Company.

L. C. FRITCH: Mr. Chairman, Members and Guests of the National Safety Council:

I esteem it a great honor and a privilege to address this gathering. The safety movement, particularly on railways, is one of the most important elements of our operation. The railways have been considered as being among the most hazardous of occupations, but through the efforts of the rank and file and the officers and due very largely to the safety movement, railroading has become comparatively a very safe occupation.

There is, however, one thing that still remains as great menace to the safety of life and limb, and that is the railway highway grade crossing.

A speaker yesterday made a reference to the cost of eliminating all the railway grade crossings in this country at a sum of approximately \$20,000,000,000. Now that is approximately the valuation placed by the Interstate Commerce Commission upon the railroads. It is hardly conceivable that the railways could raise the funds necessary to eliminate all highway grade crossings. There will be much more progress made in this direction if the attitude of the public authorities is changed toward the railroads.

Years ago it was commonly understood, or taken as a matter of fact, that the railways were responsible for everything; that when any improvement or any change was made necessary by the existence of the railway the railways had to bear the entire cost. But that time has changed. The introduction of the automobile has brought a problem which is one of the most serious confronting the American public. That is the large number of casualties which occur at grade crossings. There is scarcely a day on our railway that we do not strike from one to three automobiles somewhere on our system. Ninety-nine per cent of these accidents are due to the carelessness of the drivers. We have many instances where automobiles run into the side of our trains. This problem is becoming so serious that something must be done about it. As I said before, if the attitude of the public authorities with reference to the elimination of grade crossings will be changed and they will cooperate more fully with the railways, a great deal more will be accomplished.

I mean that the railways cannot stand the major portion of the expense of elimination of crossings; it would be impossible for them to raise the money to do it.

In many states now the railways are being met on a very fair basis, and in those states more progress is being made than in those states where the authorities do not cooperate with the railroads. This subject is one of very live interest at the present time among the railways of Chicago. There is in Cook County alone, the county in which Chicago is located, a program of some \$32,000,000 of highway improvement. That means that a great many railways and crossings are to be affected; they must either be eliminated or protected. That is only one county in this state. The same large programs of highway improvement are going on all over this country, and it is getting to be such a stupendous thing for the railways to meet that it is almost staggering. The railways are called upon every year to spend millions of dollars in the separation of grade crossings. There is a limit to the extent to which they can go, and the public must make up its mind that in order to eliminate this danger they must meet the railways half way, they must cooperate with them, they must bear their part of the cost. The railways are not responsible for the introduction of the automobile. It is an element that has been brought in without their instigation. The railways are willing to meet the situation and in many cases are meeting it successfully, so that I say the public authorities must change their attitude in this matter and make up their minds that the public must pay a very large part of the cost of eliminating these grade crossings.

If that is done, one of our greatest menaces to life and limb as far as railway operation is concerned will be removed.

The Safety Movement on American Railroads

L. C. Fritch, Vice-President, Operation, Chicago, Rock Island & Pacific Railway Company, Chicago, Ill.

The safety movement is at once a humane and intensely practical and economic proposition.

Organized safety movement on American Railroads has long since passed the doubtful or experimental stage and for many years has been recognized by management and the rank and file of employees generally as an essential in the proper, efficient and successful handling of the transportation industry, and as a part of its systematic and orderly procedure.

The United States Steel Corporation was in fact the real pioneer in organization and successful promotion of the principle of modern safety as applied to men in industry and, it is stated, that as early as the year 1906, that corporation expended one and one-half million dollars to better the working conditions of their employees through improved safety conditions, sanitation and welfare.

The railroads were close followers and the growth of the safety movement on the railroads of America is almost phenomenal. Simultaneously with the organization and attempted promotion of organized safety on the railroads, there came with the "Positive Thinker" who was willing to accept and assist, the opposite type—"The Negative Thinker," who could see nothing sincere or honest in the desire to promote such a worthy and needed cause as the conservation of life and limb, but saw rather in contrast an ulterior motive or—"Something up the sleeve." He doubted and held aloof. However, the life of the negative thinker was short as far as his ideas were concerned, and soon he changed his viewpoint and began to see that HE would be individually benefited if the safety movement were successful, and with this idea possessing him, he becomes a convert and a real advocate and the march of progress continued.

Practically every railroad of any considerable mileage in this country now maintains a safety organization or department under the direction of an officer who devotes his entire time, or practically his entire time to the study and handling of

those features that are necessary to carry on the safety work and produce positive results.

Like every other business, there are two angles from which the safety organizations on the railroads must be viewed and considered, namely, the humanitarian and the economic. It is but a delusion to believe that either of these two considerations can "Go it alone," as it were—they must be co-ordinated. There is no business activity that can be conducted in this day and age without giving consideration to the benefits that will accrue to the human agency and bring financial reward to the investor as well—the safety movement is no exception.

The safety movement generally is, today, one of the most important, widely known, openly discussed and seriously considered subjects before the American people. The complexity of our modern civilization has introduced hazards into our daily life never before known. The speed craze of the present day is responsible for untold thousands who annually lose life or limb in the mad attempt to realize a thrill. The automobile in the hands of reckless drivers has made the life of pedestrians, as well as that of the motorist, a weapon more deadly than firearms. The public generally, therefore, is vitally interested in the safety first movement and it is but proper and just that it should be so, for next to his belief in Deity, SAFETY represents and reflects man's highest ideal—conservation of human life and limb.

To practice safety, earnestly and whole heartedly, is but to observe and obey "Nature's First Law," to assist others to do so demonstrates our unfeigned belief in the "Brotherhood of Man."

The Individual Employee Must Cooperate

To carry on this work, requires time and money. The management of the railroads are willing to furnish the money necessary to make their properties safe, to guard machines, establish and maintain suitable and proper avenues for travel in and about the buildings and grounds, maintain proper and safe lighting and the many other things so necessary to make the working conditions and surroundings, not only safe but attractive so that the environment with which the workers are surrounded will appeal to their finer sensibilities. But, after all this is done, safety results will not be assured unless the individual employee willingly and conscientiously accepts his full responsibility, and does his part, adding his personal assistance and endeavor as far as possible to enlist the aid and assistance of his fellow workmen.

Safety, in the final analysis is a personal proposition and must be so looked upon and accepted.

Personal contact with and education of those who handle the every day work of the American railroad is the needed agency through which success will most surely come. Management and supervisory forces must realize this principle and lend support to its acceptance and advancement.

Lectures, employee meetings, public safety gatherings, literature and statistics, are all beneficial, but personal CONTACT between representatives and those who must be interested, is more important than these other agencies. Men must be WON to the cause.

Through safety committees, we believe, the greatest interest and cooperation of employees, and the best results can be obtained. On the Rock Island, our safety committees have done splendid work. We have always looked upon such committees as our allies, in principle and in fact.

At the present time, we have localized our efforts to obtain results through the organization of safety committees, sufficient in number and geographically located to have each important point on our railroad properly supervised and the committee at such points guided and directed by the man in charge as the chairman. We find that this distribution of responsibility and leadership is productive of greater interest and better results.

The success achieved by the railroads generally through their efforts to reduce loss of life and to prevent injury to employee, passenger, patron and neighbor is a matter of common knowledge, so well known and so obvious as not to need specific mention in these remarks.

However, exercising the privilege of reference to the particular property with which I am associated to say that in our safety work and efforts, we have been generally successful, the most attractive accomplishment lies in the reduction of 62.70 per cent in employee fatalities, 1926 compared with 1912, the year our safety department was organized.

Our railroad has taken an active part in every campaign in which the co-ordinated efforts of the railroads have been sought to give the greatest impetus to the advancement of safety education in the most forceful manner.

The railroads are ready and willing to do everything they consistently can to prevent accidents on railway highway crossings, but the driving public must recognize that the real responsibility for the prevention of such accidents lies with them and not with the railroads. Drivers of motor driven vehicles must be held to account for their wrongful acts. They must assume their full share of responsibility and if they do so, accidents at railroad highway crossings will be materially decreased.

Safety Campaigns in the Public Schools

Education of the public is the recommended medium through which the highest degree of success may be attained. To teach safety in the schools is but to embrace and to employ modern means and methods to assure the rising generation (our boys and our girls) being more thoughtful and considerate for their own personal safety and a manifestation of that same interest towards others.

Safety campaigns in the schools have always been a part of the Rock Island Lines' safety program. We have done an extensive work in the past and have definite outlines for the future. Safety talks, or lectures, by railroad men in the schools find welcome response from management and scholar alike, but it is an absolute essential, if we hope to merit and maintain such receptions, that such speakers confine themselves to the subject—SAFETY—and make no attempt to commercialize or otherwise take advantage of the kindness and hospitality accorded by the school management through the introduction of other subjects.

The school bus, thousands now operating in the various states, must be seriously considered in our safety educational work. The elimination of the small school house and the building of Consolidated schools in their stead, increases the hazard of the children who are transported in them to and from home and school, because of the numbers assembled in one vehicle rather than to have them scattered, either in vehicle or on foot as was formerly the case. We must see to it that school management becomes interested and insist that drivers of school busses take no chances when crossing the tracks of a railroad, that a positive STOP be made before attempting to cross, and a view of the track in both directions obtained by the driver, to know that it is safe to cross before he attempts to do so. At grade crossings the positive STOP, regardless of conditions, objection or criticism is the only way to insure SAFETY to life and property.

The Rock Island was a pioneer in the safety movement, we have actively and energetically pursued a program in our safety work prompted by a desire to be leaders, not followers, originators, not imitators, and we are of the firm conviction that those who enlist in the cause of safety and who lend their unstinted assistance to the advancement of that noble work are "Building for the Future of America and Its People."

CHAIRMAN WHITE: Mr. Fritch, I want to assure you that I appreciate having you with us today. In order that you may know how much the section appreciates it I am going to ask Mr. Charles E. Hill to please make a response.

CHARLES E. HILL (New York Central Lines, New York, N. Y.): To be privileged to respond to this interesting and instructive address of Mr. Fritch, Vice-President of the Rock Island Railroad, is I assure you, an honor. It shall not be my purpose to undertake an elaboration of the points he has so well covered, but rather to emphasize our appreciation of the wonderful addition he has made to our safety program.

For 13 consecutive years, the Steam Railroad Section of the National Safety Council has met in convention to discuss the railway accident problem. Each year we receive renewed inspiration which serves to increase our efficiency and stimulate our efforts, thus augmenting our progress in the field of accident prevention. Accident prevention along scientific lines is comparatively a new feature. Twelve years ago accident prevention work was not recognized by the railroads as being of any great concern.

The American people are rather prone to be skeptical of new theories until through practical demonstration they have proved their value, and safety work along scientific lines at that time was an undeveloped theory.

We have now reached the point, however, where safety is recognized as an integral part of railroad operation. We have seen the number of employee casualties materially reduced during the period in which organized safety has been functioning upon the American railroads.

This reduction does not only apply to accident frequency, but also to accident severity as well. Our experience teaches us that this has not just happened; it has been due to the carrying out of a definite plan of procedure, for our success, after all, lies in the carrying out of certain fundamentals.

The great interest that chief executives of railroads of this country are now taking in safety is indicative of a further downward trend in accident frequency.

Therefore, Mr. Fritch, you can readily understand why we not only feel honored in having you with us here this morning, but we are glad to know that a busy railway executive is willing to give his time to come here and testify as to the efficacy underlying the great fundamentals we are pursuing to reduce accidents and thus preserve life and limb.

The Practical Side of Safety Emphasized

Therefore, upon behalf of the American railroads, and particularly those assembled here this morning, I want to acknowledge our indebtedness to you for your presence here, the inspiration it lends and for your splendid address which shows a keen appreciation of the problems confronting us, and which will better enable us to meet these problems as they arise. It is our hope that we will have further opportunity to know you and that you will honor us with your presence again.

ROBERT SCOTT (Atlantic Coast Line, Wilmington, N. C.): I have no idea, gentlemen, of undertaking to emphasize anything that Mr. Hill might have said about Mr. Fritch's address. I should like to emphasize just one thing that Mr. Hill touched upon rather briefly, and that is that part of your address which dealt with the practical safety which the railroads are undertaking to carry on. If safety is not practical, it is of very little use. I want to assure you as an operating vice-president of one of the leading railroads of this country, that we safety men are trying to put it over in a practical way.

I thank you for your splendid testimony to that phase of our work.

CHAIRMAN WHITE: As further evidence of our appreciation, I think it would be entirely appropriate that we give a rising vote of thanks to Mr. Fritch for his presence here this morning.

(A rising vote of thanks was extended to Mr. Fritch.)

CHAIRMAN WHITE: It gives me a great deal of pleasure to introduce Mr. R. C.

White, Assistant General Manager of the Missouri Pacific Railroad, St. Louis, Missouri.

The Purpose of the Safety Organization

**R. C. White, Assistant General Manager, Missouri Pacific Railroad Company,
St. Louis, Mo.**

What is the real purpose of the "Safety Organization," and why should we be interested? Every employee would, without question, like to hear his railroad spoken of as the best railroad. An important factor, if not the most important, in bringing about a reputation for being the best, is safety. If we, by our performance, establish a reputation for being the safest railroad, we will at the same time have gone far in establishing a reputation for being the best railroad, as service with safety will make our railroad what we want it to be. I do not mean by using the term "our road" to restrict the application to the road that I have the privilege to represent, but use it in the broad sense. The dominant thought in the mind of every employee on every railroad should be that he wants his road to be "A Service Institution"; the best, the safest.

It takes something more than tracks, locomotives, cars, roundhouses and station buildings to make a railroad; it takes man power, and all that this implies. The thinking unit must be constantly at work and constantly alert for at the basis of every action or activity there is thought.

Without substantial work by the thinking unit we cannot hope for maximum results; without being alert we cannot be certain that our thinking is being directed along and into basic channels. In other words, without thought we would have complete collapse of our activities; with thinking of the proper kind and giving it proper direction we finally obtain proper action and therefore proper results. Hence, thinking is basic.

In the minds of the public that we serve, we officers and employees are the railroad; and with our thoughts and efforts properly coordinated, the result will be safe, dependable and satisfying transportation service. Proper coordination, however, cannot be brought about without creating and sustaining enthusiastic interest on the part of each and every one of us. This interest must spring from the desire to do good, and this desire only obtains when mutual understanding of "The purpose of the Safety Organization" obtains; thinking, constant thinking, right thinking and contact bring about that mutual understanding. This interest must, of course, be manifest from the head of the railroad, and from the head it must work down through every avenue where it can and will reach the man subject to error and injury, and none are immune to the dangers that are ever present in railroad operation, hence it naturally follows that every officer should have an interest in the safety organization and through every known mental and physical channel create and sustain individual and enthusiastic interest in promoting safety.

In order to obtain maximum results in any undertaking, we must give thought as to what we desire to do or accomplish, and then go about making plans and devising ways and means for carrying out those plans. We have made up our minds that we are going to be the safest and best railroad. One of the problems of the directing, thinking units is to convince each and every railroad employee that we have made up our minds, and that because of the desire to do good individually and collectively; further, that this desire or conclusion follows closely in the channels of universal right thinking; this thought must be sold to each employee, and he must be shown that the bargain is a good one for him individually.

The first step in formulating plans and devising ways and means for accom-

plishing our objective, was the creating of what we term our "Safety Organization." Its primary function is to keep in touch with every phase of accident prevention; to disseminate information and to educate all employees, particularly officers, in the principles of accident prevention. This is carried on by various methods, the scope and extent limited only by the capacity and ingenuity of the director of safety. The efforts of the "headquarters" organization must be intelligently and persistently directed; activity must be such as to obtain the enthusiastic interest of the individual; ingenuity must be such that this individual interest will become a co-ordinated force gathering momentum with experience and opportunity.

It is very apparent and necessary that the "headquarters" organization be outstanding in leadership and direction to preclude the possibility of inefficient or ineffective use of any substance upon which the safety movement feeds and lives.

Since the superintendent of an operating division is responsible for the safe, economical and dependable operation of his division, there must be a divisional organization or division safety committee; the division safety committee is a unit in the system organization for safety. The function of the division committee must be constructive—the making of plans and the devising of ways and means for creating and sustaining individual interest in promoting safe methods, correcting hazardous conditions and unsafe practices, and creating safe practices in producing transportation. Carrying the organization further, we have sub-committees among the maintenance of equipment and maintenance of way and structures departments, whose functions are to educate the man on the job in the principles of safety.

Functions of the Safety Organization

I have indicated in a general way the function of a safety organization, and what I have said has not been worth while unless I have caused the question to be asked: "What can I, as an individual, do?" There are many things, but I shall mention only a few; and in mentioning them before the directors of safety as well as operating officials of the railroads of our country, I will refer to them as a function of the safety organization, and addressed to the whole organization.

First—If you observe an unsafe practice and have the opportunity, tell the individual right on the spot. Tell him both how and why, in language that he understands—in doing so, you will have transmitted a thought that he can never get rid of; whether he likes it or not, you have put into him being something that is good; and have done him a real service. At the same time, make a mental or pencil note, and before the day is over make a memorandum, giving the chairman of the division safety committee the benefit of your observation.

Second—If you observe an unsafe condition and you are not in position to personally correct, do not turn in for the day until you have made out and mailed a safety card, and, in addition, advised the supervisory officer by telegram if the circumstances seem to warrant, this in order that the condition may be corrected before, rather than after, causing an accident. The saying of the philosophers, while very old, is very true; and, being the truth, we can always afford to repeat it: "An ounce of prevention is worth a pound of cure."

By following these two suggestions, it will make possible immediate handling for correction and, further, will make it possible for the division committee at the monthly meetings to devote its time to the working out of constructive plans. It is neither interesting nor constructive—in fact, it is a positive imposition on the intelligence and good nature of the members of the committee and interested visitors to be forced to sit in a meeting and listen to statements or reports as to unsafe conditions or practices observed thirty to sixty days previously, with nothing done to correct. If each individual will promptly report unsafe conditions and unsafe practices, these reports promptly gotten into the hands of the proper supervisory officers, and then promptly corrected, and record as to report and correction made, this information

can be written into the minutes of the meeting, together with subjects to be carried over for further discussion and consideration, and copies of the minutes distributed in advance to all members of the committee.

It is not my purpose to suggest here how safety meetings should be conducted or how the safety work should be carried on. However, I desire to leave this thought with you that safety meetings be conducted in such a way as to cause each and every individual present to tell the other fellow what is being done to promote safety and how he, as an individual, can be helpful. In this way your educational work will spread among the rank and file of the employees.

Essentially this is a matter of education; the transmitting of thoughts of a kind, and in a way that the individual will understand: with understanding comes confidence; with confidence comes action; with action comes results; with results comes gratitude; and at that time we find the individual an agency of interest and enthusiasm under the well-directed thought of what we are trying to do, which, in the last analysis, is so basic and essential in any field of action.

Each Safety Rule Is a Constructive Thought

Another thought I would like to leave with you is this: the operating book of rules has been compiled literally one rule at a time; each rule is constructive thought tempered with experience, and reduced to a written rule for our guidance. A rule fails in its purpose unless all have an intimate working knowledge as to its provisions. Every employee, particularly those involved in train service, must know the rules, understand and appreciate their real purpose and uniformly observe them. At this point I would like to call attention to the thought that the Golden Rule and the Book of Rules are the safe guides in every railroad man's life: without the Book of Rules we would not safely understand each other; without the Golden Rule we would not care for each other.

The purpose, therefore, of the safety organization is to inspire thought, with its impelling co-ordinated action, and I have tried, without going into detail, to show, in brief outline, how we should go about it.

The safety organization has still another duty, and that is, helping solve the grade crossing automobile accident problem. Education of the public to the dangers growing out of carelessness in the use of the automobile with particular reference to the duty they owe themselves when crossing a railroad crossing at grade. It is the function of the organization to disseminate appropriate literature, and to go out among the public and address them at all kinds of gatherings and vividly portray the dire results growing out of failure to make sure that it is safe before proceeding upon the track—to go into the schools, seeking the opportunity to do so, and in proper language impress the children with all phases of safety and especially the safe and sane use of the automobile, for the foundation for successfully teaching the principles of safety, the ethics of fair play and the value of co-ordinated action—cooperation, lies in the schools and in the homes of the nation.

I subscribe to the thought that a thing of great importance is for the chief operating officer to recognize his own responsibility, appreciate how far his interest and influence will reach, and then emphasize his own interest by inaugurating such follow-up as will enable him to know that all supervisory officers accept their responsibility for the safe conduct of the employees, working under their supervision. However, we must all recognize our interdependence in this great co-operative effort, affording safe and satisfying transportation service.

CHAIRMAN WHITE: Mr. White, I assure you that your message on the promotion of safety has been a wonderful inspiration to the members of the Steam Railroad Section, and in order that you may further understand how much we appreciate it, I am going to call on Mr. Warfel of the Union Pacific Railroad, to make a response.

Discussion of Mr. White's Paper

G. H. Warfel, Assistant to the General Manager, Union Pacific Railroad, Omaha, Neb.

I have a grievance against this program committee. Sometime ago they asked me if I would participate in the discussion of a paper by Mr. White, and I replied that I would. I was then notified that my discussion should be extemporaneous and must be brief. Now I see they have my little talk billed as a response. I have always understood that a response was something offered in reply to a toast or a prayer.

When I received a copy of Mr. White's paper a day or two ago, of course I immediately sat down to read it, and the first thing that greeted my eye, as you have heard here this morning, was this: "An important factor, if not the most important, in bringing about a reputation for being the best, is safety. If we, by our performance, establish a reputation for being the safest railroad, we will at the same time have gone far in establishing a reputation for being the best railroad." Now this had a very familiar sound to me, and I had to look back at the title to assure myself that the writer of such a statement was connected with another railroad.

It goes, without saying, however, that I must certainly subscribe thoroughly to the sentiment which Mr. White expressed, even though it be a carbon copy. I would like to call attention to this statement in his paper: "With thinking of the proper kind and giving it proper direction, we finally obtain proper action and therefore proper results." I feel somewhat inclined to suggest that two words in that statement should be reversed, and say—"With action of the proper kind in the proper direction, we finally obtain proper thinking, and then proper results."

I wonder if many railroad managements realize that one of the most valuable by-products of an aggressive and intensive handling of accident prevention work is the much greater amount of thinking done by employees than would be the case if no such campaign were conducted.

It has been our experience that when a man feels that an accident is going to endanger his standing with his employers, he will devote a much larger part of his time to careful thinking, and practical thinking, than he has ever done before, in an effort to avoid that accident.

I believe it will be found that the general intelligence of the entire personnel of a railroad will rate decidedly higher where an active and continuous safety campaign is conducted, than on a railroad where this has not been done. Inevitably, this incentive to think leads to a higher efficiency along all other lines of progress as well as in accident prevention.

In regard to interest in safety work Mr. White says, "This interest must spring from the desire to do good." Here again I should like to suggest that it is a debatable proposition whether more people are moral from a desire to do good, than from the fear of punishment for doing evil. We have found it well worth while to play upon both incentives in the human mind—the desire to do good, and the fear of the result of wrong-doing. We believe in the Evangelistic side of safety work, but we have also secured some remarkable results by emphasizing the punishment that will follow from doing wrong. I agree with the speaker when he says: "This interest in safety work must be manifest from the head of the railroad and from the head it must work down"; and I repeat what I have said in other meetings that the casualty rate among the employees of a railroad may be regarded in a general way as an

index of the effective interest taken by the management of the railroad in accident prevention. I believe it is even possible that more spectacular results could be obtained in some instances by one honest-to-goodness safety meeting held with the chief operating officer of the railroad, than by a hundred so-called safety meetings held among the rank and file of the employees. We have not yet sold the conservation idea properly to some managements.

An element too often lacking in safety organizations on railroads, is the element of authority, and that element must be supplied by the head of the organization. The voice of a safety agent or inspector may be honeyed with persuasion, may be filled with the milk of human kindness, but it will accomplish much more among the personnel of a railroad if it rings with the tone of authority.

Mr. White says: "We have made up our minds that we are going to be the safest and best railroad," and he continued, "one of the problems of the directing and thinking unit is to convince each and every railroad employee that we have made up our minds." I submit that the most effective way in which to convince the employee that we have made up our minds is through the judicious use of impartial discipline for the employee who knowingly or carelessly violates the safety rule.

A Judicious Use of Discipline Often Necessary

Now, I would not have you get the idea that on the property I represent, the officers and the safety agents are hard, stern, and cruel, seeking every opportunity to thrust the iron of discipline into the heart of an employee, for that is not the case.

But when we have set up a comprehensive code of safety rules for the guidance of our men, and have educated them thoroughly in that code of rules, a judicious use of discipline proportioned according to the hazard involved in the violation is the most effective means for securing uniform observance. A code of rules is not effective unless it is uniformly observed. I would be inclined to substitute a different sequence than that which Mr. White arranged, as to the stages through which the education of the employee is accomplished. I would state it this way: essentially, it is a matter of discipline. This requires taking action of a kind and in a way that the individual will understand. This action gets results in the saving of life and limb. The results inspire confidence; with confidence comes understanding, and with understanding comes gratitude; then we find the individual an agency of interest and enthusiasm in the work we are doing.

The purpose of the safety organization on railroads is to save lives, to keep the clouds of sadness from darkening the homes of our people; and the measure of effectiveness of the organization is the amount by which we decrease the casualty rate on the railroad. A gratifying progress in the reduction of the casualty rates on American railroads has been made in the last few years, but we have not even approached the reductions that most of us feel are entirely possible. Perhaps, one reason is that we have been too prone to present accident prevention on the basis of its humanitarian appeal, rather than upon the hard, cold basis of economic gain.

I am as strong an advocate of safety for humanitarian reasons as any other man in the work, but I suggest to you that the cause of humanity might well be served by presenting to our managements in dollars and cents, the cost to the stockholders of the failure to thoroughly and aggressively enforce safety on their properties. If this great waste could be accurately presented for their inspection, the action which they would take might be the greatest boost which

humanitarianism has received in a long time. It would be a strange thing to see the casualty rate tabulated on a dollars and cents basis rather than on a man-hour basis; but it might be a very effective way in which to present the real value of safety work—the saving of human life, and the prevention of needless suffering.

(Mr. E. R. Cott took the chair.)

CHAIRMAN COTT: It has been suggested by the Chair that we ask for a rising vote of thanks for Mr. White's paper.

(A rising vote of thanks was extended to Mr. White.)

CHAIRMAN COTT: We have a number of railroad executives with us today. I am going to ask the safety representatives of the various railroads here if they will introduce their executive officers. I will first ask any safety representative, who has a president with him, if he will introduce him to the assembly. Mr. Rohweder, will you start, please?

(Mr. A. V. Rohweder, Superintendent of Safety and Welfare, D. M. & N. Railway Company, introduced Mr. W. A. McGonagle, President, D. M. & N. Railway Company; Mr. H. Johnson, President, D. & I. R. Railroad Company, and Mr. Clarence Howard, President, Commonwealth Steel.)

CHAIRMAN COTT: Are there any other safety representatives here with their presidents today? If not, we will ask the safety representatives of the various roads to introduce their vice-presidents.

L. G. BENTLEY (General Safety Agent, C. & O. Railway): I take great pleasure in introducing Mr. J. B. Parrish, assistant vice-president of the Chesapeake & Ohio, in charge of all personnel activities.

CHARLES E. HILL (General Safety Agent, New York Central Lines): I want to present Mr. T. W. Evans of Chicago, vice-president of the Indiana Harbor Belt and Chicago River and Indiana Railroads.

(Mr. M. Dailey, vice-president in charge of operation of the C. & I. M. Railroad, was also introduced.)

CHAIRMAN COTT: We are now coming to another number on our program which I am sure many of you are anticipating. The president whom it will be my pleasure to introduce in a moment, is a president of a railroad with which you are all familiar, due to the contact we have as safety officers with our co-worker, Mr. Rohweder. It will be my pleasure at this time to introduce Mr. H. Johnson, president of the Duluth and Iron Range Railroad.

MR. JOHNSON: Mr. Chairman, may it please you gentlemen, the few remarks that I have to make are entitled, "The Spirit of Safety," or "The Safety Spirit," whichever way you wish to put it. It is, in my opinion, one of the great underlying factors of accident prevention. While it is true that volumes might be written on this subject, the short time is too valuable to listen to such an extended discourse. I have only tried to touch on one or two salient points which to the best of my experience and my knowledge are very valuable in producing in the minds of the individual a state of affairs, a state of mind, which will be very helpful to him and to his associates in surrounding his work with a safety zone.

The Safety Spirit

By Horace Johnson, President, Duluth & Iron Range Railroad Company

The Safety Spirit now well implanted in the operation of the American Railroads was brought about by the realization on the part of the managements of the necessity of curtailing the frequency and severity of accidents to employees and to the public.

It was rather a startling realization to the managements of the railroads to find that after the order went forth "Let There Be Safety" it required more than an order. They realized that it was necessary to bring forth the mechanical and educational abilities of the management, supervisory officers and employees, looking for the solution of the problem of accidents on their properties.

The problem of safety on a railroad, as compared with that in an industrial establishment enclosed between four walls, varies in a great many ways. A railroad has a wide expanse of territory to cover, a great number of things that are impossible to foresee; the effect of climatic changes upon its operation and the action of the entire populace along its line.

The solution of the railroad safety problem has resolved itself, in my opinion, into several fundamental phases:

Fundamental Phases of the Problem

First—The manner of mechanically protecting machinery, cars, locomotives, docks and structures, is one that was easily solved, as it dealt with the clear-cut problem of engineering.

Second—The most complicated problem facing the managements of American Railroads today is the problem of human engineering. I like to refer to this problem as the bringing about in the minds of our supervisory officers and employees a state of what I term "safety consciousness." How can such a state of mind be developed?

We now have on our railroad under our educational work such items as a Safety Magazine, Safety Bulletins, Safety Lessons, Safety Slogans, Safety Schools, Safety Committees—all co-ordinated and working out the ideas and plans developed on our railroad in conjunction with such agencies as the American Museum of Safety, the Steam Railroad Section of the National Safety Council, and the Safety Section of the American Railway Association.

At this point I would like to express my full appreciation of the work of the Educational Section of the National Safety Council, in carrying on both directly and indirectly, through such organizations as our railroad, the work of teaching the youth of our country, from the kindergarten through the various stages of school life, the matter of protection of life and limb.

I believe that through such efforts we will eventually have in the railroad business, men who have had from their childhood the Spirit of Safety fully instilled in their mental make-up.

In studying the manner in which the Safety Spirit can be instilled into the mind of the railroad employee, it is well to remember the fact that it is a comparatively easy matter to sell the safety idea to the president, the superintendent, the chief engineer, and undoubtedly down the line to the supervisory officers, but the big problem is to sell this same idea, through the executive and supervisory officers, to the mass of employees in the rank and file, bearing in mind that these are the men who suffer the injuries. A willing cooperative state of mind brings about the ideal situation for the accident prevention program.

A great deal of importance is attached by most authorities and students to the foreman in charge and directing the energies of a unit of employees. In fact, by some thinkers and writers the bulk of the onus of securing accident prevention is attached to the foreman, without much regard to the material comprising his force.

The mental attitude of the foreman toward safety measures undoubtedly influences his effectiveness. The secretary of the Industrial Commission of Minnesota sums up his conclusions in these words:

"The particular subordinate upon whom the responsibility for effective safety first methods devolves is the foreman. His mental attitude toward safety measures determines the enthusiasm and skill with which he will work among his men to create for them and with them a sane, safe atmosphere, that most powerful weapon against accidents."

While granting that the management imbued with the safety spirit is an absolute necessity, and that it finally focuses on the foreman (having eliminated all of the things that can be eliminated mechanically), it brings us then face to face with the material with which the foreman has to work. That is, the men who are really doing things and are surrounded by danger in some form or another—danger that must exist in the established order of things.

In dealing with the mental causes of our accidents, there is a great difference of opinion as to whether carelessness is the cause of most accidents. Authorities disagree as to whether or not carelessness causes a large number of the preventable accident. No doubt a part of the seeming divergence of opinion arises from the difference in definition of terms. What one man calls carelessness the other regards as a psychological condition, due undoubtedly to unfortunate working, home or health conditions, or to a limited mental capacity.

To my mind the attitude of the worker at his daily task is largely dominated by psychological conditions and is determined to a large degree by the environment by which he is surrounded. I would refer you particularly to the fact that a clean, orderly shop is conducive to a satisfactory mental attitude. I would suggest to you that the man who is interested in activities of the company, such as baseball, basketball, bowling, swimming, and employees' association, usually is inclined to be satisfied with his lot and to work along with a keen sense of appreciation and a keen mind, ever watchful for the welfare of himself and others. The development of women's athletic activities as promoted by the Duluth & Iron Range Welfare Department creates another approach to the employee by surrounding him with a feeling of satisfaction that some real consideration is being given his wife and family. All this tends to promote a state of mental co-operation.

The Man With the Proper Mental Attitude

Along this same line, let me suggest to you that a man who is a good citizen, who is interested in the solution of the problems of the community in which he lives; the man who tries to raise his family under proper environment; the man who tries to keep up a good order of things about his home, is a man who has developed a proper mental attitude which is conducive to safety.

I am thoroughly in accord with the recommendations of the Medical Section of the American Railway Association, suggesting that railroads require a proper physical examination of all men in their service. A thorough study of these examinations, made by competent doctors, will indicate to a very large extent the physical and mental condition of the employee, and will necessitate careful consideration on the part of the management in placing employees in occupations where their health will permit them to work with safety.

The mind and body of a man is not always synchronized, thus causing unnecessary and improper movement which is the primary cause of accidents. The synchronization of mind and body resolves itself into the elimination of accidents through mental training and through the increase in efficiency by eliminating unnecessary movements.

The question of habits of employees when not on duty is a matter that is of vital importance in the accident records of our company. It is necessary to be temperate. By temperate I do not refer alone to the matter of being temperate in the use of those things that are prohibited by the Eighteenth Amendment but to being temperate

in all matters of life. I refer you to the matter of over-indulgence in sports; the over-indulgence in recreation of any kind, that brings about the lack of proper rest.

I would also call your attention to the fact that the spirit of safety goes beyond the property of the railroad because of the fact that a large number of our employees are killed and injured as citizens in various communities. Along with the training of our employees to a safety consciousness in connection with our operation we must go beyond the line of our railroad into the community and the home, thus bringing about a fuller realization of the true safety spirit.

There are several things in which an executive officer should assume a personal interest. First of these is the matter of investigating personal injuries.

Recently we had an accident on the Iron Range in which a man was injured by the return blow of a steam hammer without an apparent cause. The usual procedure, I presume, on most railroads is to accept the report of the investigation and let it go at that. In this case an expert from the company that built the machine was brought in from the works in Pennsylvania to the source of the accident and after a careful investigation determined that the operator had been operating this hammer in an erroneous manner for a period of four years. The hammer operator was not to blame, due to the fact that the entire Mechanical Department personnel did not understand the proper operation.

This is a typical case of what can be developed through a personal investigation by the executive office.

Comparison of the Rates

1923	1924	1925	1926			1926 vs. 1923
Cas.	Cas.	Cas.	Total	Man-hours	Cas.	Percent Red.
Rate	Rate	Rate	Casual's	(000)	Rate	or Inc.
10.93	6.75	5.99	18	4,065	4.43	59.47 Red.

You will note that the Duluth & Iron Range Railroad has contributed approximately 60 per cent towards the goal, and during the first eight months of 1927 has had a reduction of 66 $\frac{2}{3}$ per cent in the number of accidents over the same period of 1926, which will contribute a still greater percentage towards this goal.

In the year 1926 you will note that there were 18 casualties for 4,065,000 man hours worked, or one accident per 225,833 man hours, indicating theoretically that an individual could have worked on this basis on the Duluth & Iron Range Railroad for a period of 92.2 years without an accident. The Duluth & Iron Range Railroad Company has operated for more than thirty-nine months without a death to an employee or passenger; and without the loss of an arm, leg, hand, eye or foot. In addition the road has operated from 1853 to date without an accidental death to a passenger.

A summary of these thoughts embodying the responsibility of directing accident prevention work on the American Railroads would include:

- 1st. The necessity of seeing that the mechanical problem of safety is well cared for on your property.
- 2nd. An assurance that the executive department of your railroad fully develops its responsibility in furthering the work of the safety department.
- 3rd. Careful attention must be given to the injection of the Safety Spirit through the medium of educational facilities and through the realization that the development of the mentality of your railroad organization along safety lines will produce the results desired.
- 4th. A great deal of stress should be laid on the subject of safety education in the public and parochial schools throughout the country.
- 5th. A thorough system of physical examination should be inaugurated and utilized.
- 6th. All accidents and their causes must be fully investigated and remedied in so

far as practicable, not only by the department responsible, but by the executive department of the railroad.

7th. Full consideration should be given the welfare of your employees insofar as their recreational hours are concerned.

8th. It is my prediction that the Duluth & Iron Range Railroad will set a standard for all Class 1 railroads of the United States in accident prevention work for the year 1927 which will be accomplished by the safety spirit which has been instilled into our employees.

In conclusion I would like to extend my appreciation for the recognition that has been given in the past by the Steam Railroad Section of the National Safety Council to the superintendent of safety and welfare of our railroad, Mr. A. V. Rohweder, and to say to you that if at any time he or any member of our organization can be of service to you, they are at your call.

I wish to thank you for the privilege of attending your most interesting convention, and also for the opportunity of meeting with you to discuss the subject of saving human life and limb.

Earnest Study of the Paper Recommended

(Chairman White resumed the chair.)

CHAIRMAN WHITE: Mr. Johnson, I am sure every member of our Section appreciate having you with us today. As a further testimonial of our appreciation I am going to ask Mr. Larson of the Missouri Pacific to make a response.

C. F. LARSON (Missouri Pacific Railroad, St. Louis, Mo.): Before I respond to this splendid paper of Mr. Johnson's, may I take a few moments to explain to my good friend, Mr. Warfel, who has something to say about the discussion or response, that I think a long time ago this Section decided not to have discussions of papers, but merely a short response thereto, and to make it short. I also would like to say that I believe all of the railroad safety workers are in agreement with my good friend, Mr. Warfel, that his railroad has set a very high example for us to follow but we do not, I believe, agree that we have had to borrow the thunder of his general manager in the preparation of the paper by Mr. White of the Missouri Pacific Railroad.

Just a few comments on Mr. Johnson's paper, and I hope when the printed minutes are in your hands you will read them very carefully and use them.

He says, "In fact, by some thinkers and writers the bulk of the onus of securing accident prevention is attached to the foreman, without much regard to the material comprising his force."

Let us enlarge, just a moment, upon the foreman question. All of the employees on a railroad who are subject to error and injury are not under the supervision of a man who is called a foreman. Our train service employees are under the direction of trainmasters and road foremen of engines, and therefore the onus attaching to the foreman as referred to by Mr. Johnson also attaches to the trainmasters and road foremen of engines who have jurisdiction over train service employees.

We had depicted for us yesterday, by Mr. Cott, that wonderful playlet showing us the qualities of two kinds of trainmasters and two kinds of conductors who had charge of brakemen. I think the onus is attached to that other character depicted by Mr. Cott, the man who bullied his men into their duties, rather than that other trainmaster who showed so conclusively that he had interest in the welfare of his employees.

I would refer to another paragraph of Mr. Johnson's most instructive paper where he says: "I would refer you particularly to the fact that a clean, orderly shop is conclusive to a satisfactory mental attitude."

I have seen railroad shops and railroad terminals littered with everything that

was conducive to ugliness, and I know that the employees in such premises could not have a mental attitude that was susceptible to carefulness.

I have seen other kinds. I have seen railroad shops with their planted gardens of flowers, clean everywhere, whitewashed walls in their roundhouses, everything conducive to a mental attitude that would lead to safety.

Another paragraph: "A man who is a good citizen, who is interested in the solution of the problems of the community in which he lives, the man who tries to raise his family under proper environment, the man who tries to keep up a good order of things about his home, is a man who has developed a proper mental attitude which is conducive to safety."

My friends, there is a very great deal in that last paragraph about the environ-



ment of our employees, whether they are conducive to a bad thinking or a good thinking, when they go about their duties.

Mr. Johnson, we feel very much repaid for asking you to come here. It is peculiar that the chairman of the Program Committee should respond to your paper. I want to assure you that I did not select myself for that purpose because I feel unable to respond as I should to such a paper as you have prepared, but the other members of the committee thought that I should respond to your paper, and hence I am here before you.

We are very happy to have had you here, and we hope that as we meet from year to year you will again come among us.

CHAIRMAN WHITE: I believe we have in this room a gentleman whom I would like to have stand up for a moment, Mr. C. L. Close, Manager of Bureau of Safety and Welfare, United States Steel Corporation, New York.

MR. CLOSE: I appreciate very much the opportunity to observe the intense interest that is being displayed in safety work. I have been deeply interested in it for many years, and some of the statements made this morning indicate how essential

it is that we cultivate the individual. We may issue instructions galore, but from my experience it is absolutely necessary, if we hope to achieve the success that all are so desirous of achieving, that we devote much more time to the individual and I think, as Mr. Johnson stated, to recognize the suggestions made by those in the ranks. It is gratifying to them as it is to any of us I think, when we make a suggestion and see it given favorable consideration; we should not be unmindful of the fact that the man in the ranks gets the same thrill out of that, and if we can cultivate him and assure him of our interest, I think we will be able to attain the ends we are trying to attain.

CHAIRMAN WHITE: Before having a report of the Nominating Committee, I am going to ask Mr. Bailey to come forward, as he has something to tell us.

Mr. Bailey has worked very hard on the Committee of Train Service Accidents, and I am sure he is entitled to all the consideration we can give him.

C. T. BAILEY (O. S. L. Railroad Co., Salt Lake City): I should like to propose for your consideration, or rather suggest to this section, that consideration be given to the appointment of a committee to study non-train accidents. I was very forcibly impressed with the necessity of this when I took up the study of train service accidents, and in going over the statistical data furnished by the Interstate Commerce Commission.

I have found that out of the total number of casualties reported to the Interstate Commerce Commission, 72 per cent, the big majority, are non-train accidents, and the analyses of the causes of these accidents are lacking. I think a committee should be formed in this section to give serious study to non-train accidents particularly and make a report at the next convention.

If it meets with the approval of the chairman I make a motion to the effect that a committee of that kind be constituted.

FRED HARTENSTIEN (Lehigh Valley Railroad, Bethlehem, Pa.): It affords me considerable pleasure to second the motion just made by our friend, Mr. Bailey. I think such a committee is a real necessity to go out and make a study of non-train accidents, the same as Mr. Bailey and myself make of train accidents and service accidents. I believe there is a very large field there and I believe a lot of good can be accomplished by the appointment of such a committee. I hope we shall be able to select that committee before this meeting finally adjourns.

CHAIRMAN WHITE: I think this would be a very good addition to our committees. I am strongly in favor of it.

(The motion was carried.)

CHAIRMAN WHITE: I wish to appoint the following tellers:

Fred Mitchell, N. Y., N. H. & H.

Z. B. Claypool, Frisco.

W. R. Spettigue, L. A. & S. L.

I will now ask Mr. Hill to make the report of the Nominating Committee.

Report of the Nominating Committee

CHARLES E. HILL (New York Central Lines, New York, N. Y.): Your committee met some weeks ago and gave quite a little consideration to the personnel that they expected to submit for your consideration as officers for the ensuing year. In the recommendations we are about to make, it was the judgment of the entire committee that these men are being recommended to you by virtue of their records and their activities in safety work, not only in these gatherings but on their respective railroads. Therefore your committee begs leave to submit the following report:

As chairman, E. R. Cott, supervisor of safety, Hocking Valley Railway Com-

pany; vice-chairman, J. E. Long, superintendent of safety, Delaware & Hudson Railway Company; as secretary, C. F. Larson, superintendent of safety of the Missouri Pacific Railway Company.

We sincerely hope that these recommendations meet with your approval.

ROBERT SCOTT (Atlantic Coast Line, Wilmington, N. C.): I feel I voice the sentiment of this entire section when I say that the committee on nominations has done exceedingly well. Therefore, I move you that the nominations be closed.

(The motion was seconded and carried and a motion was regularly made, seconded and carried that the report of the Nominating Committee be adopted.)

ADJOURNMENT

Wednesday Luncheon, September 28, 1927

**ROBERT SCOTT, Toastmaster,
Director of Safety and Insurance, Atlantic Coast Line Railroad Company.
Wilmington, North Carolina.**

TOASTMASTER SCOTT: It pleases me very much to state to you that we had 400 tickets printed for this luncheon today and every one of them was sold. The largest attendance that the Steam Railroad Section has ever had at a luncheon was 239 last year.

I think that indicates in a most forcible way the interest that our Steam Railroad fellows are taking in this work. I think it goes a little further than that. It indicates that every lady and gentleman in this room is looking forward to receiving a real message at this luncheon. I am satisfied that no one will be disappointed.

Since the sessions opened last Monday morning, I have gained a great deal of information. Some of it will be most valuable to me in my later years. For instance, those of you who attended the session in this room Monday afternoon heard Dr. Haggard, that eminent surgeon, who has charge of surgery at the Vanderbilt University in Nashville, Tennessee, make the statement that cancer is no longer a thing for us to worry about. He told us that if nipped in time a cancer may be plucked out by the roots just like a corn. That, to my mind, was a very important statement.

A little later in the afternoon we heard Dr. Cattell make the statement that although he is three score and ten and then some, he still experiences a thrill at the rustle of calico.

We listened this morning to Mr. Fritch when he told us some of the things that he has observed in connection with safety on the Rock Island, and perhaps most of you observed that he dealt with the practical side of safety. That was one of the most reassuring things to me, that Mr. Fritch believes in practical safety. I want to assure our guests—and by the way you remember that in past years we have only our own family at the speakers' table. Today it is our great pleasure to give the places at this table to presidents, vice-presidents and general managers of our railroads. I am sure that meets with the hearty approval of everyone here.

We heard Mr. White tell us about the "think" unit on our railroads. You know we have so much to do with track, locomotives, cars, machines, and things of that sort, and it does seem to me that the "think" unit is the part that is most important of all. I believe that what Mr. White told us is going to be an encouragement to all of us to go back and devote more time to the "think" unit of our railroads.

Mr. Johnson stressed the importance of appealing to the human side of our men, and going out into the communities and spreading safety. That is something that some of our railroads are a little short on.

I merely touch upon those things because these gentlemen whose names I have mentioned are our guests at the table, and it is a great pleasure for me to bear my testimony and my approval of these things they told us about.

Now we come to the most important part of our luncheon. I am going to experience a real thrill in introducing to you, or introducing you to, a president of a real railroad. It is the first time that I have ever had a privilege of this sort, and I assure you that I am indebted to your Program Committee for giving me this wonderful privilege.

Before I introduce the speaker, I want to tell a story that I heard many years ago about a fellow who was in charge of the side show of a big circus. He found himself up against it in this way. The old fellow with the gray hair and the long whiskers

who was reputed to be about 100 years old, passed away. He set out to find another one. He heard about an old man down in the mountainous part of North Carolina, and he heard that this old gentleman was 104 years old. He traveled by train, by automobile, by horse and buggy, by horseback, and finally on foot. He came to a little two-story house on the side of the hill. He saw an old gentleman sitting out there about five o'clock in the afternoon, basking in the sunshine. He went up to him and said, "Are you Mr. So-and-so?"

"Yes, that's my name?"

"How old are you?"

"I am 104 years old."

"Well, how would you like to join my side show?"

"What do I do?"

"You get \$50 a week and all expenses just to sit on a little platform and let the boys and girls come up and pay ten cents to see you. You let them stroke your whiskers, and that is all."

"I'd like a job like that, but I am not sure that I can accept it."

"Why?" What is interfering?"

"I will have to ask dad first."

"Ask dad? Where is your dad?"

"Dad, oh, he is upstairs putting Grandpa to bed."

We all remember the time when we looked upon railroad presidents as men having gray hair and perhaps a few whiskers, the wise men of the country, but somehow or other the gray hairs have disappeared, and you see young, vigorous fellows managing our big railroads. Today, gentlemen, it is my pleasure to introduce to you a man of that type, a young, vigorous man.

I am going to introduce to you a man who started as a rodman on the Illinois Central Railroad in 1896. In 1898 he became roadmaster of that same road. In 1909 he was promoted to the position of assistant chief engineer. In 1910 he became division superintendent in the transportation department. In 1915 he was made general superintendent, in 1919 assistant general manager, and in 1920 vice-president and general manager, and in 1920 vice-president and general manager of the Central of Georgia Railway; and in 1924 president of that railroad and of the Ocean Steamship Company.

In 1926 he was elected president of the Illinois Central Railroad, one of the finest railroads in the world.

I have great pleasure, ladies and gentlemen, in introducing to you Mr. Larry A. Downs.

Address

L. A. Downs, President, Illinois Central System, Chicago

It is a privilege and an inspiration to address men like you who are making our world a better place in which to live and work. This congress of safety workers gives testimony of the human principles which permeate modern business. It proves that business today, for all its emphasis upon material values, is soundly concerned with the protection and conservation of human life.

I place first emphasis upon the human value of safety work, but I have full regard also for its material value. We railway men have reason to know how payments for accidents and personal injuries cut into the revenues of the railroads. Good safety work tends to reduce this drain upon railway resources. Not only that, however; it also helps to safeguard the utility and productiveness of one of the most valuable assets of the railroads—their trained personnel.

Every railway employee represents an investment of time and money spent

in training him for his work. That investment is lost when the worker is killed; it is idle and unproductive when he is incapacitated by injury, and it has a greatly depreciated value when he returns to work handicapped by injury. Loss of productiveness from this investment may seem a small thing in one individual case out of a large organization, but in the aggregate the loss may be large. The railroad of which I am president, for example, has an annual payroll of around 100 million dollars. That is equivalent to 5 per cent on two billion dollars. It might be said, therefore, that the employees of our railroad represent an investment of two billion dollars. That is almost exactly three times the railroad's property investment. However inadequate this comparison may be, it at least illustrates the point that safety work helps to protect not only lives but also the vast investment that is represented by personnel.

Moreover, safety work contributes toward the fulfillment of an obligation, both legal and moral, which rests upon the railroads. The Transportation Act specifies that the railroads must be operated efficiently and economically, and it is mandatory upon all members of railway organizations to carry out their share of this requirement. Injuries and loss of life in accidents are inefficiency and waste of the most flagrant kind.

Appeal to the Instinct of Self Preservation

It seems to me that the hope of success for safety work among railway employees lies in appealing to the instinct of self-preservation that is inherent in all mankind. The very nature of the railway business is such that the ultimate in safety cannot be achieved by the installation of safety appliances. Neither can employees be warned specifically against all the possible hazards of accident they may encounter. This is true because the contingencies which may present themselves in the course of a day's work on a railroad are almost unlimited. Employees are shown the safe methods of performing their customary duties and are warned against expected unsafe practices, but that still leaves a large field wherein safety is a matter of the individual judgment and initiative of the worker. Covering that field satisfactorily is unquestionably one of the chief problems of our work.

The only practical solution of that problem is to train employees in the habit of making certain of their own safety and of the safety of their fellow workers under all conditions. Safe practices must be made instinctive. When this is accomplished, every member of the railway organization will function as a safety appliance of the most efficient type. The human intelligence can adapt itself to circumstances better than any mechanical appliance that could possibly be devised. Special attention, therefore, must be devoted to the safety training of new employees. Train new employees properly, and it will be only a matter of time until our organizations will consist entirely of men who are habitually safe workers.

When workers automatically and unfailingly observe safety precautions in everything they do, the goal of safety work, which is the prevention of avoidable accidents, will be attained so far as they are concerned. Getting the newcomer to railway service properly trained in safety is the surest and most direct road to that goal. We must make every effort to reach the new employee with our program of training almost as soon as he enters the service. At this stage of his development into a railway worker we have a fertile field in which to work. His mind is more receptive to new ideas, and his responsiveness to suggestions and instructions is greater at this time than at any other. By thoroughly saturating his mind with the idea of safety, we can make him a permanently safe worker, preventing at the outset the formation of unsafe

habits. But if the instruction is delayed, we are likely to find that we have lost our best opportunity and are confronted with a problem of correction instead of a problem of instruction. In that case our problem is complicated, because, as we all know, bad habits once established are hard to overcome.

At the same time, however, it is essential to press safety training vigorously among the older employees, as well. The power of their example to new employees is highly important. Beginners in railway service customarily follow for some time the methods they see used by their co-workers, especially by the veterans. If the older employees are habitually careful, the younger man in nearly all cases will form and keep the safety habit. All that safety workers can say and do to impress new men with the importance of safe methods is likely to be wasted effort if the new men see older workmen, constantly taking needless risks and, as the saying goes, "getting by with it."

I believe most railway employees are sensible of the duty to observe safety precautions which they owe to themselves, to their families, to their fellow employees, and to the public. They may occasionally fall short of 100 per cent compliance with safety standards, but when faults are called to their attention they will honestly try to overcome them in the future. On the other hand, every organization probably contains a few men who do not respond to safety appeals. Either they are temperamentally unable to comprehend the importance of safeguarding themselves and others, or they are careless, reckless and indifferent and will not take the time to do things safely. The influence and example of such men are so harmful that I believe drastic measures are thoroughly justified in their cases.

Violation of Safety Instructions a Serious Matter

I believe it would aid the advancement of safety work as a whole if the administration of discipline were more frequently invoked for violations of safety instructions. Disciplinary penalties for infractions of safety rules are now assessed chiefly in cases where such infractions result in accidents. It seems to me this has the effect of punishing the men concerned for the consequences of their faults instead of for the faults themselves.

Supervising officers should be always on the alert to eliminate any compromise with rules and instructions, and especially with those pertaining to safety. Questionable methods may operate satisfactorily while all conditions are favorable, but that is no reason for tolerating them until they demonstrate their danger by causing accidents. Disciplinary penalties imposed for such practices as soon as they are observed will act as a sharp reminder that they are unsafe and forbidden and ordinarily will serve to put a complete stop to them before any harm is done. Surely both justice and expediency are better served by administering discipline in this manner than by delaying its use until an accident calling for much heavier penalties has resulted.

The same principle which governs safety work among railway employees also holds good to a great extent with respect to safety work directed toward the prevention of accidents to the public incident to railway operation; that is, our best results probably will be obtained by reaching the younger generation with our program of safety training. This does not mean that I lack appreciation for the "Cross Crossings Cautiously" campaigns and other efforts primarily intended to reach adults. On the contrary, I am thoroughly impressed with the value of such work, and I heartily favor continuing to do as much of it as we possibly can. But I place even greater value upon the safety work that is being done in the schools. Here we are reaching in their most impressionable years the boys and girls who will be in a few years the men

and women whose cooperation we need in our safety work. Among them, too, are many future employees of the railroads. By good safety work in the schools we can with relatively little effort and expenditure imbue the minds of thousands of our future citizens with an enduring appreciation of the importance of safeguarding themselves and others at all times.

I look for this work to yield increasingly valuable returns each year. The principal benefit at first is likely to be a reduction in the number of accidents to youthful trespassers upon railway property. As time goes on, I believe, we shall see its beneficial effects not only upon those who enter railway employment but also upon those who drive automobiles, ride trains and otherwise enter into the safety problems of the railroads. Then, too, it is likely that those who have had this safety training in their youth and have seen the value of such training proved in later years will in turn hand it on to their children by both precept and example, thus continuing the chain of benefits indefinitely.

This is looking quite a long way into the future, but the long-run viewpoint is essential in safety work. The best safety program is one which coordinates the day-by-day activities of the present with comprehensive plans for the future safety work not only must be continuous in order to yield results; it also must be progressive in its scope.

Maintaining Interest in Accident Prevention

In addition to enlarging the scope of safety programs, I believe we should see that the methods used in such programs are changed from time to time. People quickly become inured to whatever is offered unchanged to their attention, and they do not long respond to any one stimulus. Continued use of the same material and reiteration of the same statements soon cause loss of attention and, consequently, of effectiveness. That is true even of what at the outset are exceptionally striking posters and most forceful slogans. "Safety First," for example, was a splendid, effective slogan when it was first produced, but constant use has worn it almost threadbare.

Novelty, on the other hand, retains attention and makes new impressions, and these are essential factors in safety work. The value of novelty should be utilized as much as possible in safety work by introducing from time to time either innovations in methods and material or some unique variation of those previously used. The important object is to present something that is new or that seems to be new. It may require considerable thought and some additional expense to have novelty in this work, but I believe the results are more than worth the cost.

Planning safety programs and methods, and supplying the driving force that sets them in operation are only minor details of the weighty responsibility that rests upon safety executives like yourselves. Your most important task, because upon it chiefly depends the success of your work, is far more difficult than any of these. It is the task of imparting to others a share of your own interest and enthusiasm in the advancement of safety work and inspiring them to cooperate heartily in furthering it.

The railroads have won for themselves an enviable reputation for efficiency. On-time trains, comfortable travel and prompt delivery of shipments in good condition are now accepted by the public as a matter of course. Railway employees also hold a high place in public esteem. They are generally regarded as examples of courtesy, sobriety and efficiency. While upholding our prestige in these matters, let us strive to win for the railroads and their employees an equally good reputation for safety. There is a prize well worth our ablest efforts.

Already it is nearly within our grasp, thanks to the good work you men have done.

In the light of your past accomplishments, I look forward with confidence to the time when safety will rank with efficiency among the outstanding attributes of railway service. I know you can be counted upon in the future, as in the past, to do your duty courageously and intelligently, and I can assure you that you will have at all times the wholehearted support and cooperation of every railway executive in your endeavors toward that end.

TOASTMASTER SCOTT: A curate was once leaving his parish and was the recipient of many gifts, from snippers to surplices. One old lady, wishing to be original, sent the retiring curate a bottle of choice cherries preserved in rare old brandy. The curate, acknowledging this gift, wrote this dear old lady something like this: "I appreciate the choice cherries, but even more so the spirit in which they are sent."

Mr. Downs, on behalf on this Section, I thank you for your wonderful message. It will be an inspiration to us, and I will now call upon Mr. Thomas H. Carrow of the Pennsylvania Railroad to make a brief response to your address.

The Railroads Sincerely Behind the Safety Movement

MR. CARROW: Mr. Downs, Officers and Fellow Workers: If I had about a spoonful of that brandy I would be able to deliver a speech that would eclipse anything that I have done, and that is going some. I am up against a very serious proposition, and that is the difficulty of selecting from a multiplicity of impressions what I ought to say within the few minutes I have at my disposal.

I do wish, however, to make a few observations. The first thing I want to say, Mr. Downs, is that I know the hearts and the minds of these men here; and if I could draw a picture of the inspiration and the encouragement that you have given them, I am sure you would feel more than justified in the effort you have put forth.

Some great philosopher has said that the history of the world is written in the biography of its great men. I know that to be a fact from reading many biographies.

At the present time I am in the midst of one on the great Napoleon Bonaparte; and Europe for 20 years was a simple description of the activities of that man's monumental brain. That observation applies to the railroads of the United States. They did not grow out of a mass of money, they were not projected into the wilderness because somebody wanted to make money, but because such men as Harriman and Hill and all the great leaders that have gone before, had the vision to see and the courage to do; and the reason today the railroads are what they are is because of the Atterburys and the Downs and the Markhams and the Crowells and all the rest of the men at the head of these railroads who are leading them on to the greatest success that we have ever known. And the end is not yet. Never in the history of the human race has machinery been gathered together so efficiently, never have men been taught so completely to do the job that they have to do as on the railroads today. Trains are on time, and we are having comparatively few accidents.

When I was asked a little while ago to respond to this eloquent speech of Mr. Downs, a little poem that I learned in childhood came to my mind:

When I was a beggarly boy and lived in a cellar damp;
I had not a friend nor a toy, but I had Aladdin's lamp;
And when I could not sleep for cold, I had heat enough in my brain,
And builded with roofs of gold my beautiful home in Spain.

When you think of the genius on the railroad, when you think of the undeveloped capacity of railroad men in the United States, you can look forward to a consummation which is not only devoutly to be wished but one that will be realized, not only in efficiency but in safety.

I could not help thinking of a quotation that has been a great inspiration to me, as

our distinguished guest unraveled his theme. "The world does not need so much to be taught as it does to be reminded," and if that philosophy applies in any branch of the railroad business it applies in safety. How often do we stray from the paths of rectitude because we are not reminded of the necessity of going the right way; and how often do our men get in the traps and the dangers around the railroad because we do not provide the ways and the means to warn them.

Mr. Downs, it is difficult for me to close. I want to draw one inference, I want to make one impression upon the minds of our fellows here and then I shall have finished; and that is, if there is yet lingering in the cerebellum of any individual here the shadow of a doubt that the railroad executives of this country are not in sympathy with and anxious to promote safety on the American railroads, let him forever hold his peace. So far as I am concerned, such failure as we have made thus far is attributable to us, and not the officers, as some few people have indicated from time to time. It is inconceivable that any man in charge of the safety work on the Illinois Central Railroad, for example, could go with an analysis to Mr. Downs and ask him to put a proposition over without his acceding to it, and the same applies also on the Wabash. The only point that I want to make is to search our own heart; if we are not getting the results that we ought, it is because we have failed to present our case in an intelligent manner.

The Positive Side of Life

I am through, but I want to pay just one moment's tribute to my good friend, Mr. Clarence Howard, and in doing so I will convey a lesson to you and I will emphasize the fundamental principles that our distinguished guest has elucidated.

This is a little poem on the positive side of life, Mr. Howard, and I had not thought of reading it until I looked into your smiling face, and then I heard what the gentleman said and I know it is appropriate and I know you will like it.

"Keep on looking for the bright, bright skies,
Keep on hoping that the sun will rise,
Keep on singing when the whole world sighs,
And you will get there in the morning.

"Keep on sowing when you miss the crops,
Keep on dancing when the fiddle stops,
Keep on faithful till the curtain drops,
And you will get there in the morning.

"Keep on trusting in the cause of right,
Keep on looking to the dawn of light,
Keep on fighting for safety till you've won the fight,
And you will get there in the morning."

TOASTMASTER SCOTT: I don't think this luncheon would be altogether complete without paying just one word of tribute to our worthy chairman, Mr. J. D. White. Mr. White joined this Section as late as the year 1924, and in the brief period of two years became its leader, the largest section in the National Safety Council. Mr. White is a man whom we all respect, he is a man whom we all love. We respect him because of his ability and his devotion to the cause, we love him because he is Jim White.

MR. WHITE: Mr. Toastmaster, Mr. Downs, Ladies and Gentlemen: I just want to say to the members of this Section and to the members of the Safety Section of the American Railway Association, that they all know me well enough to know that

in all our meetings in different parts of the country I have been proud of the fact that I represented the Illinois Central System. When I became chairman of this Section, the first thought I had in mind was to secure a speaker from our railroad at this luncheon, and I had no trouble in getting the President of the Illinois Central System to join in our program here today. I want to tell you, Mr. Downs, that it is a great pleasure to me and my ambition has been realized. Not only that great pleasure has come to me, but I have also bestowed upon my old friend, Bob Scott, the greatest thrill he has ever had in introducing a speaker at our luncheons, by giving him the privilege of introducing a real railroad president from a real railroad.

TOASTMASTER SCOTT: The time has come for this luncheon to close. If you will kindly arise, offering a vote of thanks to Mr. Downs and Mr. White, the luncheon will be over.

(A rising vote of appreciation was extended to Mr. Downs and Mr. White.)

ADJOURNMENT

Wednesday Afternoon, September 28, 1927

E. R. COTT, Chairman
Supervisor of Safety, Hocking Valley Railway Company
Columbus, Ohio.

The meeting convened at two-thirty o'clock, the chairman, Mr. E. R. Cott, supervisor of safety, Hocking Valley Railway Company, Columbus, Ohio, presiding.

CHAIRMAN COTT: Without any preliminaries, I am going to introduce to you a man who is a factor and an important one in the accident program. There are two or three things involved in the successful completion of any program. It reminds me somewhat of the definition that I heard once of the word "pep", an analysis of the three letters that composed the word. The speaker said that the first "p" stood for purpose, the letter "e" in that word for energy, and the other letter "p" for perspiration. Those are three factors in carrying out any program, but before you can have any program you must have knowledge, you must have some basis for your program. It is this gentleman and his organization that furnish the basis upon which we planned the program. I am speaking of Mr. M. O. Lorenz, Director of the Bureau of Statistics of the Interstate Commerce Commission at Washington.

Statistical Work as it Relates to Safety on Steam Railroads

M. O. Lorenz, Director, Bureau of Statistics, Interstate Commerce Commission,
Washington, D. C.

Recently at a safety conference, I heard a gentleman ask whether statistics had ever saved a life; and he suggested that the reduction in accident rates has resulted from the efforts of safety engineers and not from statistics. I submit that this view shows a misconception of the purpose of statistics in relation to safety work. Obviously, statistics do not directly save lives. The most that can be claimed for them is that they are of assistance to those who are engaged in the work of accident prevention. If they are, in fact, of so material use in this way, let us eliminate the expense of compiling them. Although you who are gathered here are in a better position than I to give an authoritative answer to the question whether you need statistics in your work, I will venture to give some of the reasons why I think that they should be of help to you.

I am reminded in this connection of the native official of an oriental city who was asked by the government to fill out a blank form which contained, among others, a question as to the number of deaths in his city during the past year. He replied, "In my city it is the will of Allah that all must die: some die old and some young; it can do us no good to concern ourselves about the number that die each year."

One of the reasons for concerning ourselves about the number of persons that die each year in various classes of railway accidents is that effort may be concentrated on the types of accidents that occasion especially large numbers of deaths. One may discover from casual reading of the newspapers that there are frequent deaths at grade crossings; but it is only after statistics have been compiled that one can make the general statement that of the 7,090 persons killed in connection with the operation of steam railways in

1926, 2,388, or 33.7 per cent, were nontrespassers at grade crossings and 2,623, or 37.0 per cent, were classified as trespassers on the right of way; so that, taking these two groups together we may say that 70.67 per cent of the railroad fatalities occur because people, other than passengers or employees on duty, are on your right of way at the wrong time. Such facts show that for the most part the reduction of the number of accidental deaths in railroad operation is one that requires the cooperation of the public and is not merely a question of care in operating the railways.

The 2,623 trespassers killed in 1926 included 196 children under 14 years of age and 255 young persons from 14 to 21 years. The majority of the trespassers killed are not hoboes. Surely, equipped with such facts, you can make a stronger appeal to the public to cooperate in preventing such accidents, than if you simply read in the newspapers here and there about persons struck by trains.

It is not my province to tell you how to prevent the many accidents to automobilists and trespassers. I realize that this is but one phase of a broader public accident problem, since total motor car fatalities in the United States are probably ten times as great as the fatalities in motor car grade crossing accidents, and fatal accidents from all causes in the United States are about five times as great as those due to motor cars.

Full Understanding of the Public Necessary

Doubtless much more can be done than has been done in the way of education and warning of the persons who have occasion to go across or along your tracks, and doubtless, if the public saw the whole railroad problem in its proper light, it would be willing to contribute more than has been the case in the past toward the expense of extensive and effective crossing elimination. We, as people, have the capacity to produce more food, clothes and other necessities of life than we need and are spending untold billions of dollars a year for luxuries. Such a people can afford to make its highways as safe as engineers think they should be made. The problem is to cause the money to flow in the right direction. This is a State and local problem more than a Federal one. But if the recapture of excess earnings under Section 15a of the Transportation Act should ever yield large sums, it might be well to distribute the money to the railways for crossing protection.

There were, at the close of 1926, 27,847 protected and 206,512 unprotected highway grade crossings with steam railroads. It seems hopeless to make them all fool proof, but doubtless there are thousands of dangerous crossings which would be eliminated or more adequately protected next year if the funds were available. Here is a magnificent enterprise which requires the co-operation of the railroads, the newspapers, the school teacher, the legislator, the inventor, and the rest of the public. When we consider that in 1926 over 1,000 accidents, involving 225 deaths and 1,506 injuries, occurred because automobiles were run into the side of a train, we can appreciate the fact that educating drivers to be careful is one of the most important features of the accident problem.

The first use, then, of the accident statistics is to point out the most important groups of accidents. The statistics should be of use, in the second place, in showing something about the causes of the accidents within any one group. Thus, to take one group at random, the statistics show that in 1926 over a thousand casualties to employees occurred from operating switches; and the analysis of causes shows that in about a third of the cases the switch lever or ball fell or caught on the foot or other part of the operator's body. This would indicate the need of a special campaign on how to operate switch levers,

or some invention to make them safer. In fact, we undertook to publish statistics regarding causes in response to a demand from those in railroad safety work who wish to know just what part of each operation is especially hazardous.

The third way in which I regard accident statistics as distinctly useful is to afford a test of how successful the safety engineer has been. When you work hard to reduce the number of accidents, it will naturally help to keep up your interest and enthusiasm and to get more support for your work, if you can point to some results of your efforts. In this respect the statistics have a remarkable story to tell. Twenty years ago steam railroad operation involved about 10,000 fatal accidents annually. In recent years, notwithstanding an increase in mileage and a great increase in the volume of business, the annual fatal railway accidents have been reduced to about 7,000, a saving of 3,000 lives annually as compared with the conditions 20 years ago. This improvement, too, has been mostly since 1917, that is, during the period when safety work has been emphasized.

This fact should encourage you to renewed efforts to make a still further reduction. The decline in the number of accidental deaths above noted was shared by all three classes, passengers, employees and other persons, but not equally. Taking the three-year period ended June 30, 1907, as a base for comparison, the number of killed was reduced nearly 70 per cent for passengers, nearly 58 per cent for employees, and about 16 per cent for other persons. That the class, "other persons," shows so little improvement is to be explained by the growth in automobile accidents. They nearly neutralize the remarkable progress made in reducing the trespasser fatalities, which are about half as many now as they were 20 years ago. Here, also, the gain is most apparent after 1917. The Railroad Administration seems to have given a great impetus to safety work which the resumed private control has continued.

A Fifty per cent Reduction in Twenty Years

Turning to the record of injuries, we note that the number of railway passengers injured annually is now about one-half of the number reported 20 years ago, but for employees and other persons the total number of injuries reported has increased. Per 1,000 employed, the number of employee injuries for all classes is greater now than 20 years ago, although for trainmen the accident rate has declined. It is in reducing the nontrain injuries, or those resulting from the use of tools and machinery, from falling, and from handling heavy objects, that you are doubtless expected to make a most striking advance in the next few years.

Yet a fourth reason exists why statistics may help to save some lives. There is nothing like competition to stimulate effort. These statistics are being used in comparisons of the records of various steam railways, one with another. Injustice may sometimes be done in the use of the statistics in this way if the reports are incomplete for one company and complete for another. We have found, for example, that some wonderful records in the number of train accidents per million locomotive miles were the result of not including the cost of clearing wrecks in such calculations where this item would have brought the total to the \$150 of expense which makes a train accident reportable. We hope by close study to make the statistics for various roads more nearly comparable.

Thus, in four ways I think accident statistics may be of help: (1) in showing the most serious classes of accidents; (2) the throwing of light on the

causes of accidents; (3) in showing the progress resulting from safety efforts and thereby justifying renewed effort; and (4) in stimulating effort by competitive comparisons.

CHAIRMAN COTT: There are not many men who have the peculiar fitness to take so-called dry figures and analyze them, and from those figures convey a picture to those who have not that ability. Still there are very few people in the country who can enthuse over statistics. There are not very many shoutin' Methodists among the so-called statisticians. I would not attempt to respond to Mr. Lorenz' remarks only as acting chairman of the afternoon, to thank him for his presence and his message. I shall, however, have the privilege of asking a certain gentleman to come to the platform, I almost said introduce him—that, I am sure, is unnecessary—a man who is able to take statistics, and not only likes them but eats them. Mr. Carrow, will you please respond?

Mr. Carrow's Response to Mr. Lorenz's Address

T. H. CARROW: Gentlemen, it may not seem credible, but for some unaccountable reason circumstances have combined to put me in the limelight here more than I had anticipated. I suggested, as the boys will tell you, when I was assigned to discuss Mr. Lorenz's paper, that it might be inappropriate because I was going to make a report as chairman of the Committee on Statistics. But Mr. Larson replied somewhat along the line that Mr. Cott just suggested, something about my appetite for figures, and that is why I am here.

"God moves in a mysterious way his wonders to perform. He plants the footsteps on the sea and rides upon the storm."

This meeting is one of the finest illustrations of the development of a situation which you do not anticipate. I rather indicated something of that in my report yesterday but I could not do so to the extent I should have liked.

I can see very clearly before me the fruition of many, many of the dreams and aspirations that I have had for 10 or 12 years, and this avidity that I have for eating statistics alive and whole is bearing fruit. I don't think, for example, that Bailey would mind my saying that one of the reasons he put that chart up there was because he arranged to get a chart for me somewhat like that in Salt Lake City, and because perhaps it took the American Railway Association about 90 days to pay the bill.

Other things are developing to indicate what we may expect from statistics, but the combination of circumstances, and the element in this combination that impresses me most, is that my good friend, Mr. Lorenz, should be here. Mr. Lorenz succeeded a gentleman by the name of Meyers in the Interstate Commerce Commission, and I had very pleasant relations with him before Mr. Lorenz was appointed. I don't know just what the year was, I didn't have time to check it up, but for a number of years Mr. Lorenz has been in charge of the statistical section. I want at this time sincerely to express my thanks publicly for the many, many courtesies he and his organization have shown to me, and in showing them to me he has shown them to all the railroad men of the country.

You perhaps never knew that I have had a force of men in Washington, on several occasions as long as a month at a time, developing information for special reasons, and in every instance Dr. Lorenz and his amiable staff have rendered full and complete assistance. The latest illustration of their cooperation is a statement that I should have liked to bring here; but I couldn't because it wasn't received in time to summarize it. They have prepared a set of detailed causes of train accidents and train service accidents by individual railroads; and I have no hesitancy in predicting that when the railroads of the country, like the B. & O., the Santa Fe, the Pennsylvania, and the New York Central, see the detailed information opposite each railroad compared with the other railroads with respect to train accidents and also train service accidents, there will be a development of specific interest in certain quarters

where perhaps it isn't developed to the extent it may be. I mean, with respect to specific details, not with respect to the whole proposition of safety.

I went down there to Washington a good many years ago as a sub-committee for the officers' committee of the A. R. A. to formulate this statistical information. I will say to their credit that these causes and the general classification conform to the recommendations that were made by the railroad people. I expect to get still further information from them.

As I grow older, I find out that a great deal of information is developed which is never utilized. I have no doubt in the world that many like my good friend, Isaiah Hale, have spent hours preparing safety bulletins on the railroad trains (when he had a spare hour or so) that he never brought to a conclusion; that Charlie Hill, for example, gathered information about highway crossing accidents that he did not for the moment tabulate and utilize; and that other members of our section have ascertained many important facts that they didn't put in the way of action.

This statistical information prepared by the Interstate Commerce Commission is what I might call, off the bat, pseudo-science. It reduces the occurrence of accidents to a science from one standpoint, namely the science of specific statement, and they say science is anything that is tabulated in systematic manner.

Massed Facts Are Impressive

One of the reasons we have to have statistics is that the human mind is not impressed by isolated cases. You might get a thrill from reading a report on one of the railroads of an accident in which ten people were killed at a highway crossing, but it would soon disappear. There would be nothing in the thing that would indicate to you that you ought to take precautionary measures. But it might appear differently if you had tabulated information showing that in the last ten years there had been 100 cases of trucks colliding with trains, and derailments and collisions that resulted in a great many injuries to passengers. For example, I recall one accident on one railroad where 25 passengers were injured. That would impress you. Then if you have the actuarial mind (a statistician is the man who gets such facts together and an actuary is the man who reads into the figures their proper significance), if you get the figures and have the vision and imagination of the actuary, as Dr. Lorenz has, then the next step is the action that is suggested by the figures. No one with any imagination at all can read these figures and study them long enough to understand their various ramifications without getting some of that pep that we fellows who are statisticians get.

I was much encouraged by the knowledge and facility with which Bailey spoke about statistics. If you think that Bailey did that on a summer evening when he had a spare hour you are mistaken. It took him, I will venture to say, what would be equivalent to a solid week's time to prepare that statement and figure it out and read into it its various significances.

To get down to a practical basis of this discussion and to indicate to Mr. Lorenz what practical use we have made of it, I can say, Mr. Lorenz, that the goal that we established in Salt Lake City in 1924, a 35 per cent reduction in accidents by the end of 1930, was predicated on the most careful analysis and calculation of the statistics that appeared in your several bulletins. If it had not been for those bulletins which you put out from time to time, the 35 per cent goal never would have been established; and it would seem to me that what has been accomplished under the impetus that is given the safety movement through that idea would justify all the effort that has ever been put on accident bulletins.

Then after we established the goal we would have been in a dilemma, a very serious dilemma, if we had not had the information to suggest a program of activities. So the following year we went again to the bulletin, we read all about getting on and, of course, coupling cars, operating switches, working around the

tracks, in the shops, and so forth; and we formulated a program of activities for 12 consecutive months; and under the leadership of our good friend Bentley, who is a student of statistics, we have had every month since 1924 one of the finest programs of safety activity illustrated that any business in the United States has had.

This morning in the wee small hours I thought to myself: if Thomas Edison had fallen into the safety business, instead of having four hours' sleep in twenty-four he wouldn't have had one, because I am growing more convinced that of all the various branches of human activity, there is nothing that will challenge the constructive imagination like safety effort. I don't believe any of you boys who are heartily interested in accident prevention on your several railroads have a single hour in your life that some suggestion, or suggestion of a suggestion, doesn't come to your mind. If you could pause for a moment and close your eyes and get the impressions that you have got since you came to this place, it would all resolve itself into embryonic activities that you have already started on your lines. As I lay in bed this morning thinking about this discussion, I thought of the unlimited possibilities of this work of ours, and I am telling you, friends, that if there is anything in my philosophy, you have the world beat; because there is nothing under the blue canopy of heaven that can afford more interest to you, can satisfy and tickle your mind and vanity more than what you can do for safety.

A New Type of Accident Prevention Code

The reason I made that suggestion was because of the latest advantage that I hope to derive from safety. I spoke of scientific information. We haven't anything that is worthy of the name of science so far as rules and regulations and instructions are concerned along accident prevention lines.

How are we going to get it? By continuous, consistent, systematic study of accident statistics. As a beginning in that direction, I have to offer for your consideration a tentative set of safety rules which I shall not even present to the reporter to go into the minutes, but shall describe them, rather, as to how I think they will ultimately be worked.

Most safety rules that I have ever seen might as well, like most literature that is on the market, be thrown into the waste basket. I venture to say that on many of the railroads of the United States 50 per cent of the employees could not locate their safety rule book if you would ask them to, and then so far as the supervisory forces are concerned, I would wager every cent that I have, including the mortgage on my house, that there is not one of them that could pass an examination on the safety rules; and the simple reason is that they are not scientifically prepared.

Here is what I propose? We do not want any don'ts and we do not want any musts. I think it resolves itself into prohibited and required. A thing is prohibited that ought not to be done, and a thing is required that ought to be done. If you examine all the statistics that Mr. Lorenz has spoken about, you will find out that 50 to 60 per cent of the accidents are attributable to things that people ought to do but do not do. You can't say "must," so we must make it a requirement. I will illustrate what I have in mind.

The first thing we will do is to classify the rules under the character of the work performed, like coupling and uncoupling cars. Let us start off with that.

"Prohibited: Going between or in front of moving cars to couple or uncouple or to connect or disconnect hose." And everyone of them starts with prohibited. There are no dittos.

"Prohibited: Using foot or hand to adjust drawbar, knuckle or lockpin while cars or locomotives are in motion or coming together."

"Prohibited: Riding on leading footboards of engines or end sills of cars when cars are coming together."

Friends, please understand that I don't know how these rules ought to be stated,

I don't know exactly what ought to be covered; I can't talk about them like Bailey can; but men like Bailey and Phillips who know all about the practical thing can put the finishing touches on them. I am merely giving the idea.

The other side of those rules is the requirement side, and this is where you will find the innovation: "Required: Look in both directions to see whether engines or cars are approaching before going between cars."

"Required: Watch out to avoid slipping, tripping, falling or turning ankle on coal, boards, stones, rubbish, tires, frog rails, switches or hose."

"Required: Watch for unexpected movement of cars or locomotives due to slack running out, grade, misunderstanding or not observing signals given."

"Required: Use lift lever to uncouple. When lever is inoperative on one side, use lever on opposite side." I don't know whether that is right or not. That is one that I copied.

"Required: Watch out to prevent being caught between overhanging load in cars."

"Required: Watch out to avoid being caught between cars and platforms or cars on adjacent track."

"Required: Watch out to avoid being burned by steam or hot water when uncoupling hose."

Why are they requirements? Because from those causes we have the bulk of the accidents.

Some Text Book Essential in Teaching Safe Practices

How are you going to impart the rules? Simply like a professor of anatomy or chemistry or any other science gets his students into the classroom and teaches them. The human mind is not capable of carrying all those things for ready reference without some sort of textbook.

How will you enforce them? You may not be able to hold a man to task for violating one of these requirements the first time; but carry with this set of rules a continuous accident record, and if a man is injured from causes from which you can reasonably conclude that he violated one of these rules, if the injuries are sufficient over a period of years, he is not fitted for that class of service.

The rules carry with them the idea of a record.

I don't know to what extent you gentlemen have made analyses of your accident records of your individuals, but if you will examine the record of 25 conductors who have 15 years' service, you will find that the number of injuries range from none at all for the majority of them, or a large proportion of them, to as high as possibly 25. If you have that information in your hands and you have the record of the man showing that he did not fulfill these requirements, then you have the information necessary to take action.

Under operating locomotives, I could give you the rules, operating hand brakes, operating switches. For example, this is a very simple one. You can't imagine what rule would come under operating switches outside of the book of rules, but here it is. There are no prohibitions under that that I have yet found. It is requirement from beginning to end, one requirement:

"Required: Care to avoid injury from: A, lever flying up; B, ball falling on foot or hand; C, slipping, tripping or falling; D, being caught between locomotive or car and switch lever or stand; E, being struck by locomotive or car; F, sprain or strain."

That is a requirement rule that no man can carry in his head unless he studies it, unless he is trained in it.

That goes on all through getting on and off cars. There would be 25 or 30 rules. Then we have station employee accidents, maintenance of way accidents, motor car accidents; and the scheme that I propose is that this classification of work will

make it possible for the safety agent, the yardmaster or the trainmaster to watch a man doing a job and tie him up with the rule that covers the kind of work that he is doing. It has all the possibilities of a literature on safety. We have no safety literature to speak of, it is all written in a hit or miss manner. Take any of the other sciences like the engineering department, the mechanical department, and you can find volumes in any library, but what can you find on safety? A few desultory tracts like I have written, or Isaiah Hale and some of the other fellows; but from the scientific standpoint I ask you what is there in literature on safety today?

With the use of Mr. Lorenz's statistics and the development of the programs that we have and the safety rules, we will find out that in the end, aside from the general matter which is always back of it all, we will have in a few more years a much better safety record on all the railroads.

A Clever Play upon the Word "Analyses"

CHAIRMAN COTT: When I was a boy in school I pronounced the word analyses, "analysis." I see now why they say "ses" instead of "sis." Mr. Carrow has that peculiar happy faculty of analyses, he sees what figures mean.

This section of the National Safety Council owes a debt of gratitude to Mr. Carrow for the assistance that he has been to us.

I want to interject something into this program before I call on the next speaker. It is a personal matter with me. The railroads entering the city of Toledo, Ohio have conducted in the past two years, and will again this year, a series of safety rallies under the auspices of the local Safety Council. For two years we have held 12 rallies at Toledo that have been attended by on an average of 1,100 persons per meeting. Mr. Hill, Mr. Carrow, Mr. Bentley and a number of the gentlemen who are here have come to those meetings and given them a message. In a way, we are faced with the possibility of listening too much to ourselves there, and we have a series of six meetings beginning next month. I am going to ask some of you gentlemen if you will volunteer your services in coming there during some month this winter and speaking to some 1,100 or 1,500 railroad employees from the 14 roads which enter the city of Toledo. I shall write some of you and I hope you will remember what I have said to you this afternoon.

Now the next number on the program brings us to another factor in our accident prevention work.

The rules of the Interstate Commerce Commission are rather peculiar. The records of the railroads are kept on a different basis from those of industry. We only report to the Interstate Commerce Commission those accidents which cause the employee to lose more than three days' time in ten days immediately following the accident.

The purpose of the Interstate Commerce Commission has been to divide hurts from injuries, a phrase, I believe, that it would be well for all of you to remember, to divide hurts from injuries. In this business of railroading we will perhaps always have hurts. Injuries will be avoided.

A number of years ago one or two leading railroads began to make a remarkable safety record and a number of us wondered what it was all about. The only reason that they made it was that they began to divide hurts from injuries and reported to Mr. Lorenz only injuries.

There is only one man who is really a competent judge to determine what is a hurt and what is an injury. That man is your surgeon. If he has the interest of the men with whom he works and the companies by which he is employed, he will attempt in each particular case to determine whether it is a hurt or an injury and do justice to the individual employee and the company by sending the hurts back to the shop and the injuries on to the hospital.

This man is an important factor in our reporting to Washington. So I think it is right that we should hear from a surgeon and secure the benefit of the advice of a man who is favorably known throughout the United States. I take great pleasure in introducing to you Dr. G. G. Dowdall, chief surgeon of the Illinois Central System.

Cooperation Between the Surgical and Accident Prevention Departments of the Railroads

G. G. Dowdall, M. D., Chief Surgeon, Illinois Central System, Chicago, Ill.

I deem it a pleasure, and at the same time a duty, to appear before this group of Safety workers comprising the Steam Railroad Section of the National Safety Council. The surgical department of the railroad is so intimately connected with the safety work that to me it seems necessary to have a close understanding between the company surgeon and the safety worker. Therefore, the subject of "Cooperation Between the Surgical and Accident Prevention Department of the Railroads" is one of considerable importance.

From the standpoint of the surgeon, the excellent results that have been obtained through the efficient organization of the safety department, appeal strongly to him. The surgeon sees the direct results of the safety work as evidenced by the material decrease in the number of personal injury cases, and consequently I feel that I can assure you of the active interest and full cooperation on the part of the individual company surgeon, provided the way is made clear to him as to how he can extend that cooperation from a practical standpoint.

From the standpoint of the safety department, it can be readily appreciated that the railroad surgeon is the man actively in the field in the handling of personal injury cases and that it is, therefore, important to elicit the interest and active cooperation of the surgeon in order to bring about the most effective results along the line of safety.

First, and it seems to me foremost in the prevention of accidents, comes the question of the physical fitness of the individual employee. I believe that we will all readily admit that ill health, or even temporary disability, greatly increases the hazard of accidents, dependent upon man failure. There are large numbers of men who are not giving their best service to the work in which they are employed, not from carelessness, not with willful intention of shirking, but due to the fact that they are ill, and many times not aware of it. Good health in an individual is of inestimable value to himself and his employer. Ill health decreases efficiency, results in nervousness, irritability of mind, often causes one to do something erratic or impulsive with the result of an error or accident. The healthy man is a safe and reliable man.

Therefore it is of the greatest importance that only the physically fit should be selected to make up the group of employees in an industrial organization. A comprehensive plan whereby every applicant for employment is required to undergo a reasonably strict physical examination before being accepted, is necessary to insure physical efficiency on the part of that group of employees.

When the Illinois Compensation Act was put into effect, May, 1912, the Illinois Central Lines deemed that an opportune time to make effective the required physical examination of all applicants for employment in Illinois. It had previously been felt such an examination was desirable, but in order to offset possible objections, this particular time was selected. So apparent were the beneficial results resulting from this examination of applicants, that on

August 1, 1914, the same rule was made effective on the Illinois Central System. It has been my opportunity, therefore, to observe directly the beneficial results resulting from the selection of physically fit employees, and speaking from the standpoint of safety alone, the results, in my opinion, have more than justified the expense, to say nothing of the improved efficiency of the individual in his work. Then, too, the physically fit employee has a greatly increased expectancy, as regards his continuous service, as well as lessened temporary disability because of disabling illness.

The second most important factor in promoting safety by increasing physical efficiency, is the medical re-examination of the old employees, particularly those engaged in the engine, train and signal service. In the past there has been opposition to such general medical re-examination on the theory that it might cause some physically defective employee to lose his job. However, in the past few years there have been a number of serious accidents entailing a considerable loss of life, as well as large property damage. The resulting investigations have shown that these accidents were caused by the failure of man power, and that this failure was due to some pre-existing disability, and further that a previous medical examination would have disclosed the presence of this disease, which constituted a greatly increased hazard. So much publicity has been given this subject that the public generally is becoming awakened to the necessity of the compulsory medical re-examination at stated intervals, of all engine, train and signal service employees on the railroad.

Physical Incompetence Led to the Accident

One of the largest railroads serving the Chicago territory with suburban service somewhat recently had a serious accident, resulting from collision of two suburban trains. Many people were killed and an investigation shows the engineer of one of these trains was responsible for this accident because of physical incompetence. The history showed that this man had been in bad health for years, but that since his examination for promotion from fireman to engineer 11 years previously, he had not been given a physical examination to determine his fitness for his responsibilities as locomotive engineer.

The coroner's jury sitting on this accident brought in findings recommending strongly the necessity of regular medical re-examination of old employees in the engine and train service. Growing out of this accident, that particular railroad has recently completed a general medical re-examination of all of its old employees in the engine, train and signal service. It is not possible to compute the number of accidents prevented by this particular re-examination, but the percentage of physical disabilities disclosed was somewhat high. Many conditions can be corrected with proper medical treatment in the individual case, and also those employees with certain physical disabilities, who now occupy the more responsible positions, can be transferred to positions of lesser responsibility. The results for safety growing out of such an improved condition are great, indeed.

The Interstate Commerce Commission has manifested an active interest in this subject and as some of you may know, the medical and surgical section of the American Railway Association has spent something over two years in a careful survey of the entire field with a view to determining a recommended standard practice covering the regular physical re-examination of old employees in the engine, train and signal service. While constructing the standard for physical re-examination of the old employees, there was also developed a recommended standard for the physical examination of all applicants for employment.

It is felt that the examining surgeon can be made to accomplish a great good from the standpoint of safety. The elimination of the physically unfit is one of the most important factors in this great work composing the safety movement, and it is, therefore, to be strongly recommended that there should be a routine examination of all applicants for employment by a capable examining surgeon, as well as a medical re-examination of old employees also by a competent examining surgeon.

An analysis of a somewhat recent medical re-examination of a comparatively small group of old employees, engineers and conductors, shows some interesting facts. The engineers showed markedly the results of over eating. Of this group 90 per cent of the engineers are over weight; 60 per cent weigh over 200 lbs. Practically all of them were found to eat daily about three times the required amount of food. The percentage suffering from diabetes was found to be unusually high, and all of this group of engineers had blood pressure well above the normal.

The conductors were also over weight but not to the extent of the engineers. This is due, no doubt, to the fact that as locomotive firemen doing hard physical work they develop large appetites and upon being promoted to engineer, they sit down but continue to eat about the same amount.

Both classes were found to have a high percentage of infected teeth; also tobacco was used excessively and positive Wassermann tests of the blood showed an unusually high percentage.

Careless Personal Habits Responsible For Ill Health

We see, therefore, that the principal factors of the diseased conditions present or beginning, were due to over-eating, infected teeth, excessive use of tobacco and over weight. With proper medical supervision and regular re-examination it is felt that these conditions may to a very large extent be prevented entirely, or relieved by proper dietetic or medical treatment. The prevention of human waste offers one of the greatest opportunities to the surgeon and safety worker, and with the promise of immense results to the industrial manager, the individual worker and his dependents, as well as to Society in general.

The surgeon is directly concerned in the matter of reducing temporary disability by getting the injured employee back to work as promptly as possible, proper consideration being given to the disability present. The careful attention of the surgeon in handling each case is of the greatest importance. The first man interested in getting the injured man back to work should be the surgeon. This is not the proper function of the foreman or employing officer. If the doctor in charge of the case can be made to realize the importance of daily suggestion to the patient with reference to his returning to duty, and by that is not meant that the injury should be minimized, but the attitude of the getting back on the job. All of you who are experienced in safety work realize the mental attitude of a certain number of employees when they are injured, and I am speaking now of the serious injuries. The attitude of many of these employees is, first, that they have a claim against the company; and also perhaps some accident insurance coming to them. A third factor, even with an honest employee, and especially in the winter time, is that he does not feel very well and that it is easier to sit beside the fire with the family than it is to make the effort to get back to work. Then, too, there is the question of uncertainty in the mind of the injured man with reference to whether he has a serious or perhaps a permanent disability, added to which is the sympathy of his fellow employees.

All of these things the surgeon must contend with and tactfully bring about

the proper mental attitude on the part of the patient, to the end that his desire to return to work is increased.

The wide-awake surgeon will know something of the various types of railroad work so that he can talk intelligently to the injured man regarding his ability to get back to work within a reasonable length of time. The doctor must analyze the situation both from the standpoint of the injured man as well as the company. He must know there is a place that the injured man fills and that it is expensive to bring in another man and train him for that particular job. The surgeon will honestly consider the interest of his patient in keeping with his professional traditions, but he will always bear in mind the importance of getting the injured man back to work with as little loss of time as is consistent with the condition present. The company must be willing to take back the injured man and put him on the job, even though he is not able to function 100 per cent. There is no cure for an injury better than getting the injured man back to work and keeping him interested in his job.

Getting the Employee Back on the Job

In the case of fractures or dislocations with resulting limitation of motion, the surgeon by encouraging that man to get back on the job persuades the patient to use the injured part to a very much better advantage than any physiotherapy treatment. After the acute inflammation subsides it is the regular continued use of the affected part that to the fullest degree restores the function, and the improved mental attitude of the patient because of his returning to work, is often remarkable.

The surgeon must be the judge, and he should be given full authority to weigh both sides in each case with reference to the work to be performed and nature of the injury, and then decide. It is important that a plan should be in effect whereby the surgeon is furnished close supervision of every case, thereby permitting him to release each man to return to work at the earliest date consistent with the injury.

Therefore, the plan should provide that an order for treatment be issued by the employing officer and accompany the patient coming under the care of the surgeon, and the surgeon should be given full authority to handle each case until the injured man, in the opinion of the surgeon, is able to return to duty and perform at least the major portion of his work, with safety to himself and others. There should be a check by the employing officer so that it will be promptly known and investigated when an injured employee having been discharged by the surgeon, does not promptly return to duty as directed.

It is of distinct advantage to the surgeon in handling these more serious cases if an arrangement is in effect so that at least a limited number of the more difficult cases, as determined by the surgeon, may be assigned to some lighter work than the customary job. In this way the surgeon can release the man for duty at an earlier period, thus improving his mental, as well as physical condition, by getting him back to work and at the same time lessening the time to be computed in considering claim against the company for time lost.

The malingerer is an extremely difficult case to handle. In the case of intentional malingering, especially if the patient has had some previous experience along similar lines, it requires extremely careful examinations to determine the exact extent of the incapacity because the information furnished by the patient cannot be depended upon. The premeditated malingerer is, therefore, a problem by itself and as we all know, has been given thoughtful attention.

There is another class of cases less serious, but still more difficult to handle from the standpoint of the surgeon, that is the neurotic patient. They truly magnify their troubles. Every persuasive power and tact and patience on the part of the surgeon are necessary in the handling of these mentally disturbed patients. They know that they have been seriously injured and develop a mental complex with reference to a

permanent disability. Paralysis is the condition most frequently conjured up in the mind of the patient. The influence of meddling people who surround him is disturbing. They encourage him not to return to work, argue that the company is liable for the injury and the longer he remains away from his work the more will be the claim. It is this class of patients that offer the greatest menace when solicited by the ambulance chaser.

An important factor in prolonged temporary disability is insurance. Accident, Brotherhood, Lodge and Compensation insurance all exercise this tendency. The surgeon can tactfully offset these influences by anticipating the period that the injured man will be able to get back to work, by beginning two or three weeks ahead of that time trying to convince the patient, then as the time approaches it may be extended somewhat, but the surgeon must reach the limit of persuasion and sympathy and then definitely fix the time, making report to the insurance company concerned, as well as furnishing the employee a surgeon's discharge certificate.

Every surgeon appreciates the advantage of getting the injured man back to work in less than the three-day period prescribed by the Interstate Commerce Commission. This cooperation is most important because it reduces the reportable accidents; also encourages the patient in the direction of minimizing the injury. However, care should be taken that too much pressure should not be used on the surgeon or the employing officer in making a drive for safety. It has come to my knowledge that under the stress of the safety campaign with comparative ratings of various divisions, a master mechanic sent an injured employee to an outside private physician, the bills being paid by the master mechanic himself, in order to prevent his records from showing this personal injury. This perhaps somewhat unfairly shows the active interest taken in the safety work on the part of Illinois Central employing officers.

The Physician Is an Important Factor

It can be seen, therefore, that the surgeon is the most important factor in efficiently carrying on this work. There was a time in the development of the American railroads when the company surgeon or the surgical department was looked upon by the average railroad manager as a necessary evil or supernumerary attachment, without importance. The surgeon was grossly underpaid; in many cases receiving only railroad transportation as compensation for his services.

In the last decade or two great progress has been made in the way of education concerning health, preventive medicine, welfare work and social economics. Perhaps even more than the railroad manager has other lines of industry shown a keener appreciation of the large economies that accrue from the physical efficiency to be derived from healthy employees who possess a full time life and working expectancy. Fortunately the progressive railroad manager is coming to also appreciate the many advantages to be derived from the selection of physically fit employees in the first place, and then to depend upon regular medical re-examination of the old employees to keep them fit.

Going a step further some far seeing executives have appreciated the advantage of building up a hospital system, comprising a group of medical and surgical specialists who are made available to their employees for furnishing early treatment in beginning diseases, thereby preventing more serious developments and complications, and also providing the very best of scientific facilities for treatment of the serious or more complicated cases among their employees.

The insurance companies have proven for us the value of careful medical examinations with early preventive treatment. To them there was evident an immense and large apparent returns because of their permanent interest in the policy holder. They could see in dollars and cents the direct saving, if sickness or accident were prevented and also if life were prolonged. Life conservation and prevention of accidents and sickness meant large immediate returns. They went after it and were willing to

spend money for it. One of the larger insurance companies report that as a result of careful systematic medical re-examination and by encouraging their policy holders to obtain early and prompt treatment of beginning disease conditions, they have increased the life expectancy of each policy holder by something over eight years.

Contemplate, then, the similar advantage to any railroad if the physical fitness and efficiency of the employee can be materially increased each day that he works, and if the working expectancy of the old, trained and experienced employee can be increased by anything like eight years. Think of the benefit accruing to that railroad organization.

The safety worker and the surgeon are working to the same end in promoting this greatly to be desired result and it is essential that full cooperation should be extended on the part of each. This to the end that the Safety work be so effective that there will be no injured men, but secondly if there is, that the surgeon will promptly get the employee back on the job unless absolutely prevented, and finally that during the convalescent period the surgeon will diplomatically keep the injured man in good spirits with the frequent reminder that he will be "back to work soon."

CHAIRMAN COTT: Dr. Dowdall, I think I express the appreciation of this section this afternoon when I say to you that I believe yours is one of the most practical papers that has ever been presented to this section.

If the Illinois Central is ever so nearsighted as to let you out of the fold, I think you need only send your application to this group of safety officers and you shall not long be out of a job.

Without taking any cracks at any of our own men, there are perhaps some of us who wish you worked for our road.

I liked your note of warning in which you speak of the possibilities of carrying the accident records from the sublime to the ridiculous. One must be careful that they do no injustice or harm by bringing men back on the job or keeping them on the job when there is possibility of doing injury to the injured man or those with whom he works.

We have a man on the program selected to properly respond to you. This man, it happens, has had most recent and direct contact with railroad and other service. I think it is quite right and proper that a good safety officer who has had four broken ribs in the last few weeks and who knows something about surgeons and their activities should reply to you. Mr. L. G. Bentley of the Chesapeake & Ohio, Richmond, Va.

Mr. Bentley Responds to Dr. Dowdall's Address

MR. BENTLEY: Do I walk like a crippled man? Friends, I am only going to take about three minutes of your time. It is not my purpose to discuss the very able, complete and impressive paper of Dr. Dowdall. He has said, I think, the last word in so far as that is concerned.

I heard one of our one hundred per cent safety men say this morning that any safety worker who expected to get results without working in close contact with this surgical department was doomed to failure, and I think I am justified in assuming, that the splendid record that is being made on the Illinois Central Railroad under the direction of Mr. Downs, and under the immediate supervision of your chairman, Mr. White, is in no small measure due to that spirit of cooperation that has been made evident to you in the address of Dr. Dowdall, whom I have known for some years as an expert along this line.

Mr. Cott sounded a note of warning, that we should not overdo this matter of getting the injured man back to work. It will handle itself, gentlemen, if the proper amount of interest is evinced by the supervising officers, by the foreman and by the surgeons, your accident records will follow that interest and it will not be long until

you find among your men the same disposition that I recently found on the Union Pacific Railroad, where objection had to be made by supervising officers to allowing their men to return to work too early.

I mention the Union Pacific because we all know that the Union Pacific has been foremost in that line of work in recent years. Now, gentlemen, I want to say that Dr. Dowdall has not spoken to you as a theorist or as a visionary; he has spoken to you as a practical railroad surgeon of many years' experience, who knows that these plans that he has recommended to you are workable and have been worked.

I doubt the absolute—I wouldn't say truth, because I question that—but the exactitude of one of Dr. Dowdall's statements. He said that all surgeons know of the requirements of the Interstate Commerce Commission that men must return to duty within three days if they are not going to be reported. I doubt if that is the case on all railroads, and I present to you this thought, that there is a virgin field for you to go back home and work along that line to inform your surgeons as to the part they can take and consistently take; because I have found on some of the railroads that the surgeons did not know that the Interstate Commerce Commission had such a requirement.

Dr. Dowdall, I know that I voice the sentiment of every member of this convention in saying to you that we sincerely appreciate your trouble in coming here, the time and study that you put on your paper, and I foresee that it is going to be of untold value to us when we return to our fields of activity.

ISAIAH HALE (Santa Fe Railroad, Topeka, Kansas): Supplementary to Mr. Bentley's very appropriate response, may I assure Dr. Dowdall, and I believe I speak for a great many more railroad safety officers here when I assure you of my appreciation of an interest in your paper. It is very unique and valuable because it is the first surgeon's report I have heard that was written in English.

CHAIRMAN COTT: I have several notes on the desk here from people who wish that certain safety officers among them might be introduced. Since we must be out of this room in fifteen minutes we cannot take the time to accede to your wishes. I think this is the second time in the history of our safety meetings that we have had the privilege and pleasure of being addressed by a woman. You will recall Mrs. Craig who addressed us a number of years ago. I have the pleasure of introducing to you Mrs. C. F. Longstreth who will now speak to you.

Woman's Place in Safety

Mrs. C. F. Longstreth, St. Louis, Mo.

"They talk about a woman's sphere,
As though it had a limit;
There's not a place in earth or heaven,
There's not a task to mankind given,
There's not a blessing or a woe,
There's not a whispered 'Yes' or 'No,'
There's not a life, or death, or birth,
That has a feather's weight of worth,
Without a woman in it."

Much has been said of late concerning the place of woman in the world today. Time was, and not so far distant, when she was content to dwell within the four walls of her home. Hers to look well to the ways of her own household and when her brief thread of life was woven, it was suffice that her

own children rose up to call her blessed. The American woman is heir to the richest inheritance of the human race. Born of a rugged pioneer stock, a God-fearing nation, she has been led by the visions and ideals of the noblest impulses which ever turned a wilderness of great forests, mighty rivers and boundless prairies into smiling gardens and glistening fountains. Hers has been an inherent desire to go forth and subdue the wilderness.

Life was a joyful adventure and the dangers were no handicap. Life was work and the vast forests were there to be cleared. Life was full of promise; there were the great open lands—theirs for the taking. Life was the gift of God, and never forgetting, she set the stamp of her God-fearing character upon each succeeding family tie—in the home, in the community, and in the nation.

Thus a new people was born, a new and greater civilization came into being. The factories of the far east, the farms of the middle west, the plantations of the sunny south, the trappers of the frozen northland, and the fishermen of the seas have compelled independence to give way to interdependence to such a degree that today the welfare of each individual is woven into the fabric of modern society. Self-isolation and self-preservation are no longer possible. We have, voluntarily or no, become a people of interdependent relationship and we cannot escape its challenge.

The Human Ideal Is a Home of Happiness

Man is born of God and is commanded to "subdue the earth"; to love and to serve his fellows. What a divine privilege! What a human responsibility!

Man must live. He seeks his mate, his woman, and together they build a home, a place of love and service. Children are born; friendships are formed; sickness—health; poverty—wealth; sorrow—happiness; life—death; but always the home.

"Oh little homes, you little homes of love,
Strength of a man; a woman's song, laugh of a child;
Warmth of a fire, glow of a lamp.
Ye narrow, walled-in worlds of joys and fears,
Built of the commonplace of smiles and tears."

An accident happens! Someone was careless, someone forgot to play safe. And what of the home? The strength of the man is broken; the song of the woman is hushed; the laugh of the child is stifled. Never is that home the same again. It lies a broken and a withered thing. Safety is home-making. Carelessness is home-breaking. The National Safety Council sponsors a new crusade—it wages war, not for a sepulcher of the past, but for a shrine of the future—a shrine of better homes, better parents, better children, a better race.

One of your neighbor cities has very fittingly and aptly adopted the slogan, "The Heart of America." I like its sound—but may I tell you just where the real heart of America is? It is in the American home, throbbing with the love of human kindness and pushing out through the veins and arteries of our great commonwealth, carrying with it the love, pity and tender compassion of a humanity intensely interested and vitally concerned with its brother's safety and well being. This and none other is the heart of America and it is for us, here assembled, to pledge ourselves anew to this far-reaching task of talking, breathing, actually living safety, so that this great American heart may beat on. Wrecked lives of little children, broken bodies of men and women, incalculable and unprecedented property losses stab at the heart of the American home and her life blood ebbs.

This great throbbing heart of America, this citadel of society, is being invaded continuously by accidents of a preventable nature, whose toll is many thousands of lives annually and hundreds of thousands of serious injuries. These are conditions which challenge the home makers of America to demonstrate that women can do, by accident prevention methods in the home, what men—you of the National Safety Council—have done to stem this tide of economic loss, personal injury, distress and death. We are fast learning that effective prevention is much more to be desired than effective cure. An accident cannot be cured; therefore it must be prevented.

Prevention Is the Higher Duty

It is one thing to rebuild the health of a disease-ridden body or a socially and economically demoralized home; but an entirely different and more valuable thing to prevent such mal-adjustments. It is one thing to take care of, through our organized efforts, the wreckage and misfortune caused by accident, but a much more constructive and commendable thing to prevent such human wreckage and misery. One of our surgeons of national reputation writes: "If ever our nation is made safe for health, it will be womanhood that will accomplish it." And I believe it equally true if ever our nation is made safe for our manhood and our little children, it is for the American woman to bring about that safety. Down through the ages it has been woman's biggest job to lift up, and to hold to her great beating heart of love—her manhood. She clings to him and like the angel of the psalmist of old, she bears him up lest he dash his foot against a stone; and there is no measuring the depths of a woman's love and devotion and self-sacrifice. And until we can write "Safety" upon our thresholds and carve "Service" upon our hearthstones, the world will echo only cries of pain, the sun will shine only to show us grief; each rustle of a leaf will be a sigh, and the flowers fit only to garland graves.

Never in all history has there been a greater challenge to womanhood. Never did woman have so much to live for, never was her physical environment so ample and adequate; never was there so many to live with, and yet never were the rules of life so complex. Never has there been such privileges of life for patient service and courageous endeavor and never has there been such responsibilities for womanhood. She must know no creed, no social rank, no riches, no fixed standard of education. But hers must be a true and unbiased understanding of human life. Thus may she become an invincible unit for public service and personal inspiration carrying the torch for higher and finer things in civilization. Sympathy for the distressed, protection for the weak and light for them who walk in the darkness of ignorance. Seeing that all the good that has come down from the hardihood of her pioneer mothers shall not be lost in the mad struggle of the present day.

There is one, and one only, way that our manhood, our womanhood and our childhood may be made safe for this and future generations, and that way is through the medium of education, and that education must begin in the home. Education for safety! It is for us to carry the message for safety back to our homes and to our communities. Interest our womanhood in its colossal importance and she will turn all heaven and earth to the end that safety in the home, in the school, in the shop—safety everywhere—may no longer be an idealistic condition to exist in the distant future, but that it may be alive and a growing condition existing now.

Have you ever stopped to consider the far-reaching contact of womanhood? Do you know of her various organizations whose influences are incalculable? Who would dare to estimate the power and the service of the General Federa-

tion of Women's Clubs? What they have done for the causes of American citizenship, legislation, public welfare and international relations they can do for national safety. There are the parent-teacher associations, business and professional women's clubs, mother's clubs, Y. W. C. A. and similar women's organizations which need but to be interested in—educated in, if you please—and the zeal and ardor of their enthusiasm and constructive work would know no bounds. I believe if such groups can be brought to a keener realization of the magnitude of this problem of education in accident prevention, they will, in a surprisingly short time, pass on such knowledge; and there will come that day when all men, in a truer sense than ever before, will possess that inherent right to "Life, liberty and pursuit of happiness."

Have you caught a glimpse of our great America of today? We are stepping forth into a larger and better life; our people have a vision intensified by our task and present achievements. In her youth America was often foolish, frequently ruthless in her daring and accomplishments. She amassed unbelievable wealth, but oftentimes at the expense of life and limb of her manhood. Now, in her sober days of maturity, she is learning how to spend her wealth for the betterment of mankind and she is teaching her children that true service is the supreme commitment of life.

Education of the Individual Is Progressing

By the wisdom of our Constitution we have established the rights of self-preservation and self-determination. Superstition has given way to knowledge. With broader vision, greater opportunities, larger rewards, we have gradually but surely grown into greater appreciation of the value of life. Health is being protected, life prolonged, strength for greater accomplishments assured through strict observation of the rules of sanitation and hygiene. Hospitals and nurseries are built and endowed to insure the health of the mother and her newborn babe. Our public schools are teaching our youth the proper care of the body, the use of soap and the tooth brush; and our great industrial institutions are expending millions of dollars that their manhood may come to a better understanding and appreciation of the worth of human life. Factories are equipped with safety devices; grade crossings are protected; traffic regulations are enforced. All this is being done that man may live, may seek his mate and establish his home that it may hold his children, teach them wholesome habits of living and instill high ideals and the spirit of service.

A little girl ran eagerly into her father's study one morning. Very proudly she displayed the stalk of a flower she had lately pulled from its garden bed—its roots with the damp earth still clinging to them.

"Just look, Daddy," she said, "what I pulled out of the garden just now, all by myself."

But the father was a busy man and waved her aside. Not to be silenced, she insisted he listen to her and again she spoke:

"Daddy, you must look. I pulled it up all by myself," and proudly taking hold of the roots, she added: "And the whole world had hold of the other end."

Ours is a colossal task—this making our homes and our communities safe. And we have to admit that there are times when it seems that the whole world has hold of the other end. But we Americans are a willing and an energetic people, we are possessed of a divine restlessness which will not permit us to accept things as they are; but impels us to crave and to seek something better. Civilization towers in pyramidal grandeur up to the blue of heaven. At its base is the great mass of humanity, constantly growing in numbers. Out

of this common material our nation is busily engaged in building its structure of civilization. Out of the mass we are finding our way to better conditions. We rise from the base of the pyramid, out from our own narrow cells into the azure blue of unselfish service and passionate sympathy born only of love.

It is the presence of the masses which means much; it is necessary for many lives to touch ours; necessary for ours to touch many, if there is to be power and understanding and real worth in what we do and what we are. You who feel alone, misunderstood, unappreciated go out into the crowd. Sense their tragedy; know their joy; ache with their heartbreak; taste the salt-sweat of their labor. Among them, they become a part of you, and you will instinctively take hold again for you will know it is all worth while. It is for this instant that you have cared.

A Tribute to Womanhood

CHAIRMAN COTT: I don't feel capable of responding to such a paper. It touched our hearts, it gave us a new purpose and a new vision.

Mr. Shedd, will you respond for me, please, and for us?

L. F. SHEDD (Superintendent of Safety, Chicago, Rock Island & Pacific Railway, Chicago): Never in my life was I more impressed with a certain thing that I have always thought was right, namely, that brevity is the soul of wisdom.

If all inside information is correct, the speed with which I have to go through with this is almost beyond belief.

Mrs. Longstreth, I am not unmindful, I am fully conscious at this moment, that I am enjoying a special privilege and have been given almost a unique opportunity.

One of the real attributes of the safety man is that he is unselfish, he covets nothing, he wants to do something for the other fellow. Yet I think there are a lot of you in this audience today, probably every one of you, who are having to exert honest resistance to keep the influence of that old green-eyed monster down. I think that every one of you would like to stand in Shedd's place today and attempt to tell Mrs. Longstreth how you and I and the rest of us appreciate her coming, how we appreciate her paper and how we doubly appreciate the able, forceful presentation of it.

I am not going to be here very long, fellows, not in this position at least, I am not going to say God bless the ladies, but I do want to pay just a little tribute to this good woman and her kind. She is a woman, a mother, a safety woman. What greater combination could God Almighty smile on with favor than a woman, a mother, and one who is able and so willing to present this great magnanimous subject to us fellows.

The Spirit of Woman Guides Effort

Woman, what would we do without woman? Mrs. Longstreth, it was a long, long trail, as they used to sing, to Tipperary, but is a longer time from that scene enacted in that beautiful garden located eastward of Eden where God created man and gave him woman as his helpmate. It has been a long, long march from that time until the enactment of the Nineteenth Amendment to the Constitution of the United States gave you women what you were always entitled to. You have come into your own, you have not only taken your place in safety, you have taken your place in the world, and if you fellows all had your hats on right now, I would tell you to get up and take them off to Mrs. Longstreth and her kind.

I don't believe in reading papers, I think it takes the snap out of them, but I know of no more convincing way, my good woman, that I might pay a tribute to womanhood than to read what I copied, I am frank to tell you, from a page in

the Chicago Tribune a few days ago, that page run in connection with the seventy-fifth anniversary of the organization of the Marshall Field & Company industry in this city, the greatest of its kind in the world.

May I read it? I want to read it least I should mix it up.

"The business which is now called Marshall Field & Company celebrates its seventy-fifth year. It began in a little shop in Lake Street conducted by Potter Palmer. In a different sense it began in a New England village with the birth of a girl. Her name was Fidelia Nash. She grew to womanhood and was wooed and married and her name became Fidelia Field. She was the mother of Marshall Field. How unbelievable it would have been to her if someone had said, 'In 1927 your picture will be published and your influence recorded in a city of three million people a thousand miles away.' There was no such city, Chicago was a struggling swampy little town. Yet she in her country village helped to build Chicago. She built a boy, she put into his character some of the staunch unyielding substance of the New England hills, she taught him that what was worth doing at all was worth doing better than it had never been done before. She taught him the principles upon which he later built his belief that no trade is a good trade unless buyer and seller are satisfied, upon which he built his conception of the nobility of service. She taught him his religion, inspired his patriotism and his faith in the goodness of men and women. These were his foundation stones. Having these and health, and the love of work, it was not hard for him to build.

Woman Is an Ally in Accident Prevention

The business which he has thus founded has been made great by millions of other women. Men, to be sure, have managed it, but the influence and confidence of women have been the greatest factors in its success."

Fellows, get that, "but the influence and confidence of women have been the greatest factors in its success."

And in conclusion, "and seventy-five years will be a short period in the life of Marshall Field & Company, and its present achievements will only be a beginning of its future worth, if the character and ideals of Fidelia Field shall continue to find their counterparts in the character and ideals of this institution."

Your paper was beyond question ably prepared, it was beyond question cleverly delivered, showing that you had given this matter considerable thought, as you women usually do.

I know that I voice the sentiment of each and every one of you fellows here today when I thank Mrs. Longstreth for coming here, for adding this beneficial part to our meeting toward making it a success. I hope she will come again, we will always be glad to see her.

We need the women. God taught us that in the beginning, that we need women. They are good safety scouts if you get them coming your way.

We have, Mrs. Longstreth, going all over this country today, a safety special. We are trying to reach a goal of 35 per cent in the reduction of accidents.

The question is asked, are you on board? Let me tell you that you are, and you may take your husband with you for I know he is a safety man. You brought him here. Take him on the safety special.

There is a place for everybody on that safety special.

CHAIRMAN COTT: I appreciated one phrase of Mr. Shedd's response when he spoke of women as an ally. She has been an ally by and for us a long, long time.

All of you safety workers know Mr. Z. B. Claypool, assistant director of accident prevention department of the St. Louis & San Francisco Railway Company. I will ask him to come forward at this time.

Causes of Accidents	Suggested Remedies
1. Not instructed properly.....	{ Give proper instructions. Place with competent man.
2. Inexperience	{ Caution. Personal attention. Place with competent man. Use judgment in assigning jobs.
3. Carelessness	{ Caution—Attend Safety Meeting for instructions.
a. Temporary	{ Lay-off. Reduce rank. Posters.
b. Permanent	{ Change worker to a place where there is not the great element of danger. Discharge.
4. Familiarity with the job.....	{ Surprise tests. Caution. Change of work. Illustrations of what may happen.
5. Over-confidence	Same as above.
6. Taking chances	{ Put bulletins in his possession. Eliminating necessity of taking same. Teach a man to anticipate danger.
7. Akwardness	{ Change job. Discharge.
8. Nervousness	{ Medical treatment. Explanation to remove fear. Not too much hurry.
9. Temporary physical disability..	{ Foremen apply first aid. Send to company doctor. Cause man to attend Safety Meeting.
10. Permanent physical disability..	{ Pension if eligible. Discharge.
11. Defective machinery	Regular and careful inspection.
12. Personal trouble	{ Consultation. Suggest to man mental concentration. Give him time to settle trouble.
13. Ignorance	Same as No. 2 (Inexperience).
14. Excitement	{ Determine speed of workman. Foreman make man feel at ease on the job. Discuss the cause.
15. Too much of a hurry.....	{ Make your hurry safe (Think right). Think faster than you work.
16. Dissipation	{ Warning. Discharge.
17. Afraid of the job.....	Same as No. 8 (Nervousness).
18. Shop joker	{ Advice. Lay-off.

19. Bad shop lay-out..... Report to proper officials.

20. Untidy surroundings Systematic inspection.

Foremen must set the example.

Foremen must keep a constant supervision on accidents.

Foremen should carry out safety instructions coming from the company.

Foremen should report back or suggest safety devices.

7. New Business.

Everyone present should be called upon individually and made to feel that he is a part of the meeting in having taken part.

8. Summary of Activities for the current month and cumulative for the period, of unsafe practices and unsafe conditions reported. Corrected, and on hand for handling at the next meeting.

	MONTH			PERIOD TO DATE		
	Reported	Corrected	On Hand	Reported	Corrected	On Hand
January	10	6	4	10	6	4
February	8	5	7	18	11	7

Clean Housekeeping—Education of the Worker—Supervision

a. Clean Housekeeping.

Clean housekeeping not only reduces accidents, but it increases production and raises the quality of production. Cleanliness is next to godliness with all the people, yet with a few people it seems next to impossible. Many a workman who prides himself with being a skilled mechanic would leave his wife if she kept house as slovenly as he keeps shop.

A shop superintendent once resorted to a clever ruse to stimulate interest in clean housekeeping. He had a sign made reading, "THIS IS THE DIRTIEST PLACE IN THE SHOP." Once each week the shop superintendent awarded this sign after a personal inspection at some unannounced time, and said sign had to be kept prominently displayed there until that department was made cleaner than some other one. There was a lot of rivalry among foremen in effort to avoid this sign.

Clean housekeeping will receive *no more* or *no less attention* than the officers in charge demand, yet a shop has to be made clean and sanitary in the first place before you can ask or expect the shopmen to keep it so.

b. Education.

Personal contact with the worker has greater value than any other form of education. Since personal contact is not possible for all of the time, we depend upon illustrated bulletins to some extent for a substitute. Bulletins with greatest appeal are the illustrated ones, wherein the picture tells the story. The illustrations should show the correct way of performing work or else both the right and wrong way. Bulletins should be specific to the work at hand and deal with the essentials. Little value as to the actual prevention of personal injuries comes from the use of what we might term General Bulletins, which might be classed as applicable in any place at any time.

Special noon hour meetings can be used to good advantage in amplifying your accident prevention activities. These meetings should be short and snappy, of not over 20 minutes' duration. The time should be split 10 minutes each on shop operating time and lunch hour. This is an excellent way to reach the entire plant collectively by personal contact once a month.

A great deal more frankness could and should exist between the management and the workmen as to cost and profits in selling the accident prevention

idea. You don't buy or sell anything else without bringing in these factors. You invite skepticism to even imply to workmen, that a corporation, out of the goodness and magnitude of its heart, because of humanitarian interest alone is going to give them something for nothing. Accident prevention has its humanitarian side, but usually that is the only side stressed. It also has its business side, which you realize more fully when asking for authority to spend more money. The man in overalls will appreciate the opportunity of being a business partner with the management in the accident prevention business. Show him how you both make money working together and both lose money if you don't.

c. Supervision.

The type and quality of work performed in addition to the manner in which it is performed will depend upon the foreman's ability to supervise and the minimum they will accept. This brings to us the time-worn slogan, "The foreman is the key man." Just as the sergeant, more than the captain, determines the morale of a company in the army, so does the foreman more than the shop superintendent determine the morale of the shop workmen. Just as the type and efficiency of the sergeant, however, depends upon the type of captain he reports to, so is the foreman influenced by his superior officer in the shop.

If a shop foreman is held as responsible for personal injuries in his department, as he is held for quantity and quality production overtime and operating costs, that foreman will then give personal injuries the same amount of attention, otherwise he will not.

The shop superintendent will demand of his subordinates just what is demanded of him, and the order of importance of such demands will be gauged by the way the shop superintendent has received them. So you want to start from the president down in selling your accident prevention program and not from the common laborer up.

When the foreman's ability to operate a shop free from personal injuries becomes a factor in obtaining promotion, on a par with production and other qualities, then will more attention to safe operation be given by foremen. We frequently hear it said, "A shop plant is just as safe as the shop superintendent makes it." Let us advocates of safety accept our part of the responsibility and say, "A shop plant is just as safe as the accident prevention department helps the shop superintendent to make it. This means keeping the score as previously enumerated under another heading, all of which means finding the weak spots so that the shop superintendent can effectively work out corrective measures. You of the accident prevention departments are the finders, the shop superintendents are the fixers. In this rapid and progressive mechanical age, new and added responsibilities are constantly being added, on to industrial foremen, with little if any preparation being given to the foremen. The need is here and the time has come to hold Industrial Foremen's Conference in your shop plants at least semi-annually, to improve the every day practices of the foremen. An outline of such meeting which the speaker attended in one of our shops is given below. Meetings were held for two hours every morning from 8:30 a. m. to 10:30 p. m. with the ranking foremen of all departments present and the chief mechanical officer of the shop and division.

Foremen's 12 Days' Conference, Two Hours Per Day

OUTLINE OF MEETINGS

First Meeting—The Foreman's Job.

Second Meeting—Interest Factors.

Third Meeting—Leadership.
Fourth Meeting—Orders, Directions and Suggestions.
Fifth Meeting—Orders, Directions and Suggestions.
Sixth Meeting—Orders, Directions and Suggestions.
Seventh Meeting—Safety and Accidents.
Eighth Meeting—Instructional Responsibility of the Foreman.
Ninth Meeting—Instructional Responsibility of the Foreman.
Tenth Meeting—Instructional Responsibility of the Foreman.
Eleventh Meeting—Instructional Responsibility of the Foreman.
Twelfth Meeting—Cooperation.

3. SUGGESTIONS

When an order may be given as a suggestion.

1. With experienced men.
2. When responsibility is to be placed on workmen.
3. To encourage progressiveness.

COSTS OF FAULTY ORDER

1. Ill feeling between the foreman and the workman.
2. Lowers the morale of the individual.
3. Broken machinery.
4. Delays.
5. Accidents.
6. Lowers production.
7. Waste of material.
8. Waste of time.
9. Morale.

In considering the cost of faulty orders, the word morale was deemed so important as to receive separate treatment.

COST OF MORALE

1. Dissatisfaction.
2. Labor turnover.
3. Men lay down on the job.
4. Loss of business.
5. Increased accidents.

Some of the things a foreman may do to increase the Morale of workers:

1. Keep good tools and in repair.
2. Keep good material.
3. Keep a clean shop.
4. Keep an orderly shop.
5. Give a square deal.
6. Promote proper understanding.
7. Maintain good discipline, properly administered.
8. Being honest.
9. Fostering good working habits.
10. Loyalty on the part of the foreman to his men and to the organization.

Seventh Conference—Safety and Accidents

Objectives.

1. To present the probable cost to the men and the company of carelessness in operation of the shop.

2. To enumerate the probable causes of carelessness and to suggest the possible remedies.
3. To promote a greater feeling of responsibility for accidents occurring in their respective departments.
 1. Costs of accidents.
 1. Compensation.
 2. Damage suits and legal action.
 3. Loss of time.
 4. Decreased production caused by effect on rest of men.
 5. Decreased earning of the company and employees.
 6. Human suffering (a) direct, (b) indirect.
 7. Increased insurance rate.
 8. Reduce accidents.
 9. Increase loyalty.
 10. Make instructions easier.

After a discussion of 21 specific cases of handling men, it was agreed that good leadership is productive of both quality and quantity in the shop output and that it is an essential factor in the control of labor costs. From the group was then drawn out a list of 19 essential elements of good and effective leaderships.

The conclusion of the group as developed in these discussions in a final summary were:

1. A foreman can be a good leader and at the same time be sociable.
2. A foreman should be the leader in his department on technical and practical knowledge of the work.
3. Occasionally the foreman does not realize his responsibility as a leader in the broadest sense of the word.
4. A foreman to be a good leader should be open-minded to suggestions from his superiors and should give consideration to suggestions from his men.
5. A foreman to retain his position as a leader should be constantly informed on the new methods of shop production and technical information relative to his department.

Fourth-Fifth-Sixth Conference—Orders

Objectives.

A comparison of a complete and incomplete order.

An Analysis of the causes of faulty orders, and the development of remedial measures.

The effects of the faulty orders.

From the request that orders be given for example, it was developed that orders are of two kinds: 1. Routine Orders; 2. Special Orders.

Routine Orders are not so likely to show fault in the giving as the special order. This is due to practice and standardization of the Routine Order. Thirteen examples of orders were given and from the discussions of them, 25 causes of orders not being carried out, and their remedies were listed by the group. It was further worked out that three types of orders are issued, i. e.:

COMMAND

When issued:

1. In case of an emergency.
2. Fear job may be done differently.

3. When foreman assumes entire responsibility.
4. As a last resort.
5. More frequently with inexperienced.
6. With over-confident men.
7. In case of necessity.
8. To men with low mentality.

DIRECTION

When an order should be issued as a direction.

1. In giving routine orders.
2. When the how is needed.
3. With the green man.
4. When the routine orders are changed.

In the beginning it was pointed out that the conference was not necessarily a foreman's training school; but was set up for the purpose of getting a perspective view of their own job, looking at them from an analytical point of view and for the purpose of pooling the ideas of the foreman based upon their extensive experiences and that from the ideas presented, practices may be better.

Number 1. The Foreman's Job

The various members of conference listed their responsibilities which totalled 25 various duties.

These responsibilities were given a rating based upon their relative importance. The group members were then asked to mark the one which they thought most important, ranking it as number one and so on down the line until ten of the most important responsibilities had been ranked. Points for discussion were given which brought out from the group what is meant by supervisory and managerial responsibilities. These two points were discussed at length with the final conclusion that—

Supervisory Responsibilities are those which a foreman has in observing conditions in his departments.

Managerial Responsibilities are those which a foreman has in handling his work so as to reduce costs.

The discussion also brought out an additional responsibility—Instructional
The discussion also developed the following:

1. That both foreman and the workmen are held responsible by the management for production, but the greater responsibility rests with the foreman.
2. The foreman's responsibilities cover a wider range than those of the workman.
3. The workman's job is primarily that of doing the work.
4. The foreman's job is primarily that of planning, directing, giving instructions where needed and seeing that the work is properly done. It was brought out that there were two ways for a foreman to carry out his responsibilities.
 - a. Do the job.
 - b. Consult his superior when the problem was greater than he could solve.

Second Conference—Interest Factors

Objectives.

- a. To prove that interest on the job will reduce productive costs.
- b. To emphasize the foreman's responsibility of maintaining interest of his

men and of discovering the possible ways of accomplishing this. Cases were cited by those present from which a chart was made listing 12 causes for lack of interest of workmen, and listing suggested remedies. Fifteen interest factors were brought out which may be used to promote interest of the workmen. The conclusions of the group were that:

1. Requires less supervision.
2. Increase production.
3. Give better quality of work.
4. Give better cooperation.
5. Attract better new men.
6. Decrease labor turnover.
7. Make for better plant spirit.
8. Damage to material and equipment.
9. Increase taxes.
10. Increase labor turnover.
11. Bad reputation for company.
12. Reduces morale.

Objectives 2 and 3 previously treated under Item 6 in Order of Business for Accident Prevention Meetings.

Eighth-Ninth-Tenth-Eleventh Conference

Objectives.

1. To bring out the cost of poor instructions to the green workman and partially trained workman.
2. To give practice instructions to the foremen, following accepted standards of good procedure.

One example will give a quick insight into this interesting part of the conference. The leader gave instructions to one of the foremen on how to sharpen a hand cabinet scraper. He used purposely a very poor method in putting over the lesson. The foreman failed to get the instructions. The following analysis of the failure of the instruction was listed by members of the conference:

1. No explanation.
2. Didn't tell the learner the way.
3. Didn't bring out the most important thing.
4. Didn't take ample time with the learner.
5. Didn't have name of the tools.
6. Didn't have patience with the learner.
7. Didn't tell the learner how to do it.
8. Didn't check up during the process of the instruction.
9. Learner didn't know what was coming.
10. Instructor was too "hard-boiled."
11. Killed the morale of the learner.
12. Attempted to teach too much in a short time.
13. Didn't take into consideration the learner's previous experience.

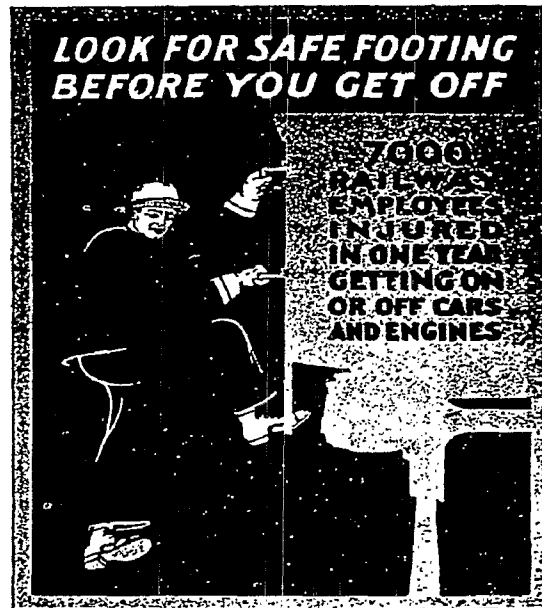
The leader gave another demonstration of teaching on the method of sharpening the same cabinet scraper and to the same man. In this demonstration he attempted to teach a good lesson and not to commit the errors that were committed in the first demonstration. In making an analysis of the second job of teaching the group brought out the following points:

1. The teacher aroused the interest of the learner.
2. Gained his confidence.
3. Showed him how to do the job.

4. He back checked the learner.
 - a. For the benefit of the learner.
 - b. To determine whether the instructor had left out any points in instruction.

To be 100 per cent efficient in instructing his men, he must—

1. Do the job.
2. In the shortest time possible.
3. With the greatest amount of ease to himself and the learner and with due care for the equipment.



Twelfth Conference—"Cooperation"

Objective.

To determine the cause of poor cooperation, the causes of good cooperation, and their effects upon the entire organization.

Fifteen specific cases were recited for discussion and around these cases were built up the causes of poor cooperation listed below:

1. Suspicion.
2. Interference.
3. Grouchiness.
4. Know it all.
5. Failure to take problem to right person.
6. Misrepresentation.
7. Inaccurate information.
8. Dishonesty.
9. Foreman to meet another half way.
10. Selfish motives among departments.

11. Jealousy.
 12. Taking matters over superior's heads.
 13. Giving inadequate information.
 14. Passing the buck.
 15. Not being loyal.
 - a. To superiors.
 - b. To company policies.
 - c. To men.
 16. Fails to confer with superiors.
 - a. Fear of criticism.
 - b. Negligence.
 17. Failure to recognize organization as a whole.
 18. Turning in incomplete reports.
 19. Gossip and tale bearing.
 20. Holding back important information.
 21. Knocking other departments.
 22. Fails to appreciate problems of other departments.
 23. Frame up on other departments.
 24. Where "sit-for-tat" conditions exist.
- The Group listed the following costs of poor cooperation:
1. Increased labor turnover.
 2. Increased delays.
 3. Increased accidents.
 4. Loss of business.
 5. Decrease in production.
 6. Bad reputation.
 7. Increased material costs.
 8. Increased production costs.
 9. Increased personal injuries.
 10. Increased fuel consumption and supplies.
 11. Destroys morals.

After foreman has attended a conference of this nature there is no doubt in his mind but that he is the "Key" man and he has a much better conception of how best to use the key.

Conclusion—"Future Objectives"

Having attained a desirable organization for the Preparation, Presentation and the Application of your accident prevention ideas, what are your ultimate objectives? Here are listed some valuable ones which have been tried and proven by some industries and will eventually be in vogue by all first-class Dividend Paying Railroads:

1. Machinery guarded 100 per cent.
2. Employees furnished individual goggles with lens ground to prescription for those with impaired vision. A record of every workman's eye test. Goggles worn 100 per cent of the time by workmen and their foremen. Visitors and officials required to wear goggles when walking through shops where workmen are required to wear them.
3. Physical examination, photograph and finger print record of each man entering the service. This will work to the benefit of all honest men regardless of creed or color, organized or unorganized labor.
4. A centralized personal record bureau which keeps the positive as well as the negative record, telling the extra service an employee (worker and foreman performer as well as that which he did not do or

- did wrong. Accident Prevention or the lack of it a part of such record.
5. The Accident Prevention Department operating on a Budget System the same as other departments, appropriation based upon results. The Department functioning on its merits as a business unit of the organization and not as a side line or a charity institution.
 6. A Personnel organization, coordinating the various other departments and obliterating the imaginary dead line existing between the management and the workers.

CHAIRMAN COTT: It is unfortunate that Mr. Claypool was put on the tail end of this program. That paper was the result of a real study and honest purpose. I trust that all of you will secure copies of it and study it because it deserves it.

I am sorry we must hurry this on. By the way, I want to call your attention to the fact that Mr. Claypool is with the accident prevention department. I like the name, as I know you must. He has representatives here with him today.

Mr. Hartenstein, who was on the program to respond to Mr. Claypool, will do so, at his own suggestion tomorrow in order to give the hotel an opportunity to go to work in this room.

ADJOURNMENT

Thursday, September 29, 1927

The meeting was called to order at nine o'clock by Chairman White.

CHAIRMAN WHITE: The first part of this meeting is devoted to the Safety Agents' and Inspectors' Session. Mr. A. V. Rohweder, Superintendent of Safety, Duluth, Missabe & Northern Railway, Duluth, will preside.

(Mr. Rohweder took the chair.)

CHAIRMAN ROHWEDER: The object of the Safety Agents' and Inspectors' Session is to give you men who are in these capacities an opportunity to discuss anything that you have in mind about your particular job. From now until ten o'clock the meeting is open for a general round table discussion.

D. M. MOORE (Safety Inspector, Kansas City Southern): I would like to know how to get away from injuries from squirt hose. I would like to know if any road is using cold water squirt hose. We are told it is not practicable on account of not being able to clean the deck, but I feel you had better have dirt on deck than blood.

C. D. SHAFF (New York Central, Syracuse): We are using a large number of cold water squirt hose on our modern power, and they have been the means of doing away with a lot of quite serious accidents. Before they were adopted on our railroad, we had about nine squirt hose accidents a month, and they have been very materially reduced. I believe it is largely due to cold water squirt hose.

CHAIRMAN ROHWEDER: I presume Mr. Moore would want to know whether your mechanical department considers the cold water squirt as effective as the steam squirt hose.

MR. SHAFF: Yes.

MR. HARTENSTIEN: I can't tell you much about squirt hose, but I do want to explain fire fighting apparatus on locomotives that are so equipped in terminals. It all depends on our locomotive engineer and the manner in which he applies the injector. He can put on the injector to produce cold water instead of hot, and it makes it perfectly safe to handle. We have brought that about through a study of the conditions and through instructions to our engineers, and it is working out very satisfactorily.

JOSEPH PRATT (Reading Co., Reading Pa.): We have not had any injuries from using that fire protection hose. The hose are tested once a month.

CHARLES A. HAMER (Frisco R. R., Kansas City): How much respect are we entitled to from some of these hard-boiled men when we go around and condemn a tool that is unsafe? I'd like to know how much respect is shown to men like myself on other roads.

CHAIRMAN ROHWEDER: I would say that your safety inspector should be, in my opinion, empowered with sufficient authority to place a B. O. tag on tools that are in his opinion in bad order, and that that authority ought to be respected the same as it would be of any other officer in the respective departments. That is the practice on our properties with our safety inspectors, and I presume it is on a great many other roads.

Mr. Shaff, you do quite a little bit of that. What authority has the safety inspector in connection with B. O. tools and B. O. equipment when he makes such an inspection and finds such a condition?

MR. SHAFF: We are very closely cooperated with by all the men who handle this work. If we find anything in our inspection that needs repair, there is no question about it, it is taken care of, and at once. We have no trouble whatever

n getting any condition or any defective tools that come to our notice taken care of right off the bat.

MR. HART (Michigan Central): By selling safety to the heads of departments we have secured full cooperation in taking out of service any tools or equipment not safe to work with. We have the mechanical departments so arranged that the superintendent or his representative appoints a man as tool inspector who makes a report in some shops twice a month, some only once a month, on all tools, and he has to give the number of tools inspected, the number found defective in the hands of men, and so on, to the end that these men are ashamed to have the inspector find any defective or worn-out tools, and they get them to replace them. Defective or worn-out tools are gradually decreasing on the reports, and very often we will have a shop without any tools condemned.

CHAIRMAN ROHWEDER: Is there any railroad that has a standard set of inspection regulations in connection with tools, ladders, scaffolds, and so forth, so that the inspector is guided by that sort of standard?

MR. HAMER: The Frisco has a standard of safety rules. I didn't ask the question to criticise my road, because I am one inspector who is backed up by the supervision to the last ditch; and when any man tries to go against the standard of safety at Kansas City, he has a pretty hard job.

Discussion of the Standard Hand Brake

A. C. EBRIGHT (St. L. & S. F. Ry. Co., Monette, Mo.): I'd like to know if there is some way we can have a standard hand brake. We are having worlds of employees injured by the operation of hand brakes. We get a cut of cars and start to set a brake, and we find so many different kinds that we don't know which way to operate them. We would like to see some kind of standard brake adopted.

CHAIRMAN ROHWEDER: Mr. Hammond, what have you got to say about a standard brake?

MR. HAMMOND (New York Central): I've got a lot to say about a standard brake. I am afraid we will not get very far with it. The Mechanical Section of the A. R. A. turned us down at one time. A standard hand-brake would be a mighty fine thing, for this reason: The majority of our equipment today has so many different kinds of hand brakes that about every day you find a new type, with the result that many times if men don't first try the brake or test the brake before depending upon its use, they run across a new-fangled hand brake and it takes about five or ten minutes to find out how to operate it.

Not long ago I made an analysis of accidents on our lines due to the operation of hand brakes, and I think that Mr. Bailey has given us a fine contribution when he put before us this wonderful paper. I didn't have a chance to debate the paper. Probably I would have gone into it a little deeper if I had told him what I know about operating hand brakes, but it is a wonderful contribution to this meeting.

As you know, every time anything is said about operating hand brakes, generally Red Hammond has his fingers in it. I have always been and still am in favor of a uniform, standard hand brake, but as I told you in the beginning, I think it is love's labor lost to try to tell the managers of the different railroads what would be the proper hand brake to adopt.

I could talk a great deal on this subject. I have got my views as to what I think ought to be a safe, a standard hand brake, but it doesn't appear to me that we are going to get very far, because we were turned down once before by the Mechanical Section of the A. R. A.

My thought along this line, if it can do you any good, is that a hand brake should be proper to protect the car and it should be provided with a brake pall that is weighted and self-operated; but we find now that approximately 95 per cent of all

hand brakes used on train equipment on Class 1 railroads of the United States are operated from the brake step board. I never did like them, but I guess we have to swallow it. The only thing we can do now is to try and educate and teach our employees the proper manner of setting this brake from the brake step board.

I always hoped that I might live to see the day when there would be adopted a uniform, standard hand brake, but I am afraid that instead of getting better we are getting worse on account of the different varieties of hand brakes that are now being used.

MR. HARTENSTEIN: I want to bring to your attention a report submitted by our friend, Mr. Bailey, in connection with the use of hand brakes. Personal injuries and deaths occurring from that classification are about equally divided as between defective brakes and the carelessness of the man. That indicates quite clearly that there is a general lack of inspection of the hand brakes on freight equipment, and the only reason I particularly mention that is that I believe every representative here should go back home with the full intention of bringing that feature to the attention of his management so that they can tighten up on their inspection of hand brakes.

MR. HAMMOND: We recently had an accident caused by one of our switchmen falling off the top of a metal roof car. You know most of the roofs of cars nowadays are metal. We put a coat of paint over that, and if the roof of the car is a trifle frosty, you realize that it is mighty dangerous to step over the metal roof.

At one time we thought that we would put a little stone dust in the paint as we painted the roof of the car and in that manner we might prevent slipping, but we found that when we made a mixture of this stone dust and paint, the stone dust went to the bottom of the paint and we got no use of it. I want to ask this assembly if they know of any way, after the roof of the car is painted, that they can scatter sand or dust of any kind on top of the paint. It appears that the man who made this report said there were certain railroads that were dusting the top of the paint with stone dust or sand, after the cars were painted.

CHAIRMAN ROHWEDER: We are using sand on the fresh paint. After the coat of paint is applied we are scattering a fine coating of sand over the top. Of course, the difficulty is that the sand does not remain after considerable use. It wears off very rapidly.

The New Train Master Got Results

MR. MOORE: In the hand brake days we had top inspection, and now we haven't it on a great many lines. We haven't it on the Kansas City Southern. I am of the opinion that if we had top inspection at all division points, we would eliminate many of these injuries caused from setting hand brakes. I would like to know the lines that have top inspection at all division points.

(The following roads reported that they had top inspection: Frisco, Baltimore & Ohio, Union Pacific, Lehigh Valley, New York Central, Santa Fe.)

MR. BAILEY: The Interstate Commerce Commission requirements call for top inspection.

MR. HALE: Theoretically the Santa Fe has top inspection, in every-day practice I imagine it is quite as thorough as is yours, but in every case it is not as thorough as it should be.

JOSEPH CLANCY: (N. Y. N. H. & H., Boston): At one of our big yards we used to have damages of about \$1,000 a day. We got a new train master to take care of the yard. Immediately he changed the inspection. Previous to his time when a chain of cars came into the yard, one man started at one end, one man started at the other end, and another man went over the top. When the two men met they changed places or crossed over and went the opposite way. Each man had a hang-out at the different ends of the train, and that was the easiest way for them to do

it. The man that went over the top went over independently. If it pulled up it was all right; the chain might have been wrapped around a wheel, he didn't know anything about that. The new train master had three men go along together; they started at one end of the train and went along the full length of the train. The two men watched and inspected to see that the chain was taken up properly. The damage in thirty days' time was reduced from \$1,000 a day to \$125 a day. Our accidents decreased along the same lines. Any man who had over a \$10 damage had to come and have a personal interview with the train master. If he could possibly help it, he never had another interview. That was one of the reasons the damage cost was cut. Another reason was that the train master insisted that they ride the cut solid into the rest of the train; they couldn't unload and let them come together the way they wanted.

In this yard they humped anywhere from two to three thousand cars a day. They had approximately 1,000 employees, and this proved very effective, so much so that the train master is now the superintendent on one of our divisions, and it is my opinion that his good work in the yard and the inspection were the reasons that put him there.

Adoption of Continuous Cut-Off Lever Advocated

T. B. McCAMPBELL (C. C. C. & St. L., Indianapolis): It has been my pleasure, gentlemen, to serve on Mr. Bailey's committee on Train Service Accidents. I am very happy to say that Chairman Bailey of that committee included practically all my recommendations with the exception of one, and Mr. Bailey doubtless had good reasons for not including that recommendation. That was for the continuous cut-off lever on train equipment. We all know the haste of yardmen in the average large yard of the country. We also know that if there is a defective cut-off lever the man doing the cut-off will not go on the other side to operate that lever, but he will reach in and get it. We are trying to keep our yardmen out from between cars. I know of no better way to do that than to have the continuous cut-off levers on our freight equipment.

I think the Steam Railroad Section should give serious consideration to the adoption of the continuous cut-off lever on freight equipment.

CHAIRMAN ROHWEDER: It seems to me the matter of the continuous cut-off lever is one particularly for the Safety Section of the A. R. A. in conjunction with the Mechanical Division of the A. R. A. We might, a little later, if the regular chairman desires, pass a resolution to the effect that that be given consideration by the Committee on Brakes of the A. R. A. Safety Section.

I would like to hear some discussion on shop accidents or maintenance of way accidents. A great percentage of our injuries, at least from a statistical standpoint, are appearing in the maintenance of way and mechanical departments. Are there any inspectors here from the shop end?

How many railroads are furnishing their shop employees with a proper examination for corrective lenses in shop goggles? What is their system of checking up goggles in service? That is as to whether the goggles are in good service condition, suitable for wear, free from scratches, and so forth, so that they are getting the maximum they can get out of their eye protection furnished through the medium of goggles.

MR. BAILEY: I am not one of the inspectors and I know I should not talk on that subject. I will say, however, that an examination was made by our oculist, requiring all mechanical men to pass that examination to determine whether they needed a correction. Up to a certain time that correction was furnished by the company. Employees entering the service after that time were required to reach a certain standard in vision. If they did not and the employing officer saw fit to employ them, they were required to provide themselves with the proper type of goggles.

D. G. PHILLIPS: We had an odd experience with the use of prescription goggles. We had a man at Toledo and had a hard time getting him to wear goggles. We found that he wore glasses for defective vision, and our goggles, of course, did not fit him. He didn't wear them, and I wouldn't have worn them either if I had been that man. We almost fired him because he didn't, but about six months ago we changed that man to the use of prescription goggles. Any man on the Wabash who needs prescription goggles gets them free of cost to himself, both with respect to the examination and the goggles.

We had a safety meeting in Toledo about two months ago, and we invited this man with whom we had had so much trouble. He came there with the pair of prescription goggles in his hand, and he said, "I am going to make a confession to you fellows. I use these for my reading glasses at home, they are so much better than the ordinary glasses that I wear." The ordinary glasses that he had been wearing had not been the proper glasses for his eyes, and he hadn't known it until he had his eyes fitted for a pair of goggles. If you want to prevent eye injuries, be sure you have eye glasses that fit the eyes of the men.

Goggles for the Employee Where Necessary

MR. BAILEY: There is one question that we were interested in with reference to providing goggles for engine men. On stoker fired engines, locomotive engineers and firemen are inclined to wear goggles to protect their eyes from cinders and dust. We do not prescribe the type of goggles that should be worn. In an efficiency test on our railroad at one time, we found an engineer wearing a goggle that distorted color. That is of such importance that instructions were issued that where enginemen were wearing goggles they must be passed on by the oculist of the company to protect against that contingency.

R. EDLESTON (Michigan Central, Detroit): On the Michigan Central in 1923 we were getting eye injuries extensively. In our steel shop in West Detroit, about three per cent were wearing goggles. There were enough goggles in that shop to supply the whole outfit, but the men would not wear them. We finally had to let them know that they would have to wear their goggles or get out. We put our foot down and demanded that they wear goggles. In 1925, in a steel shop with 135 men, we had only two accidents in the entire year, whereas in 1923 we had six a month; those in 1925 were not eye cases, either.

We have come through this year so far in our mechanical department with one eye case of a severe nature. All of our eye cases now are of minor importance, due to cinders flying and such minor things as that. We have gone very deeply into eye injury prevention. We examine our employees for eye and ear defects. If a man needs glasses, he needs special lens goggles. These goggles are provided for the men at the company's expense. We have quite a number of goggles supplied to the men on our railroad. It is making a wonderful change for the betterment of safety. If a railroad says it is an enormous expense to supply prescription goggles, I would answer that it is the cheapest thing that any railroad can adopt.

We had a man who was a first-class mechanic. He was trying his best to maintain the requirements of the shop from an efficiency standpoint. He was pulling about 65 per cent on a shop checking average. We finally got hold of the man, sent him to the oculist, and found his eyes were defective. He didn't know it. After examining his eyes we got him special lens goggles, coupled with his own glasses. That man is now checking 92 per cent, and runs as high as 150 per cent in his shop checking average, showing that we practically won out with that man, and he has more than 50 times paid for those glasses by having his eyes examined and by having the proper glasses supplied.

We also inspect to see if men's eyes are affected by the glare of furnaces. Thus

have time, go up there and get a lesson in the treatment of highway traffic; it will do you good.

We are building a park system north along the Chicago lake front, and starting at Irving Park Boulevard and going to the city limits, there are two highway traffic lanes 45 feet each, with a service road alongside, of 22 feet, and on those two 45 foot lanes nowhere between Irving Park Boulevard and the city limits will there be a grade crossing, stop and go signal or a policeman with a whistle, the movement of traffic will be without interference.

I spend my spare time trying to do something for the masses of the great metropolitan city of Chicago. Therefore, I am interested in saving lives at highway crossings where they cross steam railroad lines, or where the electric or interurban lines cross. It isn't the fault of the railroads, by any manner of means, that there are so many people killed at railroad crossings; it is more the fault of the man sitting in the automobile driving it. Sixty-five per cent of the accidents on the Lincoln Park System are caused by motorists who won't comply with the rules of the road. That is the trouble at the railroad crossing; they don't stop to think, disregard signals and signs—in other words, they run wild.

A Plan for Distribution of a Safety Booklet

I have a suggestion. It will cost the railroads in money an amount just equal to the cost of mailing it to each individual who receives it, and that is pretty cheap. It may have been tried elsewhere. I have looked into it and I can talk with assurance. In the state of Illinois next year there will be close to something like 2,000,000 automobiles operating on the highways. Thirty-five per cent of the traffic today on the highways of Illinois out in the country is represented by automobiles that are known as foreign automobiles or have come into Illinois from other states. Therefore, you have quite an interstate traffic back and forth.

I propose to you that the proper kind of literature be prepared on this railroad crossing question and the motorist's part in it, and that that such literature be placed in the hands of every motorist with the license plates, not only in this state, but every state in the union. For instance, the proper piece of literature, if handed to Mr. Louis L. Emmerson, Secretary of State of Illinois, who distributes the license plates, will reach the Illinois motorists. Mr. Emmerson has said to me personally that he will cooperate in putting that piece of literature in the envelope that contains the license plates. He said, "I will go further than that, I will put a piece of literature of that kind in every letter that goes out of this office to any motorist." You can do that in Illinois, Indiana, Ohio, New York, Pennsylvania, California, Missouri, Iowa, Kansas, and all the rest of the states, because there is no secretary of state and no man living who is not interested in saving human lives.

It is not the railroad company's fault, as I said before, in the great majority of instances that people are killed at highway crossings. It is the fault of the careless automobile driver. I have had them hit me when I was standing on Lincoln Park Highway, dead still, at five o'clock in the evening. Of course the driver was drunk but he hit me just the same. Probably if he was down in the country, drunk the same way, and driving at break-neck speed, he might have run into the side of some wonderful equipment of the New York Central or the Pennsylvania, and then have a damage suit on his hands to repaint the train.

I have a dummy folder prepared with figures on just what it would cost you to mail it. The various Secretaries of State get out a pamphlet that contains a digest of the automobile laws and regulations. Such data would appear in the folder, together with the state road map. The motorist will keep this in the pocket of his car or in his possession and never let it get away from him.

Can you visualize, for a minute, Mary and John going down the road in an

automobile in a strange country, and Mary having this folder in her possession, with the road map telling what is coming next and with all this propaganda as to caution at railroad crossings? Would John get hit? The folder is to be compiled in a simple, concrete way, viz.:

"Don't cross tracks immediately after train passes.

"When you come to a blind crossing, stop. Get out and look.

"Look out for ruts at bottom of hills approaching railroad crossings.

"There is a sign like this at every railroad crossing. Your life may depend on obeying the warning.

"Always throw your gears into second speed before crossing railroad tracks. If you should become stalled on railroad tracks, don't lose your head. Never under any circumstances speed up to beat a train at crossing.

"Don't attempt to make a high crossing grade without shifting gears; you might become stalled on the tracks at the top. Be extremely careful when driving at dusk and twilight when the vision is poor."

These slogans are illustrated in the proper manner in the folder. I believe if this were put out in Illinois alone, the saving in lives would be tremendous. In Illinois when you kill a man it costs \$10,000 and you have a devil of time proving that it wasn't the railroad's fault. I say again that in 85 per cent of the cases it is the fault of the motorist.

I would like to have this body of men think over the proposition of putting this folder out over the entire country.

The Cost Would Be Merely Nominal

Some fellows say, "How are you going to do that?" I told you when I started that I was a railroad man, so I know a little bit of what I am talking about. You can distribute the cost of this expense the same as you distribute the cost in the A. R. A. You can put it on a mileage basis or handle the expense as a part of the cost of operating traffic bureaus or classification committees. It would make the cost amount to practically cipher when you think of the educational features and the saving of life and prevention of accidents. It has got to be done in such a way that it won't act as a boomerang or some mugwump will get up and say the railroads are trying to get away from providing grade crossing separations. Grade separations will come in due time. They come in all communities when the density of traffic and population require them. To ask the railroads of America to go out and separate every grade crossing would be financial suicide; it couldn't be done. Therefore, the only other way, as I see it, is to take some simple method like this, get the cooperation of the Secretaries of State of the several states, particularly where the motor traffic is heaviest, and put out this folder of propaganda and educate the public mind that when they see a railroad track they must pay attention to it and not run across the roads as though it were not there. Then we will start cutting down in a practical way accidents at road crossings on the highways.

CHAIRMAN WHITE: Mr. Fyfe, I want to thank you for coming down to see us and bringing this wonderful message to us. I am sure that all the members of this Section appreciate what you have said, and to show our appreciation, I am going to ask the members to give you a rising vote of thanks.

(A rising vote of thanks was extended to Mr. Fyfe.)

J. F. GRONZKI (Portland, Oregon): I should like to ask if we can get copies of the bulletins Mr. Fyfe has just explained.

MR. FYFE: I have no duplicates. I just sat down and took the time to paste this together as a sort of dummy. I can have some prepared and turn them over to the proper committee and cooperate with that committee. I should be very glad to do that. It is just as simple as two times two make four. When you distribute the

expense over an entire state or over an entire system, the cost is so small to the individual line that there isn't a road whose cost wouldn't be paid twice over by the elimination of one accident. If you will just be good enough to designate to me to whom you want these delivered, I will get up some photostats and let you have them.

CHAIRMAN WHITE: As I am a member of the Highway Crossing Committee of the A. R. A. and live here in Chicago where I can get in touch with Mr. Fyfe, what do you say to the proposition of my getting hold of these and mailing them out to all those who write about them?

LEW PALMER: Is that the A. R. A. committee or the Steam Railroad Section Committee of the National Safety Council? There is no difference between the two organizations, but I think there is a chance of getting it over to the public in a little different way if you utilize the Steam Railroad Section Grade Crossing Committee, and I think the resolution was very nice, but I believe the gentleman deserves and wants some prompt attention. I can pledge to you, as a member of the Executive Committee of the National Safety Council, that that Executive Committee will support any action taken by the Grade Crossing Committee of the Steam Railroad Section of the National Safety Council. The National Safety Council is pledged to support our different sections, and as this, we are proud to say, is our most important and largest section, I am sure we will be very glad to support this splendid way of putting over one of the best things that I have heard in this conference.

Approval From the Council Committee

C. E. HILL: The suggestions that have been made here by our distinguished guest have, of course, been considered heretofore by many of the railroads, but not in the manner that he has outlined. I think his suggestions are well worthy of our most serious consideration on our own lines. For his benefit, the New York Central Lines put out literature similar to that in the States of New York, Pennsylvania, Indiana, and Mr. Emmerson offered to do it in Illinois, but the question has always arisen as to doing it uniformly and by all of the railroads combined.

I happen to be chairman of the Advisory Committee on Public Safety of the National Safety Council, and this very feature was discussed in a meeting we had Tuesday night. I know that the National Safety Council, if the railroads so desire, would be glad to sponsor it and handle it uniformly. However, if that is not thought advisable, my recommendations are that all of the suggestions that have been made here be referred to the Committees on the Prevention of Highway Crossing Accidents both in the Steam Railroad Section of the National Safety Council and the Safety Section of the American Railway Association, because these two committees coordinate at all times and there will be no duplication.

The Committee on Highway Crossing Accidents of the Safety Section is to have a meeting today. I am making that suggestion now so that Mr. Rowe's committee can consider that feature at this time and then decide upon what further cooperation they may need from the other agencies of the National Safety Council.

CHAIRMAN WHITE: That is perfectly satisfactory to the Chairman.

MR. GRODZKI: I would like to offer one suggestion in addition to what has been said, and that is that the circular be gotten out in the form of Mr. Fyfe's exhibit, which is much preferable, as I see it, to something printed in book form. I would be very much in favor of something on a card that could be displayed more readily.

MR. BAILEY: I make a motion that this be referred to the Highway Grade Crossing Accident Committee of the Steam Railroad Section of the National Safety Council.

MR. BRENNAN: I should like to amend that to the effect that it be referred to the Highway Crossing Committee of the A. R. A. also.

MR. BAILEY: I accept the amendment.

(The motion was seconded and carried.)

MR. FYFE: I don't want any of you to get the impression that this is the way it would be printed. The theory of this is that it will be of the size that will go into the license plate envelope; it is printed on map stock, the same as the Secretary of State prints his highway map. When they get one of these in Illinois, they have an official highway map of Illinois. You know and I know that any motorist who gets an up-to-date highway map of any state will keep it in his car. When he pulls it out to look at it, he gets smashed right between the eyes, as to his responsibility in connection with railroad crossings.

MR. GRODZKI: Does that show the railroad crossings?

MR. FYFE: You can't get an official map to show all the railroad crossings. It shows the major highways on concrete, and that is all.

MR. GRODZKI: Out west where they haven't got the railroads as thick as you have them here, we could show them.

Glad the Prodigal Has Returned

MR. HALE: I want to hark back just a moment to the report of Mr. Mitchell on Monday as chairman of the Committee on Membership. In the 12 or 13 years' history of this Section, we have had our prodigal sons, members who did not put a proper value on home ties and strayed away. Three or four years ago we were all very sorry to know that one of our long-time members and a big railroad had withdrawn. It happens that no longer ago than Saturday of last week or Monday of this week, that prodigal returned, and Mr. Mitchell was not furnished the data. I know that you will all be very happy to know that the Chicago, Burlington & Quincy is again a member of this Section.

CHAIRMAN WHITE: At the conclusion of this round table we are going to have the installation of officers. I am going to ask Mr. Hill to take charge of installing the new officers at the proper time.

I want to take this occasion to say a few words with respect to the wonderful sessions we have had here, and also the wonderful success of our speakers' luncheon yesterday. I am deeply thankful to every member of this session for the assistance and cooperation that have been given me the past year. I want you fellows, all of you, to give my successor the same loyal support that you have given me. I want to call particular attention to our executives' days. I think every executive that we had on our program said just the things that we wanted him to say. I believe every man will go back to his railroad with more pep in him to put this thing over. I know I am going back to the Illinois Central and I am going to talk bigger and better safety than ever before.

I want to call attention to the things said about discipline. You remember, in my opening address, I stressed discipline. I believe in it. I believe that is the only way we are going to put it over, so far as our employees are concerned. I don't mean just to go out and kill a fellow, or that sort of thing, but I have been out on the railroad myself for 18 years in an official capacity and I know just what the official on the Division has to say when some of the higher officers get after him to hurry the trains out of the yard and get off on time, pass up inspection, don't test the air, and all that kind of thing. We want to follow that up and see that they do the thing right. If they don't do it right, there are some men you can pat on the back and get anything you want out of, and others you have to sting. If you can't get it by patting them on the back, then sting them. All of our executives said that. Mr. Fritch of the Rock Island said so, Mr. White of the Missouri Pacific said so, and Mr. Johnson of the D. M. & N. said so. We are all agreed on that. Why should we stand back? Let's go out and talk it up and make the fellows understand that proper discipline is for their benefit and not to hurt them in any way.

I am holding out to you the complete elimination of accidents on our railroads. I believe we can bring that about. We have control of our employees; our men work with us; we have good morale, and we have men whom we want to hold their jobs. All we want to do is help them hold their jobs, not get them killed or get them to lose their jobs. We want to make our discipline count for good and have the men understand it.

I want to thank you all again for the assistance you have given me, and I hope that our next meeting will be just as successful, that we will have as many men present or more.

The next thing on the program is the round table discussion. That was to be conducted by Mr. Isaiah Hale. On account of Mr. Hale's having to leave, we have picked on Mr. C. T. Bailey of the Oregon Short Line. Mr. Bailey has a reputation for ability as a speaker on the safety movement and cannot be excelled when it comes to conducting round table discussions.

MR. BAILEY: When I looked on the program I found our old friend Isaiah Hale was delegated to this important duty. I looked forward with pleasure to being able to sit there and listen to some good discussion. I see they have cut the deck on me and slipped me in here. We are ready for the discussion.

W. R. SPETTIGUE (Los Angeles & Salt Lake R. R., Los Angeles): I would like to ask for an expression from the representatives of the railroads here who have adopted the new whistle signal for highway crossings. I refer to the locomotive whistle signal of two long blasts of the whistle, followed by one short, followed by one long rather than the two long blasts and two short blasts that we used to have. I would like to know what success you have observed in the adoption of that new signal.

The New Whistle for Grade Crossings

ROBERT SCOTT (Atlantic Coast Line): The Atlantic Coast Line Railroad, operating on the South Atlantic Coast, has adopted this new whistle signal of two longs, a short and a long. I regret that this new rule has not been in effect a sufficient length of time for me to testify as to its real value. I can say, however, that the safety department is very much gratified over this change, and all of our operating officers are watching the experiment with a great deal of interest. All of us have every reason to believe that it is going to produce good results.

C. C. MILLS (Frisco, Oklahoma City): The Frisco Lines have neighboring lines that have adopted this system, and we have studied it thoroughly. Within the next few days it will be adopted on the St. Louis & San Francisco Railroad. We feel it is a success.

J. A. CARNEY (C. B. & Q., Chicago): We have been using the new method of whistling for something over a year, and we feel that it has cut down our deaths at crossings by one-half. We have had a number of letters from automobile drivers who have thanked us for that method of whistling, saying if it had not been for that whistle they probably would have been caught.

I recently rode on the end of one of our trains. A Ford automobile stood very close to the train, turned down toward the ditch, and from the look on the man's face it was clear that if we had not whistled up to the crossing as we did, we probably would have gotten that man and his car.

MR. LAW (Illinois Central): I am a locomotive engineer on the Illinois Central pulling the Panama Limited, and I adopted this new whistle some time before my company did. I find that the motorist does not hear or does not heed the first part of the signal, and I do know from personal experience that the last blast of the whistle has saved me from striking many automobiles. I hope that the railroads of the United States will adopt that new signal and the engineers will sound it

according to instructions and let the last blast of the whistle end at the road crossing.

MR. BAILEY: The discussion so far seems to be very much in favor of changing the rule. I believe it was considered by the American Railway Association Safety Section, and I don't know what action was taken.

C. E. HILL: As long as you are talking about the grade crossing situation, I thought a brief statement as to flash signal protection might be of interest to the members of this body. We can make statements as to what we believe results to be by reason of certain things, but we don't always know them to be true. The only definite way of knowing whether or not you are gaining by reason of doing something is by making an analysis and knowing what your results are, both prior and subsequent to making this definite change. So far as the whistling is concerned, I think it has shown an improvement in that respect.

Facts About the Electric Flash Light Signal

I want to speak with reference to electric flash light signals that were adopted by the American Railway Association about three or four years ago, which I presume all of you are familiar with—the alternating flash light signals which operate upon the approach of a train and give the appearance of a horizontal swinging signal. The question has arisen as to whether it is more effective to have these located at the side of the highway or in the center of the highway. Our railroad, in keeping with many other railroads, first started to applying them at the side of the highway because we had no previous experience as to the effectiveness, whether at the side or the center, but since then we have had an opportunity to make an observation. At the close of 1926 we had upon our entire lines 105 crossings where these signals were located in the center of the highway, and 513 where they were located at the side, in the proportion of about one to five. During that period we had a total of 89 accidents where we had this type of protection, only 11 of which occurred where the signal was located in the center of the highway. That was in the proportion of one to eight.

During the first half of this year we had 60 accidents where we had flash light protection, only three of which occurred where the signals were located in the center of the highway, in the proportion of about one to twenty, although the signals were in the proportion of one to five.

An objection sometimes has been raised to placing the signal in the center of the highway because it was a hazard in itself and motorists would run into it. In answer to that, of the 11 accidents that occurred in 1926 where the signals were in the center of the highway, only four of them happened because of running into the signal, resulting in five slight injuries. During this year, not one has been due to running into the signal itself. Furthermore, we do know that motorists run through gates, they run into sides of trains. I don't feel that we can permit that to be any excuse particularly. The center installation tends to check the speedy motorist, divides the traffic and gets them over safely. I mention this as a safety feature solely.

It was my privilege to give this information before the Public Service Commission of the State of Illinois at their request, and they were very much interested. We are continuing that analysis, and as a result of our study installations are being placed in the center of the highway wherever it is physically possible to place them so.

MR. BAILEY: Before attempting to change rules we should have a sufficient analysis upon which to base our argument.

MR. GRODZKI: Does the railroad stand all that expense or is part borne by the county?

MR. HILL: I really believe we should not get into the question of expense, but just the question of safety. The expense in many instances is divided. That feature will take care of itself.

MR. BRENNAN: The Long Island was the initial road to adopt the flash light. We had it in use about a dozen places on the system for two years prior to the adoption by the Signal Section of the A. R. A. We put those lights on the side of the highways first, but found they were not as effective there as in the center of the highway, and, as Mr. Hill pointed out, where it is physically possible to put them in the center we are doing that now.

Recently we have secured the cooperation of the highway departments in the various counties on our lines by having them widen the road at that particular point so as to enable us to have them in the center. We are now lighting the concrete bases. They are about three and a half to four feet high, striped, and illuminated so a man coming along at night can see them. In five or six years we have had only one man injured by running into the light, and that was on a stormy night when his windshield was covered with rain. He admitted that afterward.

We feel that the flash light has been conducive to a greater degree of safety than any other device that has been adopted by the American railways at crossings. We feel that the wigwag, which we adopted in some places and which is the standard on the lines west of the Mississippi, has not reached the minds of the people in the East as it has on the Pacific Coast. For that reason we are going to adhere almost entirely on our lines to the flash light and as far as possible keep it in the center of the road.

We have on Long Island, as most people know, the most condensed form of train operation and vehicular traffic in any part of the world. We have the biggest grade crossing problem in any part of the world. We operate in three of the boroughs of Greater New York and two outlying counties. It is a long piece of line that we can hardly see on the map, but which has 500 miles of coast line, and that induces many people to come from New York over the wonderful highways, and we have to be on the alert eternally. We operate on that track approximately 1,200 trains in 24 hours, and that is some operation.

Some Opposition to the New Whistle

MR. BONE (Missouri Pacific): Some time ago we adopted two longs and a short and a long whistle. I am with the St. Louis Terminals, and our railroads operate through quite large territories of suburban towns. We have found quite an opposition to this class of signal, due to the fact that it annoys the public. I would like to ask whether any of the other railroads have found that opposition to this signal. That is one great problem that railroads have, to keep the public satisfied. Has any other railroad had that objection from the public?

ROBERT SCOTT: There has been some slight opposition. As a matter of fact, there is opposition to any kind of whistle blowing, especially in densely populated sections. However, I believe that after the people become accustomed to this signal and when they realize that we are blowing the whistle for the purpose of saving lives, they will follow our desires and fall in line with us.

MR. BONE: It has been quite a job for our train masters to keep the public satisfied in those suburban towns. We frequently have to go out and call on folks who have sent in complaints with regard to too many blasts of the whistle.

MR. BRENNAN: On the Long Island we have had our men arrested and taken into court a great many times for violation of what is known as the nuisance law. The City of New York insists that the excessive and unnecessary use of engine whistles constitutes, under the statutes of that state, a nuisance, and until advent of the automobile and the importance of blowing whistles became so manifest to all

observers, we had a good deal of that, but not since. They realize now that you can't blow the whistle enough.

MR. SPETTIGUE: In Southern California the municipalities of Riverside, Pasadena, Ontario, and various other places have objected to the old standard whistle. It is not improbable that they would object even more to the new whistle.

MR. CARNEY: We have had a lot of opposition along our suburban territory for some time to the blowing of whistles at all. It seems that our through trains from the west arrive in Chicago between seven and eight in the morning, and we have a lot of suburban trains interspersed with them. The people who have to get to Chicago in the early morning ride those trains and those who come late object to the whistles. We have tried out an air whistle, one with a soft tone which carries very well and which is not disturbing and which we believe will somewhat solve the problem. One of the troubles with the steam whistle on our locomotives is that our mechanical engineer designs a whistle which makes a certain amount of noise. We all know that a whistle is supposed to be a musical instrument and that musical instruments of that kind require a certain amount of pressure in order to make the proper tone. We put the same whistle on our engines whether they carry 250 or 2,500 pounds pressure, usually; the result is that we get all kinds of tones. It seems to me the solution is the adoption of some kind of an air whistle. We have used them for about a year, and they work very successfully. The public likes them, and under certain circumstances we can hear them better than we can a steam whistle.

MR. GRODZKI: We are now experimenting with a whistle something like Mr. Carney has mentioned, a sort of chime whistle that is not shrill and carries just about as far as the loud steam whistle that we used to have.

MR. BAILEY: There seems to be a question involved as to the spacing of the whistle. The time consumed in the entire operation of blowing the whistle for the crossing is the same, but it is differently spaced. I think that was one of the objections, with reference to the density and the loudness of the whistle. There are many communities continually disapproving the loudness of the whistle. We have been experimenting on the Union Pacific System with a similar device, as Mr. Grodzki has stated, but it seems to me that with some statutory requirements where state laws require the whistle to be blown for grade crossings, we have a conflict of city ordinances and state laws. In one of the states on our line we had that matter up and finally it was satisfactorily adjusted. We were requested to blow the whistle according to law.

Trouble With Dies Flying Out of the Hammer

MR. SHANNON (Hocking Valley): I would like to ask what difficulty, if any, the roads have had with regard to dies flying out of air hammers? We had a lost finger and a broken jaw from that?

MR. HAMER: The only reason I can see for that is inability of a man to hold the hammer where it belongs.

MR. CLANCY: I understand there is a new hammer that has a shoulder on it. It prevents the die coming out altogether. We have quite a number of accidents due to that. Of course, we have a clip that is supposed to hold the die in there, but the clips become defective and once in a while there is an accident. We have a boiler maker foreman in Boston who told me that he had some kind of a wire connection that will positively eliminate that source of accidents. I will be glad to send you a sketch of it if it does prove effective, and will find that out immediately upon my return.

GEORGE KELL (Canadian National): We have been experimenting with the steam whistle on the front end of our engines. After a great deal of opposition by certain of our officials, the general manager instructed us to put two whistles on the same

engine. The intention was that the whistle that we had on the front of the engine, being a brass bell whistle, sounded better than the old whistle. We placed two brass whistles on the same engine, one on the back end or original place, and one at the front end. We sent a number of our officials out with that engine and made tests, and even the man who was opposed to the placing of the whistle on the front end had to acknowledge that the signals could be heard clearly and distinctly at least one-half mile farther. We have now obtained 50 new engines with the whistle placed on the front end of the engine. They are in front of the box. On the other engines we carried the steam pipe from the dome to the front end of the engine.

QUESTION: Then you have condensation, don't you?

MR. KELL: To a certain extent. We lowered the pipe in the back end and put a drip in there to carry the condensation away.

MR. BAILEY: There seems to be one railroad that approves our old friend Walsh's original suggestion.

MR. EBRIGHT: That whistle ahead is a great thing for the engineer, the fireman and the head brakeman. A whistle up next to the cab knocks the hat off your head; it is deafening to the employee.

MR. BAILEY: That is one serious objection voiced by locomotive employees with reference to the shrillness of the whistle being located so close to the cab.

Problem of Handling Creosoted Ties

MR. McCAMPBELL: We are having a lot of our track men receiving quite serious burns from handling creosoted ties. I would like some of you men to tell us the methods you are using to prevent that class of accidents.

MR. BAILEY: We have experienced the same trouble on the Union Pacific. Particularly in hot weather when they are perspiring freely, they are liable to rub their heads or faces and cause infection.

MR. PRATT: We are using tongs, as far as I know, and we are not having any reports of men being burned with creosote. The ties are fairly well seasoned before they are sent out to sections to put them in.

W. J. ORR (Toronto, Hamilton & Buffalo): We had a man who lost his eyesight from creosote flying off the tie.

MR. BRENNAN: Will Mr. Orr make clear how it got into the young man's eyes?

MR. ORR: He was driving a spike in the tie and the creosote from the tie flew up into his eye.

W. J. HERROLD (Chicago & Alton): On our western division we experienced some difficulty with a motor car not properly operating the electric blocks. It will not tip the block when it passes over, for some reason or other.

MR. HEAVY (Erie): We have a light type car in operation and we experienced that difficulty where the track has not been used after a shower of rain. I have checked that operation many times and I have found no solution to the problem so far. I find that where the rail is clear that is not true, where there is no rust and the rail is clear it operates the block every time.

MR. HERROLD: That is the trouble we have; after a rain the block will not operate. After some other train has passed through the operation is successful.

MR. BAILEY: It seems to me the subject is well worth further consideration. In view of the fact that it is a matter of new operation, it might be well to refer that to some committee for investigation and report.

MR. HEAVY: We have had innumerable infections from creosote ties. Four years ago at this Section I put forth an honest endeavor to find some preventive for that thing. We find different types of men who are more apt to get that poison in handling

ties on a hot day. I don't know whether or not any of the other railroads have taken into consideration whether those are accidents or just occur as an infection due to the type of man handling the ties. It is very rare to find a Mexican or a colored man who is poisoned with creosote. If anybody has discovered a preventive I would like to hear it.

MR. KELL: We had the same trouble on one of our divisions, just one. Men were complaining of getting their hands poisoned and contended it was from creosoted ties. I inquired and found they were using a very cheap class of glove. When they took off the gloves their hands were perfectly yellow. I asked them to stop using the gloves for a little while. They did stop and we had no more poisoning.

MR. HEAVY: We have made all of those experiments with canvas gloves, leather gloves, gauntlets, and we find no difference. After the leather glove becomes saturated with the creosote fluid, the poison is more dangerous; the glove is not a preventive.

MR. BONE: We adopted the plan of furnishing vaseline for the men who unload ties. We ask them to use it. The supply department furnishes them vaseline in small cans. Whenever a man uses vaseline and thoroughly rubs it into his hands and face and skin, we do not have any accidents of that type. We don't require them to wear gloves unless they want to. That is up to them. I think this cheap glove that they wear can become saturated with creosote and be really worse on their hands than if they didn't use it. We have not had any trouble with anyone when we could get them to use vaseline on their face and hands before handling creosote timber.

MR. BAILEY: I am sorry that the time has come when we must close this discussion. You no doubt recall that yesterday afternoon, due to the time that was consumed and the necessity for providing a room for the banquet, the reply to Mr. Claypool's paper was omitted. I think this would be an opportune time to ask Mr. Hartenstien to make the reply to Mr. Claypool's paper that was postponed.

I want to thank you gentlemen for your consideration of the chairman. I hope you have all benefitted by the discussion we have had.

Response to Mr. Claypool's Paper

F. Hartenstein, Assistant to General Manager, Lehigh Valley Railroad Company, Bethlehem, Pa.

Mr. Claypool has apparently given considerable of his valuable time and attention to the subject of "Maintaining Safe Working Conditions in the Plant." He not only deals with accident prevention, but gives us an outline of meetings held in shops where the general duties of foremen and other supervisory forces were discussed for the purpose, as I understand it, of increasing efficiency and thereby increasing production, as well as other matters worthy of consideration and adoption.

In checking his suggested plan of safety organization, I do not find that it differs materially in operation from the one on the road that I represent, and the order of business is practically the same. I fully agree that safety organizations are necessary to assist in obtaining the results that are so essential in accident prevention work. Officers of such an organization should be the leaders in the safety movement and should have a full measure of assistance from everyone connected with the property from the president down.

The big job of the official of any property, in my opinion, is to be able to select an accident prevention organization, including safety supervisors, inspectors and committeemen, that are sufficiently interested in the movement to give their time and attention to increasing efficiency and effecting an im-

provement whenever and wherever it appears to be possible. Like the activities in other operations on the properties we are connected with, if we lag in this work it is reflected in our accident records and increased expenses, both to the victims and the company.

The principal problem of any safety organization is to create an interest in the work that will not vanish, but will remain seated in the minds of employees so firmly that self-preservation will always be their first consideration.

The third essential of Mr. Claypool's splendid presentation includes good housekeeping, education and supervision. The responsibility for applying and enforcing these essentials rests upon the shop superintendent, the master mechanic, the general foreman and foreman, and any laxity on their part will be



noticeable by the attitude of the men working under them toward the safety movement.

I want to refer briefly to his remarks on education: Before we can educate efficiently any man on any subject, we first must inspire his interest. If this cannot be successfully done, then the effort becomes a loss of time and labor, but if the employee can be inspired with the required interest, education then becomes an easy problem and we can expect results for the efforts.

I am in hearty accord with issuing and posting safety bulletins and displaying moving pictures showing the proper way to perform work to avoid injury and the results obtained by employees who do their work in a careless manner, but it is my opinion that the best results can be obtained by personal contact with the men on the job. The safety organization must sell accident prevention to the supervisory forces, and they to the men working directly under them, and when this is accomplished an improvement will be noticeable in our accident record.

On September 5 of this year the American Engineering Council made public

a report which should be of vital interest to all captains of industry, and the report refers so closely to the shop conditions on the railroads that I am going to take the liberty to quote it, believing that the investigation and report made by the Council will be of special benefit to the railroads, particularly in the shop plants:

"The American Engineering Council made public yesterday a report on its national safety and production survey which has been in progress for more than a year, declaring that industry must free itself from unnecessary waste by using modern safety methods to decrease accidents.

"A. W. Berresford, of Detroit, past president of the American Institute of Electrical Engineers, is chairman of the Investigating Committee.

The Meat of the Accident Prevention Problem

"When these losses and costs have been eliminated or brought down to the irreducible minimum,' the report says, 'then, and then only, will the highest production be secured, the most efficient operation realized. The dynamic force which can attain this highly desired objective has but one source; it resides in the management. Therefore, a responsibility, which cannot be evaded, rests upon the managers and executives of industry to make safety a major interest and a controlling care.'

"After a study of the 'accident and production performance of twenty industries and sixty product groups based upon an exposure of over fifty billion man-hours,' in which forty-six local committees comprising 230 engineers in all parts of the country participated, the investigators asserted that the truth of the thesis, 'The safe factory is the efficient factory, and the efficient factory is the safe factory,' has been established.

"The evidence also proves,' the report continues, 'that the accident situation in any factory can be controlled and that the accident hazard can be steadily decreased.

"The evidence further proves that that quality and thoroughness of management which secures consistently high efficiency of production as a major objective, will also attain a high safety record as an accompanying major objective.'

"The report contains 13 detailed findings built up from data covering 13,898 companies, 122,028 company-years, 2,454,413 employees, 13,143,569 man-years and 54,430,707,000 man-hours. These findings follow:

"Maximum productivity is dependent upon the reduction of accidents to an irreducible minimum. There is such a close relationship between safety and production that it is impossible for a plant to have continued increases in productivity unless it reduces at the same time, its accident rates.

"The experience of individual companies unquestionably shows that material reductions in accident rates can be simultaneously obtained with increases in production rates.

"The rate of production per man-hour, for the industrial groups studied, was 14.4 per cent higher in 1925 than in 1922.

"The rate of accident frequency per man-hour was 10.4 per cent lower in 1925 than in 1922.

"The rate of accident severity per man-hour was 2.5 per cent higher in 1925 than in 1922.'

"The report makes the following six general recommendations:

"That the same executive direction and control be given to decreasing industrial accidents as is given to increasing productivity.

"That those agencies which collect and disseminate accident statistics adopt uniform terminology and standardize their records so that they may be compiled on a comparable national basis.

"That the executives of those plants having high accident frequency and accident severity rates initiate, direct and control ways and means of lowering such rates to at least the low rates obtained by other plants in their industry.

"That industrial trade associations, engineering societies and other agencies, concerned with the improvement of industrial operation, bring to the attention of their members the necessity of improvement in safety performance as a vital step in the strengthening of their industrial position.

"That industrial trade associations endeavor to secure such action on the part of executives of their industries as will result in each plant having the lowest accident rates obtainable."

My friends, there is food for thought in the Engineering Council's report. Their recommendations can be adopted on shop and other properties operated by the railroads to good advantage, and I suggest their serious consideration. I agree with them that the same executive direction and control should be given to decreasing industrial accidents as is given to increasing productivity.

While the number of accidents resulting in death and personal injury on the railroads are decreasing, the cost of settling claims made in connection with them is increasing, and the reason for the increase in the cost of settlement is quite clearly understood. Our problem then becomes one of "how we shall further decrease accidents and the suffering and expense that follows?" We agree that over ninety per cent of them are caused by unsafe practices. Shall we continue as we have in the past, or shall discipline be used to a greater extent in further efforts to obtain the desired results?

Symbolic Emblem Presented to the Section

(Mr. White resumed the Chair.)

BEN ROBINSON (Pullman Porter, Portland, Oregon): Mr. Chairman, Delegates to this Convention: Beginning with the message of safety as given by our president on the first day of this Sixteenth Annual Safety Congress until this hour, the Pullman porters' safety representative and ourselves have summed up the whole matter today as follows: Up-to-date equipment, up-to-date safety operation, and up-to-date safety service. We realize that the Pullman car, after all, is operated on the great steam railway systems and trunks which serve as a field of our operations in which we strive to make safety converts who will continue to spread the message of safety.

In adding our bit we present this emblem known as the Steam Railway Medley designed on an old Pullman hat-bag by a Pullman porter representative to the Sixteenth Annual Congress.

We wish to present this to the Sixteenth Annual Congress as expressive of our appreciation to this occasion.

CHAIRMAN WHITE: Gentlemen, we now come to the installation of new officers. I have asked Mr. Charles E. Hill to do this for us, but he cannot remain, so I am going to ask none other than Robert Scott of the Atlantic Coasts Line, our good friend who reminds me of the slogan of the Illinois Central, courtesy and efficiency always, to officiate.

MR. SCOTT: We have now come to the last minutes of our session. It goes without saying that it has been a profitable and pleasant session. There is only one feature about this installation of officers that does not appeal to me, and that is that our good friend Jim White is going to step down and out.

MR. BRENNAN: I think before Mr. White steps out, it is entirely appropriate that the Steam Railroad Section of the National Safety Council should take cognizance of the fact that we have had during the 1927 period a most efficient, courteous and capable chairman. That is no reflection on what I may think of Bob Scott, Tom

Carrow, Charlie Hill and the other distinguished members who have served in a like capacity on previous occasions. Notwithstanding that the Illinois Central has had a lot of good advertising out of putting J. D. White here, the steam railroads of the United States members of this section have had advertising also, and advertising of a kind that we are going to carry back with us to our respective properties.

Most of us know that Mr. White suffered a serious illness during the period of incumbency as chairman. He was obliged to go fishing up in the North Woods. I am sorry he didn't come to Long Island. He went to the next best place, and he is back here in perfect health.

I think his ability as a chairman has not been questioned at any moment during the sessions which we have attended here. His courtesy has been uniform and the quality of kindness always in his voice and manner are things that we will carry back with us as pleasant memories. Let me say, without burdening further a busy convention that is about ready to adjourn, Mr. White, that I know I echo the sentiment in the heart of every man in the Steam Railroad Section when I say to you that we trust you will carry with you all the time a feeling that you brought to us many kind thoughts, many good words of advice, and that God will bless you, give you full strength and health, and that you may always know that we love you and hope to meet you many times.

CHAIRMAN WHITE: I just want to say, Mr. Brennen and friends, that I appreciate what Mr. Brennan has said. I thank you all.

A Valuable Opportunity for Forming Friendships

MR. McCAMPBELL: I wish to make just a little correction in your remarks, Mr. Scott. You said Mr. White would step down and out. We all agree to his stepping down, but not out.

MR. SCOTT: Your amendment is accepted.

I wonder if every member of this Section appreciates one phase of our activities here, and that is the opportunity for forming friendships. I can say from the bottom of my heart that the men who are in the Steam Railroad Section of the National Safety Council are the men who are very close to my heart. I regard them as friends, and I wish to hold that out to you gentlemen as an opportunity for making friends among those who are engaged in safety work in a national way. I speak from the viewpoint of one who is a grandfather, and when you get to that point, gentlemen, it is not so easy to make friends. I urge you young fellows to make all the friends you can, because you can't have too many in this life.

We now come to that part of our program where we install our officers.

I will call on Mr. C. F. Larson of the Missouri Pacific, who has been elected your secretary for the ensuing year, and present him to you.

MR. LARSON: Gentlemen, the honor that has been placed upon me, one of the newer members of the Section, is one that I very deeply appreciate. I know that the position carries with a very large amount of hard labor, but it cannot be any harder than the labor of the past year in getting up the program which I understand has not been condemned, at least, at this meeting. It is with great appreciation that I enter upon these new duties, and I hope I shall be able to carry them on with the same singular ability of my predecessor in the office. I thank you for the honor you have bestowed upon me.

MR. SCOTT: I am sure we are going to have an efficient secretary during the year. He has demonstrated his ability already.

I will now call upon a young man who has served this Section well and is going to serve as vice-chairman for the coming year. Mr. John E. Long, of the Delaware & Hudson.

MR. LONG: Friends, I wish I had the eloquence of a Scott or a Hale or a Carrow or a Hill or of my good friend, Mr. Brennan, so I could express to you my appreciation. However, I do appreciate it very, very much. If I get half the kick (and I understand kick is the proper word, because it was used by a college president at the banquet last night) out of being vice-chairman as I have secretary, it is going to be very much worth while. I have enjoyed working with you, and I want again to express my appreciation of the opportunity of working with you during the last year and the hope of working with you during this year as your vice-chairman.

MR. SCOTT: Now we come to the presentation of our chairman for the ensuing year, the man who is going to lead this Section, the man who will hold the destiny of this Section in his hands, to a large extent. His ability has already been demonstrated as a leader.

I have great pleasure in presenting to you Mr. Emerson Cott.

A Reminiscence of the Milwaukee Convention

MR. COTT: Gentlemen, in 1920 in Milwaukee I attended my first meeting of the Steam Railroad Section of the National Safety Council. I boarded a train out of Chicago. My wife was with me. We were not acquainted with anybody else on the train. I noticed, a seat or two away from me, a dapper looking young gentleman with gray hair, whose feet hardly touched the floor, and he called for the porter and asked him put a little foot cushion under his feet. My wife was rather attracted, as other women have been, to this gentleman, and later during the journey I made his acquaintance. His name was Robert Scott, of the Atlantic Coast Line Railroad. I don't know whether he recalls that, but he was the first person who told me anything about the Steam Railroad Section of the National Safety Council. I had merely been ordered by my general manager to be there.

It struck me as rather significant that this morning he should be the one to present me as your new chairman. I owe a debt of gratitude to Mr. Scott. Through the years he has given me many a word of advice and counsel.

He perhaps knows of my impulsive and erratic sort of nature, and now and then he has served to put on the brakes to keep me from skidding. I am really grateful that I was privileged to be introduced to you as your new chairman by this gentleman on my right.

A word or two, brief as I can make it, about our plans for the coming year. They of necessity are in embryo. I pledge you, however, a democratic organization for the year. I pledge you my best efforts regardless of how valuable they are. I will give you what I am able to give you.

I hope to surround myself with men who are capable of giving me advice and counsel. Any success that is made during the next year will be largely due to the kind of workers that I may be able to secure to surround me and to help me during the year. I am in search of those men now. I called together a few men a little while ago upstairs to advise and counsel with me about our program and plans for the future year. I am not making any promises; performances will answer, for if you make promises and break them, then, of course, you are in bad. I think I can safely pledge the united, whole-hearted effort of Mr. Long and Mr. Larson in trying to make the coming year a success.

We do pledge you that we will have an executive committee this year of workers, because no man is going to stay on that committee who does not work. We hope to be able to evolve a program for you. Yesterday or the day before, a resolution was passed by this Section instructing the incoming chairman to appoint a committee to make a study of non-train accidents. We also have a standing committee headed by Mr. Bailey on the subject of train service accidents. It is thought that these two committees should be transferred to the Safety Section of the American Railway

Association. It is our thought that in the future the Steam Railroad Section of the National Safety Council should confine itself to the public side of our problem. Here is the place for inspiration, some education and contact. Here is the place to air our public problems. The other section is the place, we believe, where the details of operating safety problems should be handled and aired.

I talked this matter over with Mr. Shedd before coming on the platform, and he has agreed to accept these committees so far as he as chairman can do, and I understand their Committee of Direction will take the matter under consideration at an early date.

Your bulletin service of the Steam Railroad Section will not duplicate that of the work of Mr. Bentley. It is our thought that the National Safety Council should and will produce for you during the coming year posters that are aimed at the public hazard and that you can secure your public safety posters through your membership in the National Safety Council, thus not duplicating Mr. Bentley's splendid endeavor in that direction.

This is a short outline of what we have in mind. Some of you are going to be called and asked to give of your time and of your service. During the coming year you may answer that you are busy men. The Executive Committee of the Steam Railroad Section wouldn't be worth a continental, gentlemen, unless there were busy men on it. We have no place for other than busy men upon that committee, and I hope you will realize that you as individual members owe some obligation to the railroad and the people as a whole by giving of your time, giving of your mind and giving of your heart in this work.

I feel that I have an obligation and responsibility, but I trust and hope and pray that I will be at least somewhat equal to it and will be able to follow in the footsteps of those who have gone before, to make the year a successful year, to give you a program which you can be proud of as you should.

I want to thank you for the favors that you have given me since 1920. I have only tried to be helpful, not hurtful. Any mistakes that I have made have been of the mind, not of the heart. I want you and hope to keep you all as my friends, and I hope to make you and keep you as my friends by being a friend to you.

MR. SCOTT: Before I present you this gavel, Mr. Chairman, I wish to assure you of the whole-hearted support of this entire Section. Gentlemen, let's give him our full support and let's go back home and do the job right.

ADJOURNMENT

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Taxicab and Fleet Owners Section

New Section Officers

Chairman, J. ROBERT CLAIR, Liberty Mutual Insurance Company, Boston, Mass.
Vice-Chairman, HARVEY D. WOOD, Yellow Cab Company, Chicago, Ill.
Secretary, J. E. DOBBS, Detroit City Service Company, Detroit, Mich.
Poster and Slide Committee Chairman, F. T. COLEMAN, Continental Bakeries, New York City.
Membership Committee Chairman, J. G. WILLIAMS, National Association of Taxicab Owners, Chicago, Ill.
Publicity Committee Chairman, S. J. STEINMANN, Indemnity Insurance Company of North America, Philadelphia, Pa.
Statistics Committee Chairman, A. E. LUNDSTEADT, Bowman Dairy Company, Chicago, Ill.
Program Committee Chairman, W. O. HINCKLEY, The Peoples Gas Light and Coke Company, Chicago, Ill.
Engineering Committee Chairman, THOMAS B. HOWE, Aetna Life Insurance Company, Cleveland, Ohio.
News Letter Editor, R. E. PLIMPTON, Bus Transportation, Chicago, Ill.
Executive Committee, THE OFFICERS AND—
MARCUS A. DOW, Vander Poel, Pausner and Jefferson, Inc., New York City.
DALE HARMAN, Yellow Cab Company, Kansas City, Mo.

Retiring Officers

Chairman, J. T. SMITH, Yellow Cab Co. of Philadelphia, Philadelphia, Pa.; *Vice-Chairman*, J. ROBERT CLAIR, Checker Taxi Co., Boston, Mass.; *Secretary*, J. E. DOBBS, General Necessities Corp., Detroit, Mich. *Committee Chairmen: Poster*, HARVEY D. WOOD, Yellow Cab Co., Chicago, Ill.; *Statistical*, RUSSEL REEL, Yellow Cab Co., Des Moines, Iowa; *Program*, HENRY J. MINEUR, J. M. Horton Ice Cream Co., New York City; *Engineering Representative*, F. C. SINGLETON, Standard Oil Co. (Indiana), Chicago, Ill.; *Executive Committee*, THE OFFICERS and DALE HARMAN, Yellow Cab Co., Kansas City, Mo.; LEE L. MILES, Louisville Taxi Cab & Transfer Co., Louisville, Ky.

Tuesday, September 27, 1927

J. T. SMITH, Chairman
Assistant General Manager, Yellow Cab Company,
Philadelphia, Pa.

The first session of the Taxicab and Fleet Owners Section of the National Safety Council, was called to order at nine-thirty o'clock by the vice-chairman, J. Robert Clair, Liberty Mutual Insurance Company, Boston, Mass.

VICE-CHAIRMAN CLAIR: I wish to welcome all those present to the Sixteenth Annual Congress of the National Safety Council and to the meetings of this Section. I hope you will all fill in the registration cards and turn them in, so we will know who is here.

I might say about our program that this should be a very busy and, I trust, profitable day for us. The first business on the program is the appointment of a Nominating Committee, and I will appoint Mr. Dale Harman, Mr. J. E. Dobbs and Mr. Harvey Wood.

I think we can immediately proceed to introduce our first speaker. The subject is "Safe Operation of Motor Driven and Horse Drawn Vehicles in Congested Districts." This paper will be read by Mr. M. T. Hanrahan, Superintendent of Vehicle Service, American Railway Express Company, Chicago, Ill.

MR. HANRAHAN: I have a little apology to make about the briefness of this paper. In the first place, for 60 days I have been organizing and perfecting the Trans-continental Express Air Service, which has kept me quite busy. However, I am glad to be here to contribute what I know about the handling of vehicles in congested districts. I was a close observer the other evening of the handling of the traffic down at the Soldiers' Stadium, and I am going to pay the Chicago Traffic Division and the South Park police organizations as fine a compliment as I can for the orderly handling of that great body of pedestrian and motor traffic without an accident. I haven't heard of one accident that occurred there, and I think the police department deserves a great deal of credit for the organization they perfected to handle that traffic.

To begin with, there were 705 people killed in Chicago during the first nine months of this year, and I think the larger percentage of those accidents were children in outlying districts. The larger percentage of these accidents didn't happen in congested districts. They occurred through careless drivers and half-wits who were driving cars and motor vehicles around the outlying districts.

Safe Operation of Motor Driven and Horse Drawn Vehicles in Congested Districts

**M. T. Hanrahan, Superintendent of Vehicle Service, American Railway Express
Company, Chicago.**

It is a difficult proposition for all large organizations operating vehicles in large cities to prevent accidents involving their equipment. While the humane feature is the most important, the economic waste is a serious factor, even though there may be no loss of life or serious injury to the public in the majority of cases. The problem of the safe operation of all classes of vehicles in congested districts is becoming increasingly difficult because of the traffic outgrowing our present street facilities, and there is a question in my mind whether we can go any further in the direction of additional safeguards until some action is taken

~~we~~ improve the roadways, either by double decking or whatever plan suggests itself as being the best for the needs of the situation.

However, as there does not appear to be any hope of immediate relief in street conditions, we shall have to devote ourselves to the best means at hand for controlling the situation; and speaking for the American Railway Express Company, which I have the honor of representing, we are doing everything possible to eliminate accidents.

Our company undoubtedly ranks as one of the leading vehicle operators in the United States, and we have an added responsibility, in that we are, perhaps, more intimately connected with the public than a great many other large organizations; and for this reason every man in our organization is impressed with the necessity of safeguarding our operations so as to avoid accidents.

It was a comparatively easy task just a few years ago to handle our business with a low ratio of accidents, but with the ever-increasing flood of motor vehicles, together with the increase in population in large cities such as Chicago, it has become a big proposition to devise ways and means for the prevention of accidents.

Careful Selection of Men to Operate Vehicles

Long before the motor car came on the scene we began our safety campaign by careful selection of men to operate our vehicles, as we realized that the ground work of accident prevention depended almost wholly on the human element, and no amount of planning could offset weaknesses in that respect. It has been a rule of many years standing with our company that only men of good habits and character could secure positions with us, and more especially in the vehicle service. The additional requirements are first-class physical condition, coupled with experience as a driver. We consider that it requires as much skill to drive a team of horses in congested districts as it does to operate a motor vehicle.

A motor car is wholly under the control of the chauffeur, and, if in good mechanical condition and operated carefully, should not become involved in any accidents. Horse-drawn vehicles cannot be brought to a stop as quickly as motor vehicles, and there is always the uncertainty as to what a team of horses will do under certain conditions. It is in these situations that the driver's skill comes into play, and our long experience confirms the theory that we have always held, that safety work is valueless if the selection of competent drivers is neglected.

It is our policy never to buy any but the best horses available. They must be sound, and, above all things, have a good disposition. Any that we discover in our service inclined to viciousness are immediately disposed of, as we consider that no matter how good a workman a driver may be, he must have proper tools to work with.

All of our heavier types of wagons are equipped with brakes, and they are kept in first-class condition. I doubt if any operator in the country pays as much attention to repairs as we do; for that reason the possibility of accidents due to defects in equipment is very remote. It is also our policy never to load a wagon beyond what we consider the ability of the wagon and the team to handle safely. Because of the street congestion confronting us daily, it is impossible for a team to control a heavily loaded vehicle properly in an emergency.

As regards our chauffeurs, we pursue the same careful program in their selection. They must be morally and physically fit. We consider our vehicles no place for half-wits. Too many chauffeurs today are only a lap ahead of their keepers. We consider our first and most important step, the careful selection

of candidates for chauffeur positions. Having done this, we put our applicant drivers on probation for a period of from three to six months before they are eligible for a permanent position. At the beginning of the probationary period, a corps of instructors take the candidates through a rigid course of instructions, covering the mechanical features of a truck, traffic regulations, etc., after which, the candidates are given a driving test under the observation of the instructors, through traffic conditions which our regular chauffeurs meet daily. During this test, each candidate is carefully watched to determine if he has the proper mental balance to operate successfully one of our trucks. A man may pass the mechanical tests and still not be a safe man to operate so dangerous a vehicle as a motor truck. The instructor, at the conclusion of the test, makes a report to his superintendent showing how the candidate reacted to the various conditions met in the test.

The superintendent determines from this report if the candidate is desirable. A further requirement is the test by city authorities, unless he has passed this before applying to us. Thus in the case of every chauffeur there are two checks on his competency. No chauffeur should be allowed to work out his own salvation. Rather should a carefully worked out set of principles or rules be laid down and the man held strictly accountable for their observance.

The Driver Should Be Able to Move Instinctively

Instructions to the chauffeur, which should be such that in case of emergency he will act instinctively, must be followed by ample supervision. Our company feels that the time spent in educating chauffeurs would be wasted if this were not carefully followed up with proper supervision. We maintain a corps of inspectors, all selected for their executive ability, experience and long service. A great many of these men, in fact, are seasoned veterans of from 25 to 30 years' service and they are all wedded to the idea of safety first. These men devote their entire time to vehicle control. Furthermore, to keep safety principles fresh in the minds of our vehicle forces, articles are published in the company's magazine, *The Express Messenger*, and meetings are held in our stables and garages for the discussion of accident prevention. Record is kept of all accidents in which our men are involved, and they are called in on every accident regardless of the extent of injury or damage, and the case is carefully gone over to show them how it was possible to have avoided the accident, provided, of course, our man was at fault. Unless an accident is of such consequence to warrant his dismissal, he is given another chance, with the understanding that a demerit will be filed against his record, and informed that three demerits mean dismissal.

This plan has enabled us to keep our accident record where it compares favorably with that of any similar organization in the United States. We operate approximately 8,200 horse-drawn vehicles and 3,670 motor vehicles, a total of 11,870 units.

The mechanical condition of motor trucks plays a large part in accident prevention, and I think every one will agree that so far as the commercial vehicle is concerned, good business judgment dictates that it must be kept in good operating condition. The braking power of a motor vehicle is of prime importance, and in my opinion, all motor vehicles should be capable of stopping from a speed of 20 miles per hour on a dry, smooth, hard surfaced road by means of foot brakes alone, in a distance of not more than 50 feet. Of course, it is understood that a careful and properly trained chauffeur will not attempt to drive in congested districts at a speed of 20 miles per hour and it follows that if the brakes are in a condition to function properly at a high speed, they are doubly

efficient. We have found from long experience that the safest speed limit for our motor trucks is 12 miles per hour, and to insure that that speed will always be maintained, we have placed on all our motor trucks, a sealed governor, which prevents a greater speed unless the seal is broken and the governor adjusted. Frequent inspection of the seals is made to prevent any tampering by the chauffeur. We take pride in the fact that we have never had a report nor an arrest of one of our men for speeding. Of course, this is expensive, because greater speed means greater operating efficiency, but we are willing to sacrifice all this in the interest of public safety.

We feel, naturally, that we must anticipate daily what the average pedestrian will do in congested districts, and we have impressed on all of our drivers and chauffeurs the importance of not having their attention distracted from the road in front.

All accident prevention work must start and finish with the man in charge of the operation of the vehicle, and if his education has been properly attended to, there can be no question but accidents will be kept to a minimum, provided, of course, that there is adequate traffic control, by means of lights or other devices, and more important perhaps than anything else is traffic officers in sufficient numbers to regulate the traffic properly. Mechanical traffic control, by means of the numerous devices now in use, is very helpful, but the presence of numerous traffic officers in congested districts is not only important, but absolutely necessary.

Discussion of the Use of Governors

VICE-CHAIRMAN CLAIR: It is highly desirable, gentlemen, that we conduct some discussion. I know we all have our problems concerning the particular job on which we are working. I hope no one will leave this morning without giving us an idea or two or perhaps asking a question concerning some point in which he is interested.

I am sure we are all very much obliged to Mr. Hanrahan for his paper.

WILLIAM HINCKLEY (People's Gas, Light & Coke Co., Chicago, Ill.): I would like to ask what kind of governors you use?

MR. HANRAHAN: Our Motor Vehicle Department has two or three different kinds of governors. I will get the information and give it to you.

MR. HINCKLEY: I wonder if Mr. Hanrahan knows what success they have, how long these last on various types of equipment.

MR. HANRAHAN: I think they are lasting all right. I don't remember, but I think we had only one case in five years when a governor has been tampered with by the chauffeur and he was promptly discharged.

I learned something new the other day. We have governors on our tractors and demand so much mileage and so many moves per tractor, and the operator's performance sheet has to show just how many moves he made in eight hours, how much mileage he covered. I understand one chauffeur jacked up his front wheels, where the governor was, and spun the front wheel, but it didn't register any distance. He was taken off the job.

J. A. HEINZ (Swift & Co., Chicago, Ill.): Do you have the same mileage on all sized trucks, regardless of the truck? I mean the governor.

MR. HANRAHAN: Yes, on the motor trucks we do, except a few trucks which we operate in outlying districts. We put on a truck last week for the air service alone, which is geared for 45 miles and in case the operator has to come in from the Municipal Field, which is about 12 miles out, we give him the benefit on the highways where there is little danger of accident.

Most of our trucks are operated in bus districts, and we have practically four

or five cities within the corporate limits of Chicago. You find one at 63rd Street; at Crawford is another one; at Wilson Avenue another. They are very congested too, with a lot of business.

P. J. HEBRON (American Railway Express Co., St. Louis, Mo.): Are the trucks governed at 12 miles which operate between those outer towns?

MR. HANRAHAN: Yes, they are all governed at 12 miles an hour. I am wondering what effect, if any, you have noticed on the length of the drives, where they have hard pulling.

It may be possible that the American Express has pretty good roads where they go. We take a truck of our own every once in a while and govern it down to 12 miles an hour. That is for heavy duty equipment. For light stuff I get 16 or 18 miles an hour. When we get into the heavy duty, we get the complaint that the truck won't pull out the governor, and is stuck there. It runs us into considerable expense. I don't know how it affects the American Railway Express Company. Some of our mechanics can remedy it, but our chauffeurs have a time doing it.

Speed Regulated to 12 Miles an Hour

MR. HANRAHAN: Your tonnage is about double ours. The average load of express on the three and one-half or five ton trucks wouldn't average 5,000 pounds. The tonnage with your equipment of all kinds is heavier and I don't know whether a governor at 12 miles an hour ought to be put on your trucks, because they probably don't travel over 12 miles an hour with the loads they carry.

C. S. GOLDSMITH (The Brooklyn Union Gas Co., Brooklyn, N. Y.): Are most of your trucks electric trucks?

MR. HANRAHAN: No, we have about 200 gas trucks and 175 electric trucks. All our equipment is heavy equipment. We have no small equipment at all in Chicago.

MR. GOLDSMITH: The American Railway Express in Brooklyn has practically all electric trucks and they are limited, of course, in speed.

MR. HANRAHAN: We operate only horse-drawn equipment for all Loop business. All our terminals are within a mile and a half or two miles of that congested district and we use horse-drawn vehicles exclusively on that. We find that we can sometimes use a horse for 20 years and keep building him up all the time, because the work is just a little exercise for him. We go four miles outside the Loop with horse-drawn vehicles. After the four miles we use the electric. Beyond that four miles is gas. We get along very nicely.

VICE-CHAIRMAN CLAIR: Mr. Hanrahan, as I understand it, you require each of your men to undergo a physical examination?

MR. HANRAHAN: Yes, we have an insurance company in our express service, and we ask them to join this insurance company. Of course, in joining the insurance, they have to stand a physical test, and if there is anything wrong with them—sometimes we find a minor defect—we just send the man to a doctor and fix him up and bring him back.

VICE-CHAIRMAN CLAIR: Does the examination include a color vision test?

MR. HANRAHAN: I am quite sure it doesn't.

VICE-CHAIRMAN CLAIR: The subject of giving drivers color tests in order to be sure they are able to recognize traffic signals is something about which there has been quite a little talk, and I believe serious consideration has been given to making it a requirement for taking out a license in Connecticut.

D. J. THELAND (Northland Transportation Co., Minneapolis, Minn.): I would like to ask Mr. Hanrahan's opinion in regard to the speed of the governors as it affects safety. Do you consider it safe to have vehicles governed down to a certain speed which might make it impossible for a vehicle to pass another, and in attempting to pass a vehicle, not be able to drop into the line of traffic again, and in that way cause an accident?

MR. HANRAHAN: I can't quite agree with you that he would have an accident if he got out of the line of traffic and wasn't able to make the hill as he thought he would. He would have to wait; that is all.

We instruct our drivers not to take any chances. It might lower his efficiency as far as the load is concerned, but I don't believe it would add to the hazard to take the driver outside the string.

MR. THELAND: You don't think there would be any danger of the governor shutting off while he was passing and making it necessary for him to drop back?

MR. HANRAHAN: No.

P. J. HEBRON (American Railway Express Co., St. Louis, Mo.): Mr. Hanrahan has told you practically everything concerning our company. His work is in Chicago; mine is in St. Louis. The town is a little different down there. We have a great number of hills. We also have our trucks governed to 12 miles. As Mr. Hanrahan stated, the chauffeurs are delayed if they have a load. That has been our experience in St. Louis. We have several chauffeurs who go a distance of six or seven miles, and we raise the governor to 14. Those men have three and one-half ton trucks and bring in their tonnage every night.

VICE-CHAIRMAN CLAIR: We will immediately proceed with the next paper, which will be given by Mr. William Hinckley, Superintendent, Automotive Transportation, Peoples Gas, Light and Coke Company, Chicago, Ill.

Introducing the New Driver to His Job

William Hinckley, Superintendent, Automotive Transportation, Peoples Gas Light & Coke Company, Chicago, Ill.

Do you realize the importance of starting the driver on the right road to his job?

Fatal automobile accidents, estimated figures, in the United States in the year of 1920 amounted to 9,106, and in 1926 to 23,000, a vast increase of fatalities which human intelligence cannot replace, not to mention money spent on autos or accident repairs.

At this point we have a little road book. I haven't it with me, but if you will write to us, I will send you one. This book embodies traffic rules, not in detail, but generalities, with a few designs of intersections, which show the driver how we want him to handle his car. We also include about 30 or 40 don'ts and try to impress the driver with all the points in this book before he starts out with his car which is, of course, after his credentials have proven satisfactory.

Our first move is to ascertain from the applicant just what he knows relative to traffic rules and regulations. We do this to determine just what he knows about his job. When we find him lacking we attempt to educate him on the essentials of traffic regulations. We then take him into the office and introduce him to the office force and do the same in the shop in order to make him feel at home. He is questioned as to what he knows about the mechanical end and asked to demonstrate his ability by performing the work which is generally supervised by the shop foreman. In many respects this brings out the question of truthfulness which we deem necessary. If he is inclined to make false statements to obtain a position he might do a lot worse after he gets the job.

If the applicant has spoken the truth he is ready for the wheel under the supervision of the foreman, assistant foreman or an A-No. 1 mechanic. These men know their game and are of good standing in our organization. They carry but two ideas in their minds, "Safety First" and "operation of the car." They are also good judges of human nature and make allowances for nervousness and excitement when noted on a man taking over a new job. The applicant is

allowed to pursue his own course until such time as our man thinks he is able to handle the car properly. Here we change the course and he is taken over a prescribed route through heavy traffic conditions.

Deviating for the moment to put my point of view over, I would like to ask the following question: Why does an automobile make a hog of human nature? The term hog might be changed to suit one's ideas but the term is proper, as I see it. This demonstration drive with the mechanic brings out this point strongly and we base our opinion on the candidate's ability to fit our organization, which we try to keep within the safety zone. For instance, we pull a man to the curb and note what movements he makes in pulling out into the traffic lanes. He either shows respect for the other fellow in the lane of traffic or the hog comes out and he busts into traffic. The same course is pursued along these lines at intersections, lanes of traffic, etc. If the man shows respect for the other fellow he is considered desirable but if he shows no respect at all he is cautioned about the hog element and given an opportunity to change his ways.

Heavy Traffic Brings Out a Man's Characteristics

After the elimination of the hog we endeavor to determine just how his mind functions relative to carelessness. In other words, keeping our idea of safety in mind, the man in charge will guide him into places of traffic to determine his thoughts as to how much he relies on what the other driver will do. He is also checked on traffic signals and lights and we explain the dangers of running through lights and also that a stop light means just what it says irrespective of what traffic conditions are.

Assuming that the routine proves satisfactory we endeavor to explain a few of our ideas on driving. A black-board with a street layout with intersections showing proper and improper methods of driving is used. The black-board is cleared and he is asked to answer questions by making a sketch on the board.

When we are sure he understands our ideas the man is ready for the job. Our efforts do not stop here, as he has to satisfy the man he is to drive for and ourselves on the operation of the car. The probation period is six months and if he survives we term him a permanent employee, provided he takes care of his job and decides to stay.

In conclusion, safety meetings are held once a month and the men are represented at these meetings. Bulletins are posted on the procedure and the attention of the men is called to them.

Last year we ran into 89 accidents on a fleet of 230 pieces of equipment. In each instance the committee, consisting of our staff engineer, the superintendent of transportation and the superintendent the man was working for, sat in on the case. One thing we are handicapped by in the Peoples Gas, Light and Coke Company, is that the superintendent of transportation has charge of very few chauffeurs. The bulk of them are distributed to other superintendents, and we cannot bring the powers that be to believe that we ought to have jurisdiction in sizing up the men as they should be sized up.

In other words, if a man is a good gas fitter, we have an awful time dragging him off a truck, and we have to pound it into his head to go along with our ideas. It is about the same in other lines of our work. Cooperation is getting better along these lines every day. The continual pounding is making them see the light of day, but I don't believe it will work as efficiently as if the man having direct charge could lay out the work as he sees fit.

Out of those 89 accidents, 14 per cent were at fault. We felt that our drivers were careless. There were 15 per cent that were possibly avoidable, and the

rest were accidents where our men were absolutely not to blame, where they stopped at traffic signals or stopped at stop streets or were stopped in traffic and somebody backed into them from behind or the side, and there was absolutely no chance of the party causing the accident collecting any damages from the Peoples Gas, Light and Coke Company.

We are striving to improve that record by the use of a bulletin board, and three colors of stars. We use a red star for an "at fault" accident; a blue star for an "avoidable" accident; and a yellow star for an accident "not at fault." When a man gets three red stars within a year he is dismissed from the service, irrespective of what his record has been. If he gets five blue stars, he is dismissed from the service. We are now at the point where we think we will have to lower these stars. In other words, the supervisor or vice-president of operation, who has charge of the transportation department, is contemplating cutting that to one red star or three blue stars for immediate dismissal.

MR. JONES (Indiana Indemnity Co.): There are a few things I would like to ask. Pertaining to drivers who have formed the habit of pulling in on the left-hand side of the street, if reports are sent to your company, what action is taken?

MR. HINCKLEY: In the first case, a reprimand; in the second, a lay-off; in the third, dismissal.

MR. JONES: Pertaining to the number of accidents—blue stars, yellow stars and red stars—if a man should be in an accident that would cause him to receive a red star, how long a period do you allow him to go without taking that mark away from him?

Three Accidents in a Year Bring Dismissal

MR. HINCKLEY: We allow him to go one year from the date of the first accident. If he has two more, he is dismissed at the end of the year, but we give him a year from that date, which is ample time, I believe.

As a matter of fact, the supervision of our company, as I said, is right now contemplating bringing that down, due to the fact that we haven't made the big drop in the percentage of accidents we should in 1927 to date, as we did in 1926 over 1925.

MR. JONES: Supposing a man should violate some traffic rules and a pedestrian should write in to the company and tell of his violation, is that information of value, or do you request this man who makes the complaint to give further information, and to appear at the trial against the driver?

MR. HINCKLEY: We do not. In a case of that kind we would summon the driver to the front. We would ask him the question. You can pretty nearly tell whether the man is lying or not. The average pedestrian will not write a letter unless there is some cause for it. That is the way we feel.

In the public utility business we believe in service first, and the consumer or pedestrian on the street is always right.

MR. JONES: My opinion differs somewhat from yours, because I drive a car every day of the week, and you will often see that the truck driver isn't at fault. You must appreciate that a truck will only travel at a certain rate of speed. Many of us fellows who are driving what we call high-speed cars push in and push out the truck driver. The truck driver isn't always given the break.

Understand I want to put this to you as an individual who is not interested in defending either party. Every man driving a truck isn't what he is represented to be. I think the truck drivers feel that they want to give the passenger cars the benefit of the road, but you always find that if the car is scraped as you say, the man with the passenger car wants to put it on the driver of the truck.

MR. HINCKLEY: That is an accident there. Now you are bringing up two versions, as I see it. You are talking about pedestrians reporting violations in the first place, and then you cite what is really termed an accident. If one of our trucks scrapes an automobile, that is an accident. Where the man makes a complaint against us in the case of an accident, our claim department goes out. He gets this man's side of the story. We get our driver's written report and compare notes.

We also go to the witnesses when there are witnesses obtainable. We have very few accident cases where witnesses are not obtainable. When they are not obtainable, the man gets the "break" provided he has proper length of service and the reputation. We are humane, or try to be.

On the other hand, if it is a fellow we have had a lot of trouble with and we know he is a little bit haphazard, he gets no "break" from the committee. But anything that comes in as an accident—if one of our cars touches another car—the instruction is: "Bring in that number if it is possible to get it." We go out and consult the witnesses, and ordinarily your witnesses will give you a "break" on it and the man is worked on accordingly.

In the last twelve years of operation, we haven't had three letters from the pedestrians come into the office, drawing to our attention the fact that our drivers are not obeying traffic laws and regulations or are abusive in giving the pedestrian the right of way.

Age May Disqualify the Applicant

C. C. BENEDICT (Standard Oil Co. of New York, New York City): I would like to ask what regulations you have, if any, regarding the age of a chauffeur. Do you have an age limit and what has been your experience?

MR. HINCKLEY: Ordinarily we have set no age limit. In other words, if a man is capable to do the work on a truck or car, provided he isn't too old to be active, he is eligible for the job. If a man is 45 years old at the time of hiring, we do not allow him to participate in what we call our pension.

Every employee of the Peoples Gas, Light & Coke Company is allowed a pension. That pension is added on at two per cent each year of service. When a man is 65 he is asked to take the pension, and in the automobile end of it unless a man at 65 is very active and has the ability to go along, he is dropped.

The element of youth is left to our own judgment, and it is our aim when we are hiring drivers for the transportation department not to go under the 23 year mark, if we go that far. Most of our men today run between the ages of 27 and 50.

MR. BENEDICT: It has been our experience that the driver 21 years old is inclined to have more accidents than the one 26 or 27.

You spoke about instructing your new driver in the mechanics of the car—teaching him about the mechanical part of the truck. Is that done just so he will have a little more intelligent knowledge of what he is handling, or so he can make minor repairs?

MR. HINCKLEY: It is done so he will have more intelligence. We ask our men not to touch the cars. We find the average chauffeur "gums up" the job more than it is worth, provided we let him go ahead on that basis. We have one set of trucks making a 50-mile zone from State and Madison Street, on which we allow the driver to change spark plugs and make other minor adjustments.

JUDSON C. DAVIS (Hartford Accident & Indemnity Co., Chicago, Ill.): Are the safety meetings held on company time or on the time of the employee?

MR. HINCKLEY: They are held on company time, and if the meetings extend over time, the men's time goes on on the same basis. They are called in at 3:30 in the afternoon. Their quitting hour is 4:30.

W. F. COULTER (Hartford Insurance Co., Hartford, Conn.): What percentage of

the men are turned down in the test when you run them through a mechanical test, when they are applying for a position and you are not sure they are telling you the truth?

MR. HINCKLEY: We lose about three out of five on the truthful statements. The average man will tell you he knows more than he really can put over in the shop, when you send him out to do it, not realizing he will be called.

P. J. HEBRON (American Railway Express Co., St. Louis, Mo.): Is the man's previous record investigated before he comes in?

MR. HINCKLEY: Absolutely. We are assuming now his credentials are O. K. and the man has passed what we call his application test. That is where my talk started. We look into that thoroughly before we take a man on, and if there is any doubt at all we make a very thorough investigation by sending a man out to look up his record.

G. O. GILBERT (Illinois Bell Telephone Co., Chicago, Ill.): Do you use the policy of bringing men from the shops to promote to chauffeurs or do you hire them outright?

MR. HINCKLEY: Both ways.

MR. GILBERT: What percentage?

MR. HINCKLEY: In regard to bringing them from the shop into the chauffeur jobs, there aren't very many men who go into the shops lazy enough to want the chauffeur's job. If they get into the shop, they stay there and don't want to get out. When our lay-off periods come, it is hard to get the mechanics to go driving. That percentage is small, and I wouldn't say it would be one-half of one per cent of the total men on our turnover.

The Problem of Who Should Employ the Driver

MR. GILBERT: Do you expect the drivers to do other work than chauffeuring?

MR. HINCKLEY: We expect our men to do as they are told, whether it is chauffeuring or something else. In the public utility game, such as we are in, there are instances when the chauffeur can be used nicely, and if he has to use a pick or shovel or anything else, he does it.

T. B. HOWE (Aetna Life Insurance Co., Cleveland, O.): I gathered from Mr. Hinckley's paper that he believed the men in charge should hire the employees, but I gathered from the trend of his paper that his concern really does not do that. It sounds as if there were another employment manager. Do you believe the man in charge should do the hiring?

MR. HINCKLEY: I think he should, but we are handicapped in that respect. Our officers have come to believe, in the last two years, that it should be done; but on the other hand, the superintendent who hires this man hires him from his point of view. It may be a laborer or it may be a delivery man or a truck driver or maybe a gas fitter. Gas is the essential thing and that is where we lose out. We have pretty good control over our delivery men and personal car chauffeurs, but the minute you get into the gas fitting subject, you are touching something you can't handle.

J. A. HEINZ (Swift & Co., Chicago, Ill.): Are your chauffeurs organized?

MR. HINCKLEY: They are in this respect: Some years ago Tim Murphy, known to many of you from the vicinity of Chicago, organized what he termed the Gas Workers' Union. That took in everybody—our laborers, our men operating engines, the gas fitters, and the chauffeurs. In other words, they were all Tim Murphy's union men, up until last year when the stationary operating engineers took them over and they are all Tim Murphy's Union.

MR. HOWE: I would like to have the question I asked previously referred back to Mr. Hanrahan.

MR. HANRAHAN: You mean about the employment of chauffeurs? We have, as

I say, six stables. We have three garages and three stables, and each stable has an assistant superintendent. One man has charge of all the horse-drawn stables and one has charge of all the garages. All of the help is hired by the superintendent, who has charge of the garages, and as a man goes along his demerits are charged up to the superintendent. So if he gets a "dead one" in the service, we say to him, "What did you do that for?" We charge him up with the caliber of man he gets in. If he gets a burglar, we call him in as well as the burglar. It makes him doubly careful when we go after him as well as anybody else.

VICE CHAIRMAN CLAIR: I think this has been a fine discussion, Mr. Hinckley.

I might say that we have some well defined ideas as to what the activities and functions of this section should be. We feel we should be one of the leading sections in the Council. After all we are the men who are going out, literally rolling up our sleeves, and tackling this problem of educating the men behind the wheel. We are not talking theory. We are practical fellows. We are the men in touch with the drivers. As I say, it is our work to get to the man behind the wheel, and that human factor is surely the big problem.

The last paper will be presented by Mr. Harvey D. Wood, Safety director, the Yellow Cab Company, Chicago, Ill.

Some of the Real Problems of Taxicab and Fleet Control

Harvey D. Wood, Safety Director, Yellow Cab Company, Chicago, Ill.

I am very keenly interested in this section, primarily of course because I need help. But other than that I have been identified in various sectional meetings with the National Safety Council for some time, and it is only in the last year and a half that I have come over with the Yellow Cab Company and have become interested in this section. Previous to my connection with the Yellow Cab Company I was in the public utility business, and the Public Utility Section, as you know, is a real section. They are very active, and they have some wonderful sessions. I hope some day to see this section grow and expand to that size so that we will have bigger and better meetings and more interesting discussions brought out.

Along that line, I am going to apologize, Mr. Chairman, for not having a paper. I didn't come up here to give you any information. I came up to give you some more fuel to "chew the rag" about, something which we can all talk about at the luncheon, to add to the questions Mr. Dobbs submitted in the mail some weeks ago.

There are three important things in connection with the driver that some of us automatically and others systematically consider in employing a man or in putting a man to work. They are, of course, selection, training and supervision. Those three subjects cover the whole field, as I see it. They can be subdivided and resubdivided, and on the selection phase of the thing you enter into your psychological test or you enter into the personality or qualities of your employment manager, whichever method you may employ. Then you have various ways of measuring your candidate, whether he would fit this kind of job, whether he should be a ribbon clerk or a taxicab driver.

That is something that is more or less undeveloped as to the finer points, anyway. I hope some day in the immediate future we will get something started on the selection of drivers. Why is a man picked for this particular job? Now I often ask the drivers that. They come in, and I talk to all the new classes. I sometimes single a fellow out and say, "Why did you come to work here? Were you out of a job, and did you see an "ad" in the paper and come over here, or did you come because you were attracted to the organization because of its reputation on the streets, or because of the possibilities you have here of making a success of yourself or something like that? What was it?" You know as well as I do what the answer

is. I know before I ask him. It is usually that he was out of a job and needed money to buy some bread and beans and so he came here to work.

Is that the way it should be? I don't know whether it can be changed or not. Maybe it can. But I have in mind, in the selection of a man, to get the thing down to at least a point where we can pick a fellow because he is adapted to that kind of job. Now I don't believe there is an organization in the world where there is a bigger clearing house than in our organization for that proposition, because we have every nationality, every religion and creed and everything else mixed up in our staff of 6,000 drivers.

We have to have that sort of conglomeration, you might call it, because we cover the city of Chicago. We have garages over here on the West Side in the Italian section, and we have them over a little farther on the South Side in the Bohemian section; and those lines are very definitely drawn here in Chicago, as you Chicago fellows know and as most of you on the outside know. Those communities are very typical of their nationalities. They are not mixed up. They are real Bohemian or real Italian or Jewish or Hebrew, whatever it may be. Then you have your section in Evanston where we have some fellows driving our taxicabs who are college students, very bright fellows.

Careful Training Is Important

You see, it makes it necessary for us to draw from the various communities the class of individuals who live in that community. So there is your selection problem.

Now we come to training. That is a big problem, training a man in our business. I have to stick to our business. I don't want to pass up the fleet owners, but the taxicab business is my business.

We have school cars and school car instructors; and I am not altogether sold on the class of fellows that we now have on those school cars, because some of them are capable of being instructors and others are not. Others have just gotten in there because they have had long years of service and it is a sort of fatherly job and so the job is passed along to them. That isn't, of course, as desirable as it should be, but probably in the industrial makeup of things it is efficient to a certain extent.

Training the new man is a problem, because he doesn't get any money while he is being trained. He is out there on his own hook and usually when they come they haven't a great deal of money saved up, and we spend a great deal of time running that fellow around the streets, finding out how well he can drive an automobile. Some day he will be missing unless his money starts to come in.

In the taxicab business there is your problem. You work on a commission basis, and how are you going to hold the new man while you are training him? Is it practical to pay him so much a day? If you started to pay the fellow for the period of his training, would you get a lot of fellows in there for that period and when you got ready to have them go to work would they disappear? Is there some way that can be worked out so once you get a new man you can keep him on the school car or embryo stage of development until he is absolutely trained, without getting him discouraged so that he will leave you before he gets into the cab? I can't cover the truck because you have a salary problem there and it is entirely different from the taxicab where you have a straight commission job.

I think a lot can be said on the training of a man. There isn't enough of it done. There isn't a day that I don't have a driver—of course, this is reflecting on our efficiency—who has had an accident the day before, and I ask him how the accident happened, to describe it. For instance we will take an accident where he was caught on a wet creosote block street.

Incidentally I think there should be a law against having these streets, but I guess there never will be. But supposing the driver got caught on a wet creosote block street and skidded into the car ahead of him. That man had probably only worked

two weeks. I ask him, "When you were instructed, weren't you told about the hazards and dangers of this creosote block street when it is wet. It is almost impossible to stop a car on a street of that kind."

Well, he didn't remember whether he had been told about it or not. In other words, we crammed so much stuff into him that he couldn't remember. I know positively that he had been instructed in that, because in the course of his training he goes to the garage from which he is going to work and goes in a "meter" cab with a member of our No Accident Club (which I am not going into today), who is an old-time driver and very efficient in driving an automobile. He goes out "on the meter" with this fellow for one day while the man is picking up business. In the morning he is given a card, telling about the man he is going to "ride the meter" with, and on the back of the card are 12 questions I have prepared for the new man to ask the No Accident member. Those questions relate only to safety, and three of those questions are given over to the problem of creosote blocks, or, as I call them, wood block paving.

Questions That Emphasize Unsafe Conditions

Question No. 4 is, "What is wood block paving?", and the other fellow is supposed to explain to him that it is wood blocks soaked in creosote.

Question No. 5 is, "When is wood block paving the most dangerous?" The answer is—When it is wet, or something like that, or when it is sprinkling.

Question No. 6 is, "How can I stop my car most effectively on a wet creosote street?"

I know those fellows ask the questions and are answered. Still in two weeks the fellow has forgotten the things he has been told. Whether the method is thorough or not, I don't know. Maybe we try to cram too much into his head. But we find the man having accidents, because he has not profited by the experience of the fellows who have gone before him.

So the training is a big problem. I think sometimes we rush over things too fast. But as I said a while ago, the problem presents itself that if we don't rush over these things the man is liable to become discouraged and leave you before he goes to work.

Supervision is a big problem in our business. Probably there is no other industry that is equal to it, because once a man gets on a cab he is virtually out from under supervision. Don't misunderstand me. Of course we have supervision, but it is not like it is in the factory, where you have your foreman walking around supervising the actions of the employees. Supervision, I think, is something that can be minimized considerably if you will develop a higher type of driver; in other words, if you will get a man on whom you can rely on your cab and one who takes a lot of individual responsibility and does not have to be closely supervised. I think supervision there would probably be reduced to a minimum if that condition could be reached.

Now we come on down here to labor turnover. Of course, that is all related to the other things, but labor turnover embodies a great many things. Labor turnover is caused a lot of times by insufficient salary. It is caused by working conditions not being desirable. It is caused by an overbearing immediate superior or something like that. Labor turnover, as we all know, is a big, expensive item, and I would like to have some discussion on that subject, of how you can make the job more attractive.

I don't want this to be taken as a criticism, but I have heard considerable in the papers this morning about discharging men. I am not a molly-coddle or anything like that, and I am not very easy with a fellow when he has an accident, but there is danger in being too liberal with your discharges, I think.

For instance, you might have a man working for you for six months or a year,

and he might have had during that period a number of accidents, and when you go over those accidents with him it may appear they are careless accidents to a certain extent. In other words, they are largely avoidable on his part. We are trying to develop a method now where we can take that man back on the school car or into the school instruction and salvage him, rather than discharge him.

We are trying to do this for several reasons. One reason is that you can't learn the taxicab business over night. When you have an investment of six months or a year in a driver he is a valuable man to you. If the fellow has been earning his living and making some money for you during that time, he is a valuable man to you and should not be promiscuously discharged if there is any hope for him. We are going strongly after that thing. We are not babying him, but trying to analyze and find where the faults are and attempt to correct them. I think more should be done along that line, rather than so much discharging, because every man wants to work, and if the job is not attractive to him, it is probably as much your fault as his. I think something should be done to encourage and show him his mistakes, or you should be broad-minded enough to make any corrections where it is your mistake.

All Drivers Employed at a Central Point

M. T. HANRAHAN (American Railway Express Co., Chicago, Ill.): I have a question I want to ask Mr. Wood. Do the men in charge of these various garages around the city employ the chauffeurs who work out of that garage?

MR. WOOD: No, but that is taken care of pretty nicely in this way: We have an employment department and an employment manager here. It is up to him to get drivers. This new man will be sent out to the garage, and he can be discharged by his garage manager on his first offense. He can be given a yellow ticket and discharged. The garage manager has that authority.

MR. HANRAHAN: Is there any one man who employs all the chauffeurs?

MR. WOOD: Yes, one man.

MR. HANRAHAN: I don't see how he can do it intelligently.

MR. WOOD: He has help; he has a staff.

MR. HANRAHAN: It is under his supervision and he has assistants? If one of his assistants got a bad actor into the service he would charge it to the assistant?

MR. WOOD: Yes.

MR. HANRAHAN: Have you any way of distributing the capabilities of the employment officers?

MR. WOOD: No. That thing struck me pretty nicely a while ago, about giving the employment manager a demerit when he picks the wrong fellow.

MR. HANRAHAN: I think that is one of the ways our company keeps away from bad fellows, because each garage man, superintendent of the garage or assistant superintendent, is charged with employing men who work out of his garage.

He has some trucks and is authorized to employ men. When he employs a man, he is given an application which is filled out by the application clerk, and before the man is passed on, his ability and recommendations are gone over, but if the man proves a bad product, he is charged to the assistant superintendent, and if he gets too many bad actors into the service he is called in and they tell him, "You are all wrong." That is the way we keep him on his toes.

MR. WOOD: Of course, that thing is done here, but it isn't done that accurately. Of course, this is true in any organization. The labor turnover in any department will sooner or later get to the head or the foreman of that department. That is true of course. But it isn't checked that closely.

MR. HANRAHAN: You need a good judge of mental equilibrium. Some people can analyze a man as soon as he comes into the room. If he sits down and talks for five minutes, they know whether he has the mental balance to be one of their men or not.

A. C. WARFEL (Hartford Accident & Indemnity Co., St. Louis, Mo.): I would like to ask if in the taxicab company they have any bonuses or rewards for safe driving?

MR. WOOD: Yes, the Yellow Cab Company has a semi-annual bonus, and the amount of money the man gets is determined by his "booking," that is, the money he brings in, his seniority and his accident record. We have a demerit system, and if a man has an accident, he is given so many demerits. If he doesn't have an accident and has a good record, he gets 52 merits a year, a merit a week, and that advances his commission. He gets 30 per cent when he starts, and if he gets enough merits he can go up to 32 and with more merits up to 35 on his commission; and later on we have a degree which we call a gold star, which is only conferred on a few men and they get 37½ per cent. Of course, their bonus is determined by their seniority and their accident record, because they are given a demerit when they have an accident. The garage member gives them a demerit. Their bonus is determined along that line.

DALE HARMAN (Yellow Cab Co., Kansas City, Mo.): I would like to answer for Kansas City. We don't operate in Chicago. Our bonus is given monthly, the same merit system being in use as in Chicago, except that the volume of the accidents is taken into consideration as the number of demerits. One demerit is any accident. If it is a big accident he gets two to five.

In connection with that, we have a safety club where the drivers participate in the money that goes into the fund. They divide themselves into teams. There are eleven in our organization, a captain and ten men. The drivers put in a nickel a day for every day they work. For every nickel they put in, the company puts in a nickel. That seems small, but it amounts to quite a little. The organization has about 275 men, which amounts to over \$600 a month. For every day they don't have an accident the company puts in a \$5 bill. The more money we can spend in that way, the more we keep down our accidents.

Most Drivers Have a Keen Sense of Pride

MR. WOOD: I believe the majority of drivers have a very keen sense of pride. Maybe it is hidden away, but you can bring that out; you can appeal to their sense of pride.

Here in the Yellow Cab Company we have just organized in the last month an organization which is known as the No Accident Club, and a nucleus of that organization was formed at a banquet in a hotel here, which the Chief of Police attended, and 67 drivers were presented with diplomas and gold badges. They are the gold badge members of the No Accident Club. The diploma is made of parchment paper and framed and it is a beautiful thing. The text of it is that he has been driving for so many years for the Yellow Cab Company and it is a recommendation of his service. From that nucleus has grown a club of something over 500 members.

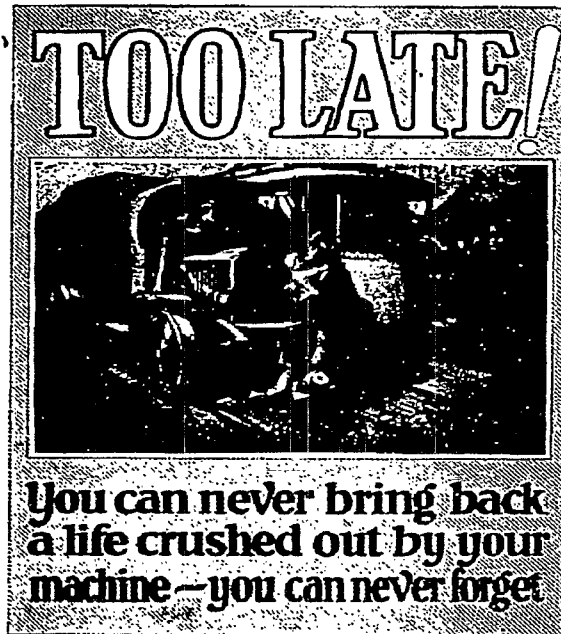
The other grade of membership is what we call the white badge members. Those men must have a year's seniority and to have driven a year without a chargeable accident. Those fellows are just as proud as they can be of that membership. You hear it every day down there. If they have an accident, they will come right back to Mr. Prince's office (he is secretary of the club), and say, "I just had an accident. I was standing down on so-and-so and an automobile ran into my rear end. I had a personal injury." It was absolutely the other fellow's fault, as our driver was standing still. He comes back and says, "Do you think I will be suspended for that accident?"

That isn't an exception. It takes place every day. The thing is too young yet to tell how much good it will do, but I believe that we are going to get somewhere with it, because these fellows are out working among other fellows all the time, spreading that proposition to all the stands and garages and talking safety, thinking

about accident prevention. When you get them to thinking about accident prevention, you have them started on the right road.

S. R. MILLMAN (Aetna Life Insurance Co., Hartford, Conn.): We had a statement from people who drive trucks that the curtailing of their speed to 12 miles an hour helped them greatly in the elimination of accidents. Now we have a cab company here which is operating cabs as fast as they can safely be operated. I wonder if they find that the slow traffic cut to 12 miles an hour with these trucks causes accidents to the fast moving traffic like the taxicab.

MR. WOOD: Yes. Over here on Canal street these big trucks poke around here and the driver figures they are going faster than they are and starts to swing around and tries to swing too late. Yes, there is no question about it. We have more accidents where there is slow-moving traffic than we have on Lake Shore Drive where we'll go 40 or 45 miles an hour.



H. L. MUNGER (Erie Taxicab Co., Erie, Pa.): Do you find the driver who has an accident now and then improves any? If you hold him in service, does he get away from accidents?

MR. WOOD: Generally, yes. We always call them "neutrals." Of course, I rather give the "neutral" a quota. He doesn't know it, but I give him a quota. I know that in the first two months is going to have a few accidents. They are not going to be serious, because he is trying his best not to have accidents. He is trying harder than he will at any future date. They are not going to be serious, but he will have a few accidents and take them seriously and will improve with age as he goes along.

MR. MUNGER: I may have some problems that none of you have. I have two drivers who have both had fatal accidents, one in 1912 and the other in 1917. Neither ever passes a traffic signal.

MR. WOOD: I don't condemn a driver for a fatal accident. Circumstances always have to be considered. We have a number like that.

We had one of the worst accidents I ever heard of recently. Of course, it is human failure. This happened at 4:20 in the morning on the South Side on a street with traffic lights. One of our old-time drivers, 42 years old, was responsible. He was going on his last run and was taking a woman passenger south and he crossed the Midway out there. It is wide open. There is nothing to obstruct the view on either side. You can see for blocks both ways. In addition there is a traffic department. A DeLux was going east with the green light, and they were both going 35 or 40 miles and collided. The driver of the Yellow cab, as I say, was an old man. He had 24 stitches taken in his head and two or three ribs broken. He ran through a red light and never saw the other cab.

MR. MUNGER: Some of them discharge a man.

MR. WOOD: In this particular case, I am afraid the fellow will not only be discharged but will go to the penitentiary, because it was a bad accident and purely and simply his fault, and I guess he can't get out from under it. The police saw the accident.

MR. MUNGER: I have come to the conclusion that an accident man is oftentimes the best man you can hire.

A Fatal Accident on Jackson Boulevard

MR. WOOD: That is sometimes the case. We had a fatal accident down on Jackson Boulevard. One of our good drivers was driving down Jackson Boulevard at a fair rate of speed and a man ran out and ran right into the rear of the cab, fell on the pavement and fractured his skull. The driver never knew the fellow hit his cab. There is a fatal accident.

We had another case on the boulevard not so long ago. It is a pretty fast boulevard and the fellow was going across a street where there was a safety zone. There was a fellow standing on the safety zone, and just as our cab got within three feet of him the man stepped in front of the cab. The cab was going 25 or 30 miles an hour and the fellow stepped right in front of it and was killed.

VICE-CHAIRMAN CLAIR: Gentlemen, I think an important point has come up, as to a man having an accident and what his future experience will be. I can tell you from my experience, in working with 500 taxicab drivers for years, that I agree with you, and would much prefer to take a chance, if necessary, with a driver who has had a good, hard jam, because he has learned his lesson.

On the other hand, you don't want to place your confidence with the fellow who comes in and says, "I haven't had an accident for 15 years." I always laugh at those fellows, because I say that doesn't mean a thing, and I will tell you why. Those are fellows who are over confident. They pat themselves on the back and say, "I am a good driver. I have done it for 15 years, and I am going to do it for 15 more. Nothing can happen to me."

MR. HINCKLEY: I would like to know what Mr. Wood's experience has been with the men of whom he speaks, the men who have been dismissed from the organization, when he tries to bring them back. I have had some sad experiences along those lines I would like to know how long you have been doing it.

MR. WOOD: I will tell you what I know. I started keeping records of drivers last year, 1926.

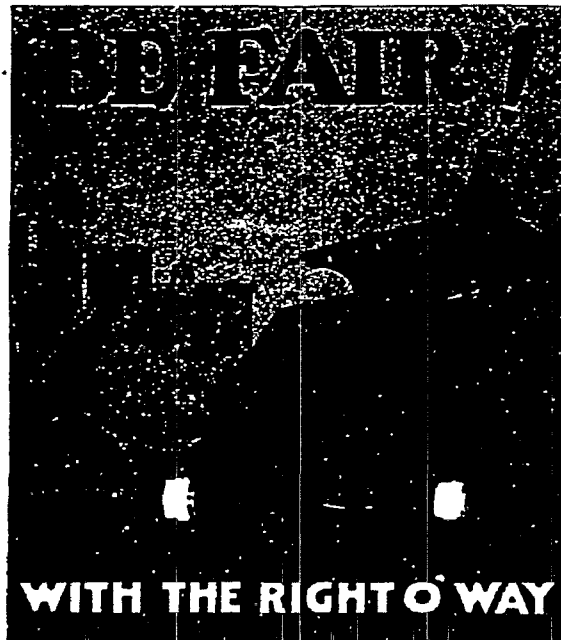
When we have a driver who comes back now, he is sent up to my office. He has to get an O. K. from the assistant general manager. He sends him to my office to get his accident record and sends out to find what his earnings were for the period, and the reports against him, etc. He weighs the man's sincerity in coming back. In other words, there is where your judging the man comes in. He also figures out whether or not he is capable of improving. Nobody wants to do wrong, but maybe he can't keep from doing wrong. There is no use in worrying along if he hasn't the capacity to improve. He uses his judgment and talks it over with me. He asks

me to look up his accident record and give my opinion as to what I think of the type of accidents he had, whether they were careless accidents, or accidents that would have happened to most anyone. We weigh the man like that and give him to understand we are going to watch the record closely and see if he is improving, and with that little psychology he is put to work.

MR. WARFEL: I would like to ask if anybody here is familiar with the court plan set forth in a magazine with which I am not familiar, called *Maintenance and Operation*, issued several years ago. I happened to see part of the page and wanted to get more of it. I thought some of you might be familiar with that method.

MR. HINCKLEY: I might give you a synopsis as to what they do on that, and accept corrections if I am not right on it.

As I understand it, every Tuesday evening there is a safety meeting, and the



meetings are held after hours. The men having accidents in the Standard Oil Company are brought into these meetings. They have their judge and their jury and it consists of five or six drivers along with the supervising force.

The man is brought in and gives the judge and jury his testimony. If I remember rightly, it is handled that way, and the course of procedure depends on what the jury's verdict is. Sometimes the man is given another chance. Sometimes he is discharged. It is based on that as nearly as I can get to it.

MR. WOOD: I don't see how it would work out in our organization. I have thought it considerably. As I see it, the important thing is to talk to the driver at once. There is no use in the driver coming with his own statement unless you get a witness his statement at the same time and weigh his case from two or three sides. You don't get a witness' statement, sometimes, for two or three weeks or a month. There is no use in bringing a man up after the accident is three or four months old and talking to him.

SECRETARY DOBBS: Along this line, I would like to offer for your approval a little form I got up. I have to contend with all the different things—accidents, methods of prevention, and everything else, and I have constantly thought how I could reduce the work or improve it.

Along the line of investigating an accident, I have had a lot of difficulty in questioning a man and deciding as a judge would in a justice court, and then rendering a decision. The man goes away very much dissatisfied, and he probably talks to his superintendent and goes to the assistant general manager and says he doesn't think he was to blame for the accident.

So I got up a little form, which I think works out well. I find it very helpful in establishing a permanent record. I call it the "driver's liability test," and on it I have about 36 questions. To run this liability test all these questions have to be answered in the negative to relieve the man of any and all responsibility in the accident.

It starts off like this:

Questions That Place the Responsibility

"Was he intoxicated or had he been drinking?" If the answer is "No," that is good, and if it is "Yes," it involves the man immediately.

"Was he speeding at the time of the accident?" We will say the answer is "No" as we go along.

"Was he going too fast for the conditions?"

"Was the intersection a blind corner?"

"Did he fail to stop if he could have done so?"

"Did he turn improperly?"

You will notice that if the answer is "No" it is continually relieving the driver, and if it is "Yes," that is where your fault is.

"Did he fail to give proper signals?"

"Did he fail to look in the proper direction?"

I have covered pretty nearly every angle a man can slip up on in getting himself involved in an accident.

Then, too, I have also some general questions which defeat him if you have left out any technicalities, such as, "Was our driver entirely to blame?" Sometimes he is.

"Was he negligent?" There is an answer that is general. If you find he is liable to be just slightly negligent, you could put the answer "Yes" and fight it out with him along that line.

"Was he careless?" This is reducing the word "negligent." Maybe he wasn't negligent but was reckless. Maybe he wasn't reckless, but was careless.

Then we have a few others, such as:

"Is his attitude or character unfavorable?"

"Did he fail to tell all the facts and truth?"

"Was it possible for him to avoid the accident?"

"Did he act outside the scope of his duties?"

These questions and a lot of others which I haven't mentioned go to relieve the man of any responsibility which involves him, and if the answer should be "Yes," that he was careless, if you can see that the man was careless, you are the judge, of course, and you must decide how he was careless.

Down below I have a few lines for notes. If you put a "yes" after any one of the questions, explain the question in the notes. If he was careless, you might explain that he failed to do some little thing which contributed to the accident.

If a man can pass the drivers' liability sheet test and get a complete record of "no's" he is absolutely not at fault. Sometimes a man parks at the curb and is struck by a passing vehicle and he passes this test, and we find he was parked

properly at a place where he should park, and had his vehicle lined up properly along the curb. He will pass a good test. But if you find some little fault with him, you can charge him with it and get a permanent record with an explanation here.

VICE-CHAIRMAN CLAIR: I am sure all of us should be interested in getting a copy of this questionnaire of Mr. Dobb's.

MR. WARFEL: How do you find the accident record of the courteous driver, Mr. Wood?

MR. WOOD: To me courtesy in public relations is only, in other words, safety first. I don't preach safety first. That is all bunk. I want to make a man observe the golden rule. I want to let him interpret it in his own language and apply it in his own way; so long as he observes the golden rule he won't have traffic accidents. I don't care anything about the slippery street or the intersection or anything else, if he is a man out on the street who regards the other man's rights and appreciates the value of public relations which are good, in other words, if he knows any act of his may put a blemish on his company's name. If he has that confidence and responsibility, he won't have accidents.

VICE-CHAIRMAN CLAIR: I think we all agree that "courtesy" is very nearly synonymous for "safety." It is invariably so in safe driving, and if a man has a sense of decency to give the other fellow the necessary amount of consideration, he invariably will be the safe driver.

D. A. HALEY (Illinois Roadway Lines, Chicago Heights, Ill.): I was going to ask if any gentleman in the room can see any excuse for a rear-end collision.

MR. WOOD: No, sir. There are three kinds of accidents I won't excuse a driver for—rear-end collisions, turning around in the middle of the block, or striking someone when he pulls away from the curb.

A Certain Kind of Concentration

MR. HALEY: Suppose a driver with a previous good record has a collision of that kind, and he could have avoided the seriousness of the accident by using his head, which he didn't do. He did the wrong thing. Is the driver after that any good? Wouldn't he do the same thing again?

MR. WOOD: I heard Mr. Ross talking the other day about concentration and he said some girl came out of a meeting where the professor was giving a talk on the subject of concentration. She was quite enthused about it, and when she met the professor some time later she said, "Your talk was just wonderful! It helped me so much! I have been able to concentrate so much better since attending your lecture."

The professor was pleased and said, "Just what are you concentrating on now?"

She said, "Oh, just lots and lots and lots of things."

That is the way some people concentrate—on just lots and lots of things. If a driver has a diverted mind, he is going to have an accident. If he is not concentrating his mind on driving an automobile on the streets of Chicago, he is in a bad way.

I never pass up the opportunity with a bunch of new men to impress upon them that they must know the city. It is inherent in all of us to have a certain amount of pride, and a taxicab driver naturally takes the attitude he is supposed to know everything.

I have been studying this city for years, and there are many streets I don't know. You might expect the new taxicab drivers to be less informed than I am.

Someone stops the driver and says, "Will you drive out to 12325 Windemac?"

The driver says, "Yes (that is out on the North Side I guess.)" He starts out at random along Michigan Boulevard. He is trying to figure out where it is in the meantime. All at once somebody in front stops and he slams on his brakes too late and hits him. It is caused by a diverted mind.

I want to talk on that a minute. It is a poor thing. Right over here the other day I had a driver in my office. He had been having quite a number of accidents. I asked him, "Well, Cox, what do you find to be the most confusing thing you have to contend with?"

He said, "I think probably no left hand turns in the Loop."

"Have you any specific case?"

He said, "The other day I picked up a passenger at LaSalle Street station, and I wanted to go to a number on LaSalle Street, so I started down LaSalle Street."

As you fellows might know, LaSalle Stops at Jackson Boulevard and you have to turn left to go over to LaSalle, but you can't turn left. There is no left hand turn. So you have to turn right. In order to get onto LaSalle you have to go to



Sherman and make a right hand turn on Jackson, and you can make a turn on LaSalle.

He came down LaSalle. He didn't know about this no left hand turn on Jackson. He got up to the light. It was red against him. He was waiting to make the left hand turn and one of the older drivers came near him and said, "You can't make a left hand turn." So he had to make a right hand turn. Then he couldn't make a left hand turn on Clark and was getting further from his destination all the time. He then turned right and went down Clark Street.

When he got to Van Buren and Clark and he knew there was a street over there where he could make a right hand turn. So the only thing for him to do was to get back to that street. He turned west on Van Buren and headed past the LaSalle Street Depot again.

He was telling me all about the trip. I said, "That was rather confusing, wasn't it? You know, you left something out in telling me that."

He said, "I don't know what it was."

I said, "what were you thinking about when you were going west on Van Buren, approaching the LaSalle Street station?"

He said, "I was trying to figure what that street was that I could go through on."

I said, "While you were driving weren't you also thinking about this man back of you. If a pedestrian had stepped off the curb in front of your car, you would have run over him and never known you hit anything, wouldn't you?"

He agreed that that was true. That shows the value of knowing where you are going before you start. Most of those fellows do, of course. I try to preach that to them.

ADJOURNMENT.

Tuesday Luncheon, September 27, 1927

The luncheon meeting convened at one-fifteen o'clock, Vice-Chairman Clair presiding.

VICE-CHAIRMAN CLAIR: We haven't a principal speaker here. If our present plans go through, I hope we will all be the principal speakers this afternoon.

I feel there is almost an apology due to many of you men, for the reason that you didn't hear from us more often during the last year. The situation was out of our personal control. Through the enthusiasm of Mr. Dobbs we were able to get out this questionnaire, which at least has accomplished something.

We have big visions, gentlemen, and one of the reasons we called you here this afternoon was that we knew that whoever came to this luncheon meeting, could be depended upon for enthusiasm. We feel that anyone who is here today has the progress of this section at heart and will be with us in the future. I want to thank you all personally for coming, because I consider it a tribute to this section and to its future.

I am going to suggest that we run this meeting this way: There are two questions which I wish everybody here would answer.

First, we want to know what the best stunt is that you have used in your accident prevention activities with your drivers. Secondly, we want to know what you recommend as a topic to be later investigated by means of questionnaires sent to all members of the section and which subsequently will be returned to you in the form of a monthly letter.

Mr. Dobbs has some things he has found as a result of this questionnaire which he sent out, and I am going to ask him to start the ball rolling and give you some of the high spots of the replies he received from his questionnaire.

SECRETARY DOBBS: As I see our objective, it is specifically, accident prevention methods, and I decided—and nobody held me back except the Section Chairman on several points—to launch a questionnaire to find out what is being done, as we are all doing something. Every safety engineer with every organization has worked out his own idea and his own scheme in producing some kind of stunt or method of preventing accidents.

My questionnaire got to pretty nearly everybody on the list. I got them back and checked the questions that were the highest. This is the way it read:

"In an endeavor to determine the relative weight and best preventive methods for vehicle accidents, would it be possible for you to contribute to this questionnaire in answering the questions listed below?

"Have you used any of the following preventive methods? Will you check the ones you have used?

- "1. Psychological tests.
- "2. Other methods of selecting new drivers.
- "3. Supervision by foremen or superintendents.
- "4. Drivers' schools.
- "5. Book of rules with literature.
- "6. Making drivers pay for damages when they are found negligent.
- "7. Discharging drivers, for poor record.
- "8. Trial by jury of drivers or superintendents.
- "9. Educating the driver by direct mail.
- "10. Contests with cash or prizes.
- "11. Weekly or bi-monthly meetings.
- "12. Are there any other methods which you know of or which you have used?

If so, will you kindly explain these in detail?"

Taking the questions as they rank, No. 10 was used the most—contests with cash or other prizes. That seems to be the leading item in preventing accidents. You gentlemen all know yourselves how that works, because you have probably used it. It has a very good effect in keeping the men interested and reducing accidents.

The second in rank was No. 6—making drivers pay for damages when they are found negligent. I am glad of that, because I had the courage to install it in our company against a lot of protesting, even from the general manager. He didn't think it was right, but I was thoroughly sold on it, and I got it by. He was afraid it wouldn't work, but he left it to me, and I had the courage to try it, and it is working with us. It seems to be the second leading stunt here on this questionnaire. Many others are using it.

The third is discharging drivers for poor record.

The fourth is supervision by foremen or superintendents.

The fifth is a book of rules with literature.

Those are the questions which we would like to have discussed. I would like to launch this question more thoroughly with more companies, to get a more accurate reading, but this tells the story that most of the companies are using contests with prizes and finding the best results. Those are the peak preventive methods and that is what we have been driving at here for a long time. If most of them are using it and most of them claim to get the best results, that must be the answer to our difficulty.

More Accurate Information Is the Object

M. T. HANRAHAN (American Railway Express Co., Chicago, Ill.): Mr. Chairman, let me ask you something. You say most of them use it. Suppose one man drills a fleet of ten vehicles, would you give his version the same identical rate that you would the man who drills a thousand? That is the question. If a man drills 500 or 600 or 1,000 vehicles his opinion ought to weigh a good deal more than a man who has ten. That is what I would like to know.

MR. DOBBS: I haven't gone into it deep enough to classify that. However, we have some pretty big companies reporting, and that is the leading point. I would like to launch this on a bigger scale and get more accurate information.

MR. HANRAHAN: What proportion of the members present are in favor of that, and of those who are in favor, are they representatives of the taxicab companies or fleet owners?

SECRETARY DOBBS: That is the thing on which I would like to get further information. We will be drifting toward the objective when we get some information along that line. That is exactly our purpose.

VICE-CHAIRMAN CLAIR: This, you see, gentlemen, is a beginning. Right away we have started with the why and wherefore and I am sure if we follow the procedure as we have lined it up, we will accomplish something.

For instance, if each of us gets a statement from our secretary and he asks us specifically what has been our experience in running contents, with bonus awards or other prizes, among our groups of drivers, we will have an opportunity of a clearing house for our respective idea and results. We plan to issue a compiled general statement to everybody. This will not only apply to a group of ten vehicles, but it will also apply to a group of 1,000.

That is the thing, gentlemen, we are going to try to give you. That is the thing we want to discuss and that is what will start us in the right direction.

SECRETARY DOBBS: Along this line, I would like to call on Mr. Coleman if he is here. I have a very interesting letter from him which answers every item in detail, and he includes that item.

VICE-CHAIRMAN CLAIR: Mr. Coleman is not here. I happen to know him and to

have been working closely with him. Mr. Coleman is with the Continental Baking Company and they operate 105 fleets from coast to coast. That is an example of a big company operating both trucks and teams which is running bonus contests very successfully. I am sure that is the gist of what Mr. Coleman reports. He finds, both for teams and trucks, that the contest with a cash bonus is probably the most effective thing that he has tried.

SECRETARY DOBBS: I will explain one experience I had with making the drivers pay. In connection with that I got up a sort of an agreement. It is an application for employment, with an agreement. The driver signs an agreement to pay for any damages when he is found negligent.

I want to picture to you the condition we had before this system was placed in use. The driver would come in and say, "I don't want to pay for it. Why should I pay for it? You ought to have insurance." He used to get hard-boiled and want to throw the secretary out of the office and everything else. Then we put this application in use, and every man had to sign it before he came to work for us. It established one thing in his mind, and every time the man came to the office after an accident he was absolutely expecting to pay for it. He admitted that he had agreed to pay for it, and you could see that the man's attitude was entirely changed. He drove as if he thought if he ran into a fender he would run into his pay check, where previously some of them claimed a right to two or three accidents at least. Some would say they worked for such-and-such a company and busted up two or three trucks and never had to pay for them. We found very few cases where the men refused to sign the agreement.

It is for the moral effect. The man knows what is coming to him if he scratches anybody's fender, and he is going to be careful.

A Signed Agreement Is Effective

MR. HANRAHAN: Are you connected with any labor union?

SECRETARY DOBBS: No.

MR. HANRAHAN: Can you legally demand of that man to pay that? Can he not make a memorandum of that and any such time as he leaves your service, demand full payment?

SECRETARY DOBBS: There is a legal technicality involved, but to answer your question quickly, I will say we have defeated many drivers in court. The judge would often ask, "Have you an agreement or contract?" and we would present it to him, and he would rule in our favor if he found the man was negligent. If the man is negligent he acts out of the scope of his duty, and according to the interpretation of the law, the employer has a right against him.

MR. HANRAHAN: Do they take it out of his salary?

SECRETARY DOBBS: We do. We have done it many times.

P. J. HEBRON (American Railway Express Co., St. Louis, Mo.): You could never do that in Missouri.

VICE-CHAIRMAN CLAIR: Here is another point. If a general questionnaire went out, we would be able to get, from all states, the general reaction to this sort of thing with a consensus of opinion on what different people in different parts of the country thought about it. Of course, in some states, in some locations and under certain circumstances, this may be impossible. We know that in all safety activities certain things are good under certain conditions, certain situations and certain locations. In other places they may not be as effective.

I think each of us should get up and say what has been our most effective means of preventing accidents, with a few reasons. There may not be two that agree, but we want to find what each one of you think, so we can investigate and get the details.

C. S. GOLDSMITH (The Brooklyn Union Gas Co., Brooklyn, N. Y.): We have no

safety engineer in our company. We have a general safety committee and each department has a subcommittee, which is, of course, the general safety committee. As far as drivers are concerned, we have tried no stunts and had no campaigns for safety.

We do this, however, if a driver has three accidents in a year and he is to blame and we feel he is to blame, we let him go. We caution him and call him in a couple of times a year, and have some police officers who are traffic men give him traffic rules. In that way we bring the matter of safety before him. But aside from that, we have tried no stunt.

VICE-CHAIRMAN CLAIR: About the subject you think most beneficial?

MR. GOLDSMITH: I would be most interested in finding the best means of promoting safety, whether contests with cash awards or discharging the man, whatever it is.

Personal Pride Makes the Average Man Reliable

W. O. HINCKLEY (The Peoples Gas, Light & Coke Co., Chicago, Ill.): It has been our experience in handling men that the touch of personal pride will do more than anything else. I don't care how tough a fellow is, how hard-boiled he seems to be, there is a certain amount of personal pride in him.

Since the installation of our accident board with his name stuck up there with a red star or a blue or yellow one beside it, he feels a certain amount of regret if his name gets on there, and consequently we have cut down our accidents pretty nearly 65 per cent. That has been our experience.

Now as to what would be the most essential thing to use, I am in favor of the same idea that is carried out in a great many organizations: that is, the standardization of traffic signals. The railroads throughout the country have their standard track and their standard signal. An engineer on one road can take his train across another and get by. To me that is a vital point, to bring safety not locally but nationally, all over the country, and have everybody understand it.

I realize that is a big problem, but unless we do that, I don't believe we are going to accomplish our end.

A. E. LUNDSTEADT (Bowman Dairy Co., Chicago, Ill.): We have featured the National Safety Council posters. We have had contests for safety slogans and tried to get men to write safety slogans. That fell flat.

I would like to see this division of the National Safety Council conducted along the same lines it has been conducted.

MR. HOWELL (Federal Insurance Co., Hartford, Conn.): I would say that the questions you have asked are primarily for fleet owners and taxicab owners, and are questions which the insurance man can't possibly answer.

From our viewpoint we think the general giving of safety talks to the drivers is inclined to show them how by their record they can eliminate further accidents, and by distributing safety literature, slogans and things of that sort, we can eliminate a good many of the careless accidents.

We have thought a great deal of the matter of discharging drivers or making them pay for accidents, but I am open to conviction and would like to hear some more along that line.

I think we should do further research work in this section.

A. C. WARFEL (Hartford Accident & Indemnity Co., St. Louis, Mo.): The only thing I had in mind was where there are fleets of interstate or intercity passenger buses or in some cases taxicabs or trucks, in view of the accidents which do occur, some provision should be made for the installation of a first aid kit, the same as you find in the passenger car of the train; not necessarily as big, but a small, compact kit, and some little first aid instructions could be given the driver, so in emergency he would be able to save a life.

P. A. WEINMAN (Lumberman's Mutual Gas Company, Chicago, Ill.): I have been driving for a good many years. It seems to me that the fleet-owners with slow moving vehicles should instruct their drivers who are moving at a snail's pace to keep on the right hand side of the road. I believe they would avoid a good many accidents. I think the greatest nuisance in the world is to run into a fleet of milk wagons, and that is the thought I would like to see gotten over to a lot of fellows.

H. L. CUMMINGS (Yellow Cab Co. of Virginia, Richmond, Va.): I think the thing that will help us all, taxicab or fleet operators, is to get busy on character building among our men—sell to them the principle of applying the golden rule, in public relations, with the passenger, the pedestrian and with the driver of the other car. When you have done that, you can successfully conduct contests in your organization which will materially decrease accidents. Those are the lines on which I have been working.

I have been running a little contest this year, with the drivers themselves conducting it. I operate 55 cabs and have 70 drivers. They originated the contest themselves. Each morning when they go to work they pay a nickel for their manifest or trip sheet, which goes into a general fund. The organization is divided up with ten men to a team. At the end of the month the team with the best record divides that money. For five months during this year the fund was carried forward. It could not be divided, because there were no accidents. We have been operating 55 cabs and 70 drivers since the first of January, with this contest in effect, and we have had five accidents, which have cost less than \$600. One was a personal injury which cost me over \$400.

Necessary to Build Up Morale Again

MR. HANRAHAN: Prior to 1915, while I was with the American Railway Express Company, we had about 500 wagons in Chicago and we had nobody to tell us how to run the wagons; but after the unified companies got together, Mr. McAdoo put them all in one and he let the labor union walk in and tell us we must do business with them.

After 1918 I found that the morale of the man had lowered a little bit. He did things and he thought he could get away with them. So we made out a set of rules and we submitted the rules to the labor union and asked if they would approve the rules. Then we said, "We are going to apply those rules. There is to be no drinking, no speeding, no misconduct or misapplication of any rule." Of course, you can see that in applying those rules it made one of our supervisors or employment officers a little hard-boiled. He was going to apply the rules because they applied them to us.

Of course, in many cases that were brought to my attention I took into consideration the length of service of a man. Maybe I knew him personally, because I was in contact with a lot of those men at that time and knew them well. I overlooked a lot of things which the rules said I shouldn't overlook. But I did it just the same.

It has reached the point now where they want us to apply the rules in their favor sometimes, and, of course, we just reciprocate and say, "All right, we will do that." So now it has developed to where if a man commits an offense once or twice or three times, it is left to my judgment as to whether this man should be forgiven or whether he should be dismissed, and usually the man is brought to me for trial. He has a hearing in my office with the union officials and with the supervisor under whom he works, and he is given a fair trial.

I think myself it has reached the point where an employment officer has to be a little hard-boiled in order to maintain discipline. I notice since I have applied these hard-boiled methods that our morale is better. I don't have as many drivers committing offenses as I used to, because I say, "You are through now. You have committed this same offense before, and I told you the last time you were up here that if you

came up again, no excuse would be taken." The result is I don't have one-third of the accidents I used to have, and I am getting a better caliber of men, because they know they can't get back into the service.

I disagree with Mr. Wood of the Yellow Cab when he said he got better work out of a man after he had been dismissed. I try them before they are dismissed. I give them all the "breaks" before they are dismissed. If a man gets three trials and is cautioned and is under the supervision of a high-class inspector and still goes out and breaks one of our rules, I say he is not fit for the service.

So you might class me as "hard-boiled," so far as employing men is concerned, I don't re-employ them. If they are out, they are out. They know they can't get back. I think our fleet will compare favorably with any other.

Difficulty in Setting Up Standard Contest Schedules

W. W. CLOUD (President, National Association of Taxicab Owners, and President of the Yellow Cab Company, Baltimore, Md.): We are very sympathetic with the activities of the cab companies and fleet owners with the national association. I think it is important that we get back to fundamentals where we can agree and work along with the truck owner.

I think it would be impossible, and I am sure my friends, the cab operators, will bear me out, to set up rules for safety contest schedules that would be applicable to both fleet owners and cab operators. The business is entirely different. One handles merchandise and the other handles humans. I speak from actual experience. I have been in close contact with the industry for the past 18 years, and have been in close contact with the accident side.

For the benefit of our good friends in the insurance business, we carried insurance up to the time it reached \$210 a cab and then stopped short, because we couldn't afford it. Now the rate in Baltimore is \$450 a cab and \$550 property damage, which, of course, is out of the picture. But I do think we can get together on a basis, and I think questionnaires as to a subject could be distributed and answered and I think we would get some practical suggestions. But I believe positively, based on experience, that we would be unable to set up a safety plan of contest and awards that would be applicable to both taxicab and fleet owners.

J. G. WILLIAMS (Secretary, National Association of Taxicab Owners, Chicago, Ill.): We have about 150 or 160 companies operating taxicabs, running from three or four cabs to 3,000.

There isn't any one best stunt that we have found that everybody can do, but we do find this: that the best thing that can be done is for the owner of the enterprise to get dead in earnest, just head over heels in earnest, so earnest that he doesn't intend to have any accidents. And when he gets in that frame of mind he doesn't save them, because he finds a way to meet every man that is going out of the garage and says to him, "Now, nothing like that today." And they understand that kind of talk.

We have a man in Nashville, Tennessee, who operates between 30 and 40 cars. He requires every one of his drivers to deposit \$50 in cash before he goes to work, and if for any reason he leaves that service, on account of accidents or something of that sort and he takes him back, he puts up \$100. The universal experience with those men is, that when they are \$100 men—have put in \$100 (and he has a number of them)—there is never a peep, never a come-back. It is all over. They have their money in there and they pinch the nickel and drive carefully.

Everybody in the world knows that you can drive carefully, and that is that, and if you want to make them drive carefully, you can do it.

We have a man in Des Moines whose insurance ran so high he couldn't pay the premiums. He had to carry his own insurance, and he was frightened to death.

He operates 100 cars. He took off his coat and stood with those men. He told them from now on they weren't going to have any accidents. He said, "Now that applies to the best men I have." All right. The next day his best man came in: there was something the matter, and he was gone. That happened to three of them, and then it stopped, because they found that the whole business was going. He told them he was going to fire the whole business, and that stopped it.

We have a man in Fitchburg, Massachusetts, and some of you gentlemen know how crooked and hilly those streets are. He operates 20 cars. He has been operating for seven years and his total cost has been \$100. He operated 20 cars last year and didn't pay \$1, not a cent. How does he do it? He doesn't have any stunts. He sits up with those drivers and they know that they can't have accidents.

That is the whole thing about these accidents. It isn't some trick you can do. That isn't it. Doggone it, you can do a thousand tricks, and start early in the morning and keep it up until late at night and impress on their minds you aren't going to have this, and it will keep you busy, but you won't stop them then.

We have various illustrations. A man from Providence operates 40 cars. He operated them last year and his whole accident cost was \$400, \$10 a car. Think of that! How wonderful that is! He has 27 men who have been with him for over 10 years. And he has one man who has been with him 19 years, and so on. If you ask me how he does it, I don't know and he doesn't know, except that he just isn't going to have any accidents. He has made up his mind.

Safe Driving Is Merely An Attitude of Mind

Now as to topics we can get interested in, there is a mob psychology about this whole thing of driving and any man can drive safely who wants to, who tries to, who gets into the habit of doing it. Now can't we inculcate in the minds of these men the habit of driving safely. You can break the habit of reckless driving and form habits of driving safely, and every day you drive safely, your habit is stronger. If we start with that idea, we can form a safe driving habit.

I think that is a lot better than depending on periodic or spasmodic stunts. Not that they are not good, for I believe everything in the world you can do in this safety business does some good, but there is a way to form a safe habit of driving. We will find that out.

R. E. PLIMPTON (Associate Editor, Bus Transportation, Chicago, Ill.): This is my first visit to the Congress. I wrote down in answer to the first question:

1. Competent management.
2. Operating practices.

I am not deprecating the work of the specialists at all, when I say that I think a good many people are tired of safety specialists and take refuge from them. I hope their work will be a substitute for the failings or inefficiency of the management.

Operating practices follows No. 1, I believe, because if we go to the root of this thing we have to have some information about sound operating practices, to find out what accident prevention matters have done.

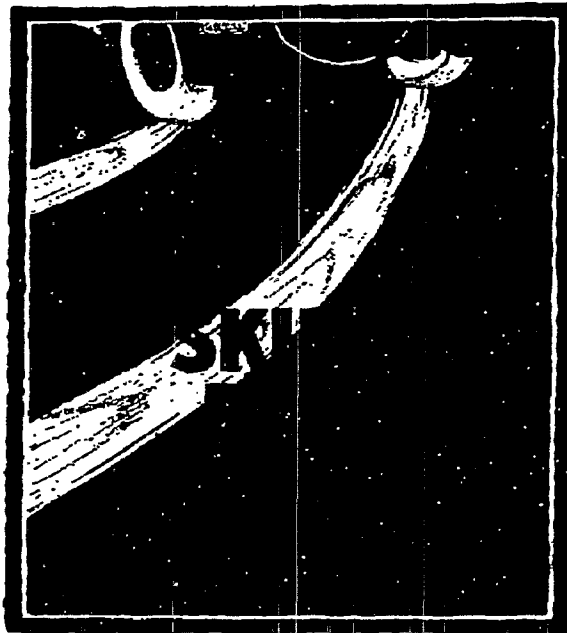
SECRETARY DOBBS: I want to remind you that, while Mr. Williams' talk was most excellent, don't you think that some of the methods explained come under the heading here of supervision by foremen and superintendents, and another one applies quite strongly to this one of discharging drivers for poor records? It comes under that heading, so the questionnaire also covers that. He told how one man got up and said he was going to fire them, and did. So it comes under that heading and the other comes under supervision. Possibly supervision is one of the best stunts.

N. M. MARSHMAN (New Haven Chamber of Commerce, New Haven, Conn.): I am not interested primarily in the operation of any particular fleet. I am interested

in the operation of all commercial vehicles on the highways of the city of New Haven, and it is on account of that interest that I am here and am trying to absorb some information from this meeting.

There are two or three reactions that just hit me between the eyes. Do you men, who are firing these men for poor records, realize that you are firing them to be picked up by someone else and their poor records continued? While I realize you are interested in the individual record, the time is not far distant when we will be interested in the safety operation on the highways; and that factor has to be considered, whether you have a right to fire a man and send him out to be hired by someone else, and let that poor record be continued on the highways.

A factor which was held in New Haven has been a contest of fleet owners on the basis of accidents per 1,000 vehicle miles operated. We grant you can pick all



orts of holes on that basis, but it is a basis to start on, and we find the retail merchants are interested in knowing whether this or that company's record compares with the other fellow's.

If your men are interested in having the drivers know the results of accidents, teach them first aid. I know of no better way than giving them first aid work and letting them realize the accidents that might happen, and teach them how to try to save the patient. The first aid lessons bring before them the results of accidents, and when a man properly knows the results, he becomes interested in it.

Mr. Williams hit the entire problem of safety operation between the eyes and it went down at the count of ten, when he said that the entire thing depends on the executives. There isn't an industrial plant which is safe, unless the executives of that plant demand that it be safe. That applies also in your business.

I would be interested in hearing from the National Safety Council, through the Taxicab and Fleet Owners Section, regular information as to what has been carried on. It don't want that for myself, but want to pass it to the smaller cities in

Connecticut and the city of New Haven. I would like to pass these ideas on, because many of these people are not now in a position to become members of the National Safety Council. It would be impossible to sell them. That is a suggestion of what I think can be worked out with better service to this section. It is nothing more than up-to-date methods.

VICE-CHAIRMAN CLAIR: I feel that every person here is one of our real standbys. I think we are getting along very well. We would like to hear from those who haven't talked, but it is now time for the Public Safety session.

ADJOURNMENT

Wednesday, September 28, 1927

The meeting convened at ten-five o'clock, Vice Chairman Clair, presiding.

VICE-CHAIRMAN CLAIR: I know you will pardon us for calling the meeting together so late, but we wanted to wait for as many late-comers as possible, and the Nominating Committee has been having a session outside. I do want to say a few words about the general scope of this section, looking ahead to our future activities. We have a section here which should be of substantial benefit to every fleet-owner in the country, regardless of whether the vehicles which he operates are taxicabs, delivery, laundry, milk or bread wagons or trucks.

Look ahead to the day when we will have papers read during the meetings of this session on air hazards. It is the thing that is not far away, gentlemen. Already, Mr. Hanrahan told you yesterday, the first express plane has taken off. It is something we want to look forward to. It is something we want to begin to study, because it won't be a great many years before we will become interested in hazards of the air, and we soon will have fleets of airplanes not only doing commercial but passenger work.

We want to say something about the small fleet manager. We welcome the small fleet manager. We want him to come here and participate and give this section the benefit of his experiences. I know, in servicing fleets from five cars to 3,000. But I am most interested to get to the small man, because I find he is fighting his problems, and in his small way, if you will, is working ideas out which with a little adaptation and revamping can easily be used on larger groups. The small fleet manager is as welcome here as the large operator.

We are now ready for the report of the Nominating Committee, submitting their action of officers for the next term.

DALE HARMAN (Yellow Taxicab Co., Kansas City, Mo.): We have selected Robert Clair as chairman; Harvey D. Wood, as vice-chairman; J. E. Dobbs, secretary.

If the chairman will accept those three as nominated and leave it to these three men to appoint the rest of the committees, that would be the recommendation of the committee which you appointed yesterday.

VICE-CHAIRMAN CLAIR: You have all heard the report of the Nominating Committee. Unless there are further remarks, I would like to ask for a motion that the report as submitted by the Nominating Committee be accepted and this order of officers be elected for the coming year.

P. J. HEBRON (American Railway Express, St. Louis, Mo.): I move the report of the Nominating Committee be accepted as read and these men be elected for the coming year.

(The motion was seconded and carried.)

CHAIRMAN CLAIR: I am not going to take up any valuable time, gentlemen, by giving you an elaborate speech. I have tried sincerely in the last two days to give you the idea that I am really heart and soul behind the future of this section. And I want to say this: that you may depend upon me absolutely to work with anyone and everyone who has a problem of any kind in which this section can be of assistance.

Leaving the matter that way, gentlemen, I hope that the things we try to do will speak for themselves, and I trust that we may have everybody's sincere cooperation.

DALE HARMAN (Yellow Taxicab Co., Kansas City, Mo.): Mr. Chairman, will you have an opportunity to talk on this compulsory insurance law later?

CHAIRMAN CLAIR: I don't know of any provision that has been made to talk on this compulsory insurance at a later time.

MR. HARMAN: Is any action going to be taken at the present time?

CHAIRMAN CLAIR: In what respect?

MR. HARMAN: Is a committee to be appointed to investigate the experience or get the benefit of the experience of Massachusetts or any other state that has recently adopted compulsory insurance and inquire into the rate and into the extent of the insurance, as to volume, etc., or the amount, whether it has been found that it is too high or that they could get along with a lesser insurance and thus lessen the rates, and whether the experience has been such that it would bring a reduction in the rates?

I know of a number of cab operators—possibly the same thing is true with the fleet operators, I am not familiar with them—who have been able to show by handling their own insurance that there should be a much lower rate inaugurated by the substantial companies or the conference companies as they are called, and I think that is a subject that this section of the Safety Council could well give a half day's discussion to.

A Committee to Study the Effects of Compulsory Insurance

CHAIRMAN CLAIR: I think Mr. Harman's point is very well taken. I don't know of anything that is being done at the present time that has more of a general interest than this Massachusetts compulsory insurance law and how it will work out.

Would your idea be to hold this meeting some time this week or appoint the committee and let them work separately?

MR. HARMAN: That would be immaterial. I would like to have the committee appointed to go into it.

Mr. Cloud will bear me out that we appointed a committee a few years ago in our Taxicab Association and they went as far as they could. That was about three years ago. We went to Baltimore, Hartford, and had conferences with all the large insurance companies. But there have been a lot of new things and ideas put into it, and there have been different things found out that would possibly revamp the thing.

It might be a little selfish on the part of some of us cab operators in wanting the experience of this section, but it would be beneficial to the cab operators because I know our taxicab section is going to open the matter up again.

CHAIRMAN CLAIR: I think the whole subject has a general appeal. Not only the taxicab man is interested, but the motor truck fleet operators generally are interested, because it is going to come home to him just as closely.

I would like to put that motion of Mr. Harman's before the members.

HARVEY WOOD (Yellow Cab Company, Chicago, Ill.): I will second the motion.

CHAIRMAN CLAIR: It is moved and seconded that a special committee be appointed to take immediate steps to investigate the latest developments of the Massachusetts compulsory insurance law.

(The motion was carried.)

I will take the members of that committee under advisement. Perhaps Mr. Harman or Mr. Cloud could suggest someone.

W. W. CLOUD (Yellow Taxicab Co., Baltimore, Md.): I would be glad to serve, but I would be put in a rather embarrassing position, because I have recently been appointed by the Governor of Maryland to investigate and report to the next legislature on this subject, and that would really keep me out of any active participation. I would be very glad though to give the benefit of my experience.

CHAIRMAN CLAIR: I think perhaps the investigation of the Massachusetts compulsory law will be one of the main things this section can do within the next few

months, and I am sure there isn't anyone here from any state but who wants to know the developments in this connection.

F. T. COLEMAN (Continental Bakeries): I have been trying to divide allegiance between the Food Section down stairs and the Taxicab and Fleet-Owner's Section. I don't want to have a conflict, and I would like to get a motion before this meeting to see if we can get the program committee to meet with the Food section program committee so we won't have a conflict.

I have between 3,000 and 4,000 vehicles on the road every day. I have about 5,000 employees on the Food Section. So I have been trying to get the Food Section together so we can get some interest stirred up. They have appointed a committee to meet with the Taxicab and Fleet-Owner's Section. I thought you possibly would appoint a committee so we wouldn't have a conflict.

CHAIRMAN CLAIR: When may we meet your committee?

MR. COLEMAN: Any time.

CHAIRMAN CLAIR: I am sure we would all be glad to cooperate with your group and we will instruct our program committee to get in touch with you before the next year's program is lined up so that we can get together. Will that be satisfactory?

MR. COLEMAN: Yes, thanks.

CHAIRMAN CLAIR: Our first paper this morning will be given by J. C. Williams, secretary, National Association of Taxicab Owners, Chicago, Illinois.

The Soul of Safety

**J. C. Williams, Secretary, National Association of Taxicab Owners,
Chicago, Illinois**

Robert Burns wrote an epistle to a young friend in his early days, and he started it by saying:

"How my subject seems, me gang.
Let time and chance determine,
Perhaps it may turn out a sang,
Or perhaps turn out a sermon."

I don't see how anybody can talk a whole lot about safety without finally preaching a sermon about it. It is in that class with eternal things, especially if you are going to talk about the spirit.

We have here "The Soul of Safety." If you are going to talk about the spirit of safety, that is a tremendous thing and a very vital sort of thing. There are all sorts of spirits in the world and some are for safety and some are against it. The spirit means this—it means essence. It means heart, the pervading influence, the peculiar characteristic or quality. It is the animating principle.

Spiritual things are spiritually discerned. The spirit of safety is a spiritual matter. It isn't a matter of facts or figures about how many people are killed, because now we know a whole lot more about the number of people who are killed than we did last year or the year before. Figures come in right along. Knowledge of figures doesn't make any of these things less. Of course, if we use them properly, they are an advantage, but the spirit of safety isn't that knowledge of facts and figures.

The spirit of safety is not in the mechanics of the car. That helps tremendously, but it doesn't supply a spirit of safety. It isn't in brakes. It isn't in good roads. Because the more roads we build, the more cars we get to fill them. And if we have a little boulevard in this part of town so as to make the congestion less, the day it is opened everybody who has been driving over on the narrow street comes out and drives on that boulevard. Spirit isn't there.

The spirit of safety isn't in parking regulations. Yet it is a wise and necessary thing to have parking regulations, else we would never be able to move the traffic, to get by or get anywhere. Well now, it isn't in restriction of vehicles, because in this Loop down here the vehicles are not restricted and they move and move and move. Of course, the movement is much slower, but you get where you are going by and by and you move on and on, but the spirit of safety is not in those things.

The spirit of safety is not in laws, because there can't be enough police officers to enforce the laws to save all life, and if a motorist doesn't intend to obey the laws, who is to blame him? You can't have enough officers. There is no possible way. The spirit of safety is not in laws. It is not in regulations.

The spirit of safety is not in bonuses you pay your drivers. We try that. We give them more. We give them all the rewards we can to get them to drive safely.

The spirit of safety is a spiritual thing. Nobody in the world ever entered the Kingdom of Heaven who didn't intend to go there. The scripture says, the Kingdom of Heaven suffers violence and the violence takes it by storm. That means this: That you will never get in there unless you make up your mind to go, and furthermore, unless you walk the straight and narrow road; and it is thorny and it is rocky and everything else. You can't get there unless you try. Neither will you get the spirit of safety without all the effort you have in it. It isn't the broad road. The broad and winding road is the other one where the people are killed and where you have your accidents and where you don't care, the road which everybody is using. But this safety road is the narrow one.

The Soul of Safety Is the Desire For Safety

The spirit of safety arises from this thing—the wish to do. If you want to get into the Kingdom of Heaven, you must have the wish to go in, and then you must follow it with the intention. Now that we want to do this safety work, we have the wish to do it. We have the want to do. We have to do it day and night, and then when we want to do a thing—here is where that part comes in—the ways and means will multiply. We will find thousands of ways to do it and ways to tell other people and ways to try to get other people to do this thing. If we are after it ourselves.

Don't employ experts, if you are an executive, and turn over to them the operation of this safety and forget about it yourself, or at the end of the month check them up and say, "This thing isn't worth a damn. It isn't worth a cent. You aren't getting anywhere," and then get another safety expert. There is nothing to all that. Get in behind this thing yourself, with your heart and soul, and wish to do it. You can find ways. You will accomplish what you want to. That is the spirit of safety. That is the soul of this thing, and that is the thing we have got to get.

The means will be just as varied as there are individuals, and you will get new ideas and you will get those people with you interested and determined to do the thing safer themselves. That to my mind is what we are talking about, and a person who sincerely and earnestly and with determination follows out this whole safety idea and program will find ways, he will find means, and he will ultimately be successful.

CHAIRMAN CLAIR: Thank you very much, Mr. Williams. That was a very fine talk. Are there any remarks or discussions?

I was one of the people who recommended that we devote at least one paper to the discussion of horse-drawn vehicles during this session. I did that with the thought in mind of which I have spoken so many times, of trying to increase the scope and usefulness of this section, and so, as always when a subject is suggested,

they came back and said, "It is your job." That is what happened to me, and the title of this paper is, "The Safe Operation of Teams and Wagons."

The Safe Operation of Teams and Wagons

**J. Robert Clair, Safety Engineer, Liberty Mutual Insurance Company,
Boston, Mass.**

As compared with the scope and general appeal of our automobile accident problem, we are not faced with a national issue regarding the safe operation of horse-drawn teams and wagons. There is a practical need, however, for definite research and preventive work in the field, which is the subject of this paper.

The peak of general usefulness of the horse, as a pleasure or commercial unit of transportation, is slowly declining. And yet there are, in the United States today, literally thousands of commercial fleet operators who are directing groups of horse-drawn vehicles as the most efficient and economical method of distributing their products. The bulk of these fleets will probably be found in the laundry, the bakery and the farm products industries. To the managers of these fleets, our subject is an all-important one. They are as anxious to work out the details of their accident prevention campaigns as the fleet operator who is directing groups of taxi cabs or Mack trucks. It is within the scope of this Section to interest the operators of team and wagon fleets as well as to make positive efforts to offer them some constructive remedies.

I believe that it is something unique to have papers read on the subject of horse-drawn vehicles before the members of this Section. We trust that our efforts this year to include the subject will increase our usefulness to members and perhaps interest a number of fleet operators in our activities who have previously not been attracted by our motor vehicle discussions.

For those of us who have had considerable accident prevention experience in both the automobile and horse-drawn vehicle fields, many interesting comparisons between the two unavoidably present themselves. The two problems are practically specialized and distinct from each other and yet, paradoxically, they have much in common.

National statistics regarding accidents involving horse-drawn vehicles are meager to say the least. Separate classifications of this type of accident rarely appear on the reports from state or federal authorities who would otherwise be expected to tabulate such things. Where such figures do appear they are usually approximated with no attempt made to analyze causes.

Some Interesting Groups of Statistics

The statistics which I have used for the purposes of this paper represent figures which I have personally collected from sources to which I have had access. In most cases they are from commercial fleets which have been or are being serviced by our engineers. For comparative purposes we have figured an accident frequency rate which has been obtained by tabulating the number of accidents reported during a given period from an equal number of commercial motor vehicles and wagons. The resulting accident frequency rate per motor vehicle was .98, while the rate for wagons was .51. This means that a motor vehicle is twice as liable to become involved in accidents as a wagon. A further analysis of causes among nearly 3,000 team and wagon accidents reveals a number of interesting facts.

Among 53 causes of accidents to horse-drawn vehicles, the following 23 causes

lead in the order of importance. In each instance the comparative frequency rate is shown.

1. Horse shied, 12.5.
2. Runaway, 9.5.
3. Horse walking off, 8.4.
4. Other vehicles struck in passing, 7.7.
5. Our vehicle damaged when parked, 7.3.
6. Damage to our property at intersections, 5.7.
7. Our vehicle cut off, 5.0.
8. Caught in car track or rut causing collision, 3.9.
9. Other vehicle skidding into us, 3.0.
10. Other vehicle struck our vehicle in passing, 2.9.
11. Other vehicle side swiped, 2.6.
12. Side swiped by other vehicle while moving, 2.3.
13. Other vehicle damaged at intersections, 2.3.
13. Damage to property by horse chewing same, 2.1.
15. Striking parked vehicle when pulling out from curb, 2.0.
16. Backed into by other vehicles, 2.0.
17. Skidding into other vehicles, 1.9.
18. Hit in rear by other vehicle, 1.9.
19. Backed into other vehicle, 1.7.
20. Personal injuries caused by running or walking into our vehicle, 1.4.
21. Failure of equipment, 1.3.
22. Turning in street, struck by other vehicle, 1.1.
23. Miscellaneous, 11.1.

Injuries to Drivers of Teams and Wagons

A study of injuries to drivers of teams and wagons, which cases fall under Workmen's Compensation, shows the following list of causes:

1. Getting on or off wagon, 27.0.
2. Vehicle hit, throwing driver, 16.3.
3. Runaway, 7.9.
4. Falling while making deliveries, 5.1.
5. Loading or unloading, 5.1.
6. Sudden movement of horse, throwing driver, 4.2.
7. Strain, lifting supplies, 3.3.
8. Wheel passing over foot, 2.3.
9. Hit by other vehicles, 2.3.
10. Kicked by horse, 2.3.
11. Struck by falling box, 1.9.
12. Struck by falling wagon shaft, 1.9.
13. Bit by dog, 1.9.
14. Wheel struck car switch, driver thrown, 1.9.
15. Falling off vehicles, 1.4.

Accidents which are peculiar to horse-drawn vehicles and which do not appear under Workmen's Compensation cases concerning drivers of motor vehicles are as follows: These causes are listed in the order of their frequency:

1. Runaway.
2. Sudden movement of horse throwing driver into or off wagon.
3. Kicked by horse.
4. Struck by falling wagon shaft.
5. Bit by horse.
6. Stepped on by horse while unhitching or harnessing.

The following causes for horse and team collision accidents which are not found among causes for automobile accidents are as follows. These are also listed in the order in which they are most frequent:

1. Horse shied.
2. Runaway.
3. Horse walked off, damaged property.
4. Property damaged while making delivery.
5. Twisted reins.
6. Horse's hoof caught in rut or car track.
7. Personal injury to children playing about team.
8. Property damage resulting from child striking or annoying horse.
9. Personal injury caused by being frightened by horse.
10. Personal injury to others while getting on or off wagon.

So much for statistics. Without devoting any further time to comment upon their features, I shall proceed to consider the commercial horse-drawn vehicle itself.

The Old Team and Wagon Have Been Little Improved

The mechanical development of the motor car has been of a surprisingly mushroom nature. Comparatively speaking, the automobile is yet a youngster. Many of us remember those good old peaceful days before its arrival. And yet, in shortly over a quarter of a century, we have witnessed the development of a sturdy, fast, self-propelling machine which has brought with it many commercial advancements and blessings and yet, we regret to say much tragedy and unhappiness.

During the years of the remarkable progress made in the mechanical construction of our motor vehicle, our team or wagon has remained quietly in the background, practically neglected, unnoticed and unimproved. I think it is fair to say that at the present time, considering the modern team or wagon as we meet it in its common form, it is, mechanically at least, 25 years behind the times.

I feel very privileged to be able to inform you that we have had the pleasure of being able to assist, in a number of small ways, in what I consider to be one of the most radical and revolutionary attempts for the construction of a mechanically safe wagon. In this regard, I wish to pay special tribute to Mr. A. A. Clarke, treasurer of the General Baking Company, for the unique contribution he is about to make in the field of safe wagon construction.

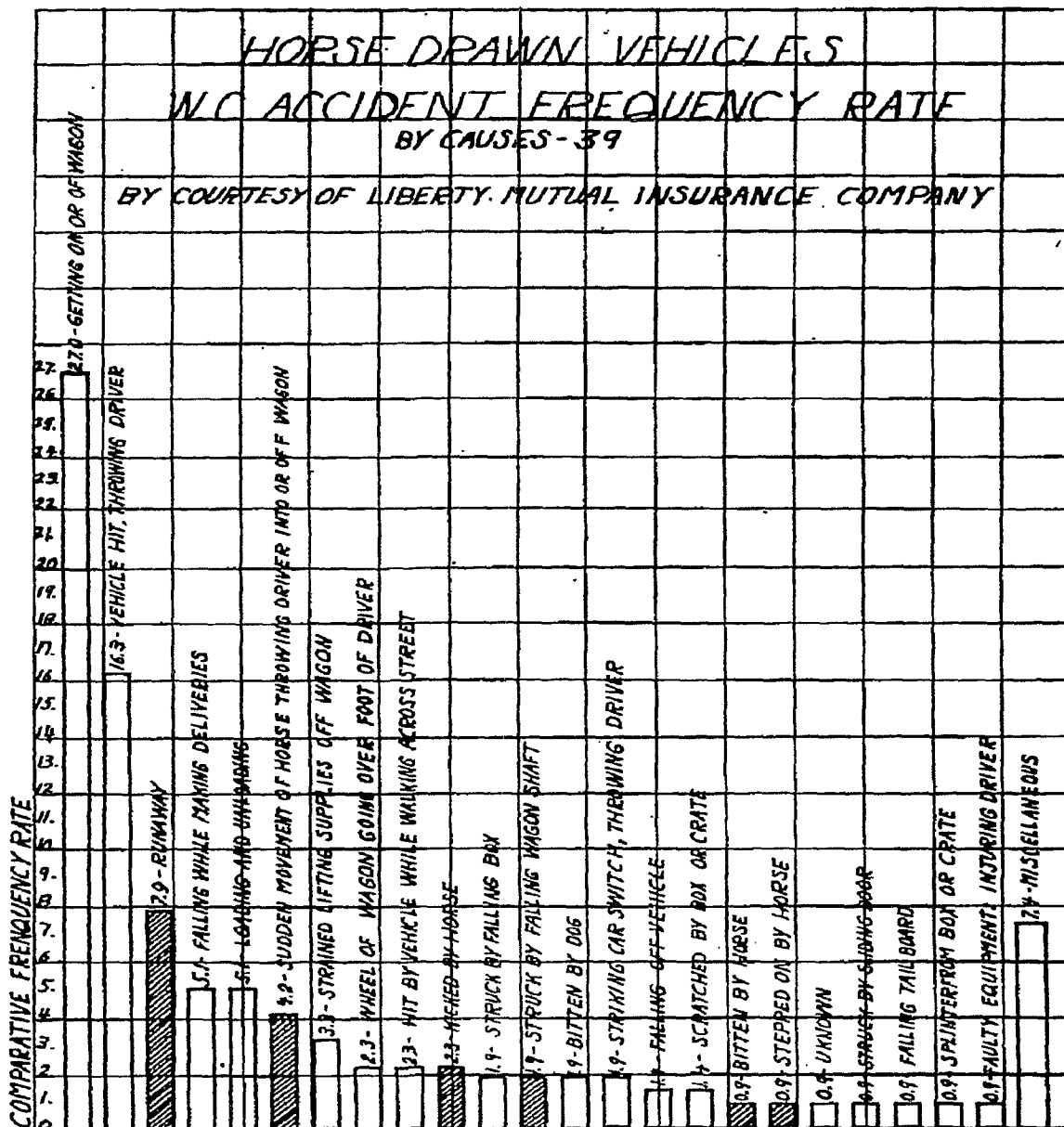
I had the pleasure of viewing this new safety wagon as it has been developed by the General Baking Company in New York on September 26.

The type of wagon, to which the new mechanical safeguards have been added, is of the standard enclosed body, box type, with the driver operating from the front.

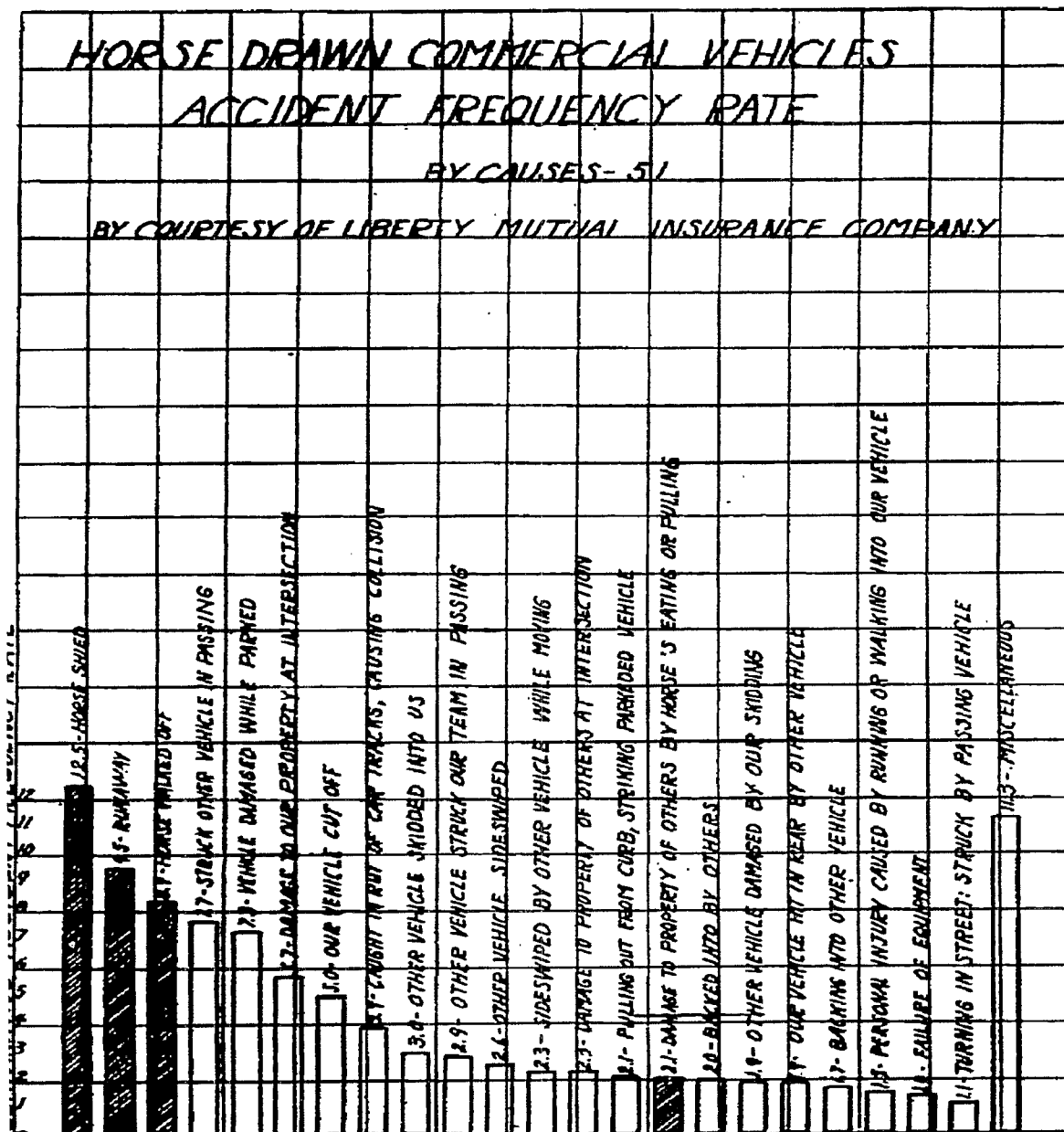
I am sure that a brief summary of the specifications of the mechanical safety features of this new wagon will prove most interesting.

1. From the front and left side of the old regulation toe board, has been built up permanent partitions to a height of about 18 inches from the toe board level. This gives a cab effect. From both front corners of this partition, wooden corner posts have been erected which meet the visor, or projected roof, of the wagon. This new cab construction protects the driver from being thrown headlong from his seat; effectively prevents him from making an improper and unsafe left hand exit from his seat, and the front right supporting column offers him much needed protective assistance in getting on and off the wagon.

2. A canvas weather-boot, or curtain, may be adjusted so as to extend



around the front and left sides of the cab enclosure to a height of about 12 inches. Above the permanent partitions a rein slot, with flap protection, is cut through the front section of this curtain. The lower ends of the curtain hang on the outside for the proper shedding of rain. This curtain makes for new protection against the elements for the driver and adds substantially to his comfort. When not in use this weather curtain is rolled tightly to the pro-



ecting top of the wagon and secured at the top of the two supporting columns by means of straps.

3. The right-hand side of the driving seat has been cut out and entirely eliminated, necessitating the driver to operate from the left-hand side of the driving seat. More will be said concerning the advantages of the operation of wagons from the left-hand side of the seat in a later paragraph. There is an

auxiliary, hinged, right side seat which may be dropped into place for the use of a route foreman or supervisor when it is necessary for them to ride with a salesman.

4. A rear vision mirror is attached about midway on the left-hand side of the extended roof of the cab. This is a new and most necessary addition for the safe operation of a wagon.

5. The wagon is equipped with the patented "Ferrel" type brake. The "Ferrel" brake, without doubt, is the most effective wagon brake yet constructed. This brake is applied by means of a foot pedal which extends up through the toe board in the front left-hand corner of the driving cab. This brake pedal is equipped with a regular self-locking Reo motor truck ratchet.

6. A chain for locking the right front wheel is affixed handily below the toe board.

7. There are two steps for entrance to, or exit from, the driving cab. The first, or lowest one, is so hung that its permanent position is directly in front of, and about one inch away from the tire of the right front wheel. The face of this step is about six inches square. It is made of corrugated non-slip metal with upturned flanges front and rear. The nearness of this step to the wheel protects the driver's foot from becoming caught between the step and wheel. The second step is located on the frame work at the base of the shafts and takes the form of a circular piece of corrugated non-slip metal about three inches in diameter. The safest means of exit from the seat is backwards.

Tail Lamps With Candle Are Preferred

8. Tail lamps of the candle-burning type are favored in preference to electric or oil burning styles. These are affixed to the rear left-hand side of the wagon. They extend out beyond the wagon body so that the driver, by glancing back from his left-hand operating position, may always be sure that they are alight.

9. The rein hook is attached to the projecting roof of the cab on the front right-hand corner. This is to avoid striking the driver's head should he be thrown forward.

10. The toe board has a semi-circular section cut out of its right side which exposes the top step to the view of the driver and gives his foot safe and easy access to it.

These are the outstanding mechanical safety refinements which have been built into what may be a history making horse drawn vehicle. Up to the present, horse drawn vehicles have been sadly neglected in respect to development and improvement along lines of safer operation and protection to the driver.

Without going into further detailed explanation, it will be most interesting for you to note how the improvements on the General Baking wagon have been planned to meet the driving hazards as I have tabulated them in the above statistics.

I regret that time will not permit a study of that form of wagon, frequently called the retail type, in which the driver sits or stands in a cab located in the center of the body. Comparatively, this is a highly hazardous vehicle. At some future date, it is hoped that we may be able to make a study of this.

I believe that our engineers were among the first to recommend, for greater safety in driving, that the drivers of teams and wagons be required to operate from the left-hand side of the driving seat. The hoary custom of the right-hand side for horse driving is a thing of the past—at least for commercial purposes. The old order is changing. Reasons for this are plentiful.

We recognize the fact that a left turn is one of the most hazardous ma-

neuers a vehicle can perform on a highway. At intersections controlled by automatic traffic signals, the left turn is invariably eliminated. This is done not only for greater safety but for the more expeditious movement of the traffic flow. A left turn necessitates the cutting of the line of vehicles progressing in the opposite direction which slows down the movement of both lines.

The left turn is highly hazardous for the motor vehicle. How much more dangerous is the same left-hand turn for our comparatively slow moving horse-drawn vehicles! The left-hand drive is more efficient and the safest operation point for motor vehicles. No one has thought of paying much attention to our horse-drawn teams and trucks up to now.

Hazards of the Horse Driven Vehicle

From the right, a driver cannot give hand signals to the man following to signify his intention to stop, turn, or back, except by a mechanical arrangement which is clumsy. In making a left turn, this right-hand driver, especially if his wagon has an enclosed body or a high load, is at an extreme disadvantage. Should he wish to take the ordinary and desirable precaution of looking back, before turning left, he must extend his body far to the left, lean out, and look back. In the meantime, the forward movement of the vehicle usually continues unattended and with all manner of potential accidents. If the load has an ordinary overhang, even this bad attempt at safety is not possible. Again, should the vehicle of this driver who is leaning far over to his left, be hit in the rear, the driver is at once in danger of being thrown from his seat and severely injured.

Commercial fleet owners who realize the hazard of the right-hand drive have shown themselves willing to stand the expense of a few radical mechanical changes in their equipment for the sake of greater protection to the public and to their operators.

A few final words about the horse: Special care must be exercised in seasoning and breaking in each animal properly. It is oftentimes necessary to put two drivers on a wagon, for the first day or two, in cases where the horse is green. Feeding must be carefully supervised to fit the individual peculiarities of the stable inmates. Periodic weight checkups are often made to secure indications of poor treatment or the health of each animal. Records should be carefully kept of the accident experience of each horse. Continually bad offenders should be replaced.

A List of Essential Precautions

"Unattended horses walking away and damaging property" and "runaways" are the leading causes of wagon accidents. The necessary precautions to be taken against these types of accidents are as follows:

1. Let each driver study and know, to the best of his ability, the peculiarities of the horse which he drives.
2. Stand wagons in front of parked cars instead of behind them. This is very important.
3. Never leave a rig standing without locking wagon brakes or chaining the right front wheel.
4. Tie ropes should be used on horses when it is necessary to feed them on the street, away from the stable.
5. We have found the old bit weight to be perhaps the most inefficient method of securing a standing horse.

We realize that when a horse becomes frightened, or otherwise takes it into his head to run away, that he will haul the wagon in spite of brakes, chains or

bit weights. We do feel that the above five precautions are worth while, at least to retard the speed or to keep the runaway in nearer the right-hand curb.

Constructive progress is being made to assist the operators of horse-drawn vehicle fleets in solving their accident problems. We trust that these remarks may serve the purpose of bringing to the attention of those interested a few of the most recent preventive ideas.

P. H. HEBRON (American Railway Express Co., St. Louis, Mo.): Why do you use a candle-burning tail light?

CHAIRMAN CLAIR: One outstanding thing, especially with people who distribute food products, is that kerosene is smelly and the driver is apt to get it on his product. Cleanliness is the leading reason.

A Candle Burning Tail Light That Is Snuff Proof

The reason the electric type isn't favored is because it usually necessitates the carrying of a storage battery or dry cells, which is quite an expensive investment to a fleet-operator who has many vehicles. Then there is the maintenance expense.

We have a candle-burning tail light that is practically snuff proof. It will burn brightly without being blown out. Each wagon has to carry a spare candle, and in placing the lamps as they are placed, he has a check on them all the time.

MR. HEBRON: Could you give me the name of that type?

CHAIRMAN CLAIR: I don't believe I have it here. But I will make a note of it and see that you get it.

MR. O'NEIL (Travelers Insurance Co.): Could you tell us why you park in the rear?

CHAIRMAN CLAIR: Our recommendation is that you park wagons in front of other parked vehicles in preference to behind them. We find in the analysis of accidents which we have made that "horses walking away from the curb and damaging property" is the third leading cause for team accidents. We find that a horse, if he sees something in front of him, has an instinctive tendency to walk to it. He wants to go up and nose it. Invariably if a horse does that, he will chew off pieces of the top or of the upholstery. Also he may walk too close and the shaft of the wagon damages the back of that vehicle. That is the first thing.

In the second place, if the horse walks away, and he is behind a parked vehicle, he will knock off a bumper or a fender, because a horse can't judge clearance distance. I have a bulletin which I would be glad to give you, showing pictures of these hazards and why we recommend these precautions.

Dairy Wagons Sometimes Double Park

SECRETARY DOBBS: I would like to ask a question, on chaining the right front wheel. It seems to me that would bring a lot of accidents in the case they are double parked. We find our teams are constantly double-parking, and we adopted the chain but had to use it on the back wheel, because if we put it on the front wheel we would be pulling the horse into the car a number of times.

CHAIRMAN CLAIR: I think it is an unusual thing that you are allowed to double park.

SECRETARY DOBBS: We are compelled to.

CHAIRMAN CLAIR: That is an unusual condition. As I said before, we have tried to recommend a safe practice which will fit the majority of cases. I would say that double parking was something beyond the ordinary. For that particular condition, it might be that it wouldn't be best to chain the right front wheel.

The next paper will be given by Mr. C. C. MacMahon, superintendent of transportation, Commonwealth Edison Co., Chicago, Illinois.

Safety and Its Application to Electric Trucks

C. C. MacMahon, Superintendent of Transportation, Commonwealth Edison Company, Chicago, Ill.

After what has gone before, Mr. William's talk and the chairman's, what I have to say may seem rather insignificant in a way. Rather than speak on generalities, I am going to confine myself to their application—safety application to our particular department. At the time I was asked to give a talk before this body, I was asked to explain the practices and policies that we have set up and adopted in our particular department of the Commonwealth Edison Company. So that is what I am going to do, and I am going to give you workable ideas of what we are doing and how we are doing it.

We have been in the safety movement probably 13 or 14 years, and I will be frank in admitting that when the safety movement was first established in our company, I was very skeptical. It seemed rather unusual that a company of our size would employ a lot of safety engineers, because I felt that we were normal, doing things by safe methods, and wouldn't have any reason to do anything that was unsafe. I thought there would be a particularly hard row to hoe in order to sell the idea of safety.

That was my personal attitude. We were at that time—I am speaking of the company, not the department I am in—killing on an average six employees a year. We were electrocuting some; some were falling off poles; some were slipping off ladders; some were being killed this way and that. After the first year of operation, I think the total fatalities dropped to about four, which indicated that safety work was having a good effect. We went along for about three or four years and finally got to the point where we didn't kill one employee during the entire year. Then I began to take a very great interest in the safety movement.

Where you have a fleet of trucks similar to the ones we have—we have practically 300 electric vehicles and 200 small gas cars (we have no commercial gas cars) covering an area like Chicago—safety is a great thing. So we established a safety division in our particular department. We hold safety meetings every two months. Where possible, we have a speaker from the Chicago Safety Council. Then the supervisory members of the department also talk on their particular activities and the activity of the department, and one of the things we find very essential is to get the employee, speaking particularly of the driver, to make suggestions or talk about the safety meeting. Some of them are rather reluctant to talk, but we bring out ideas and we ask questions, and we finally get them to talking. Our meetings always start at six o'clock and some of them last until eleven o'clock, which indicates the interest the men have.

We bring out every phase of safety we can possibly think of. We instruct the men on safety methods of operation, the mechanical end, all tools are very carefully inspected, and the handling of the cars while employees are working on them. As to the chauffers, the new man is given a very careful test before he is allowed to take a car out on the streets of the city. He is given a three days' trial and then we explain all the rules of safety to him. He is instructed just what to do in the event an accident should occur, and we impress on the minds of our men that accidents do not happen but actually are caused. We try to make that clear, to bring that out so it will be uppermost in the man's mind.

We find that the safety suggestions we encourage in our departmental

meetings have great value. If a man begins to thing safety, talk safety, and discuss measures of doing things in a safer manner than perhaps he is doing them at the present time, he will be more careful. We encourage suggestions and any man who offers a suggestion which is accepted is rewarded for it. We find we have gotten some valuable suggestions on safety from our employees.

But we find also that eternal vigilance is very necessary. We have our meetings, as I said, every two months. We spend a lot of time and energy in serious talks to the men, trying to encourage safety ideas; but occasionally we will find one who has disregarded all the rules of safety, and as a result, we have had an accident.

We have only had one fatal accident in our department since the department was organized, and this department was organized about 22 or 23 years ago. This accident occurred in June, 1926. One of our mechanics had to do a job on the front end of one of our trucks and in order perhaps to give him more freedom of movement, he moved the truck out into the aisle, and this happened to be a very large garage. There is a 60-foot aisle in the garage.

Details of a Fatal Accident

That was at six o'clock in the morning. One of the drivers of one of the departments came in for his truck, and it so happened that he was a little bit late. He found his truck parked in the stall, but the truck this man was working on was in such a position that he couldn't get his truck out without moving the truck from the aisle. The man had a safeguard. He had a light underneath, but due to the fact that it was comparatively late, the man didn't see the light. He walked around the back end of the truck, stepped up into it, and before the man could make a noise to indicate that he was under there or to get out, the other fellow had moved the truck the full length and the man under the truck was crushed under the battery department and died before we could get him into a car to take him to the hospital.

You can imagine the feeling of the man, who through perhaps being just a little late, had caused a death. You who are executives and who have to do with a large number of men and who have had a death in the family, you might say, can appreciate the feeling I had. I don't know that I have ever had anything that affected me like that particular case. It was the first and only one we have had, and I hope it is the last. The man who was killed attended all our meetings and the man who moved the rig, while not one of our men, was a company man and attended all the safety meetings of his department. It was one of those items of haste which enter into things and cause trouble.

Just recently we had the first accident we had had for some time. We had two last week—one week before last and one last week. In spite of anything we can do to emphasize the necessity of eternal vigilance, one of our men rode on the fender of a car at midnight to go to lunch. A taxicab, presumably, so the report goes, cut him off on the boulevard, and the driver says, in order to keep from killing the man on the fender, he had to swing across the parkway and he hit a tree and knocked off the fender on which the man was riding and wrecked the car, and the man is in the hospital.

Sometimes you wonder what you can do to instill safety ideas into some of the men. The only thing we do is keep everlastingly at them.

Another thing in connection with electrical vehicles is the necessity, the absolute necessity and importance of withdrawing or removing the running key so that when the driver is absent the car will be absolutely harmless.

Only last week out on the South Side, the driver claims he had the key in

his pocket. There were some children of a curious nature who got onto the car, one of our large panel rigs. If the man had his key in his pocket, they must have found something to operate the switch, and it is rather doubtful to me, considering the age of the children, that they would know enough about it. They started the car, it shot across the street and they jumped off. The car ran across the sidewalk, ran over a little fellow and broke his leg.

I presume in handling fleets a lot of you gentlemen here are in the same position I am. We found in the past three years that our accidents were gradually increasing, that is, the property damage accidents. The surprising thing was that we found the accidents were being caused by our older drivers; so we discussed it, and conceived the idea—I don't know whether we originated it or not, but we conceived the idea, I will say—of developing what we call a trial board. It is composed of three supervisory members, two employee members, and one member of the safety bureau, and the chairman. We hold meetings every week, and every man who becomes involved in an accident must appear before this trial board and stand trial, and prove that he was blameless, or else take the responsibilities for the accident.

A Bulletin Board That Is Essential

In addition to this trial board, we have what we call the bulletin board. It is a board about 42 inches long and 30 inches wide. It is a board like you see in the hotels, where you can insert numbers and names and symbols. This is arranged with the first column on the left being used for the name. On the margin at the top is, "The Transportation Department Accident Board," and on the right hand margin is the year. It is divided into two columns, January and December inclusive. On the first right-hand column is the name of the man who may have occasion to appear on this board. The findings of the committee or the trial board are posted, the name of the driver or the mechanic or whoever it may be that is involved. His name appears on the board, and three at fault accidents during the entire year indicate to us that the man is unsafe, either in that particular position, or else is an unsafe employee for the company.

So we have set up a number of accidents—three is the number—which are sufficient cause either to dismiss or remove the man from that particular job. We have had only one occasion to remove a man since this trial board has been in effect.

It is rather surprising what lengths the men go to not have their names placed on the board. We also have provisions in our rules and regulations governing this trial board that any case may be reopened if the man can produce sufficient evidence to warrant it. You gentlemen have perhaps some similar methods in your own particular departments, but if you have not, we would recommend it. It is a great help.

I have heard quite a number of safety men talk, and I think one the greatest things we have to stress is the mental attitude of all of us who are in this movement. We cannot, in my opinion, over-estimate the importance of obtaining and maintaining the proper mental attitude. I have heard safety men emphasize that if such-and-such a thing isn't done, we are going to have an accident, or that this place will burn up if we don't do this and that. I think we have to know in our own minds absolutely (not only believe but know), that accidents will not happen, instead of leaving a loop-hole and saying they may happen. We have to emphasize it in our own mentality and minds and know that accidents will not happen. We have to sell ourselves and the

individual on that particular phase. That is my idea of it, and that is what I try to do.

In closing, I am going to recite a little excerpt from Mr. P. Y. Young, one of our Edison men, whose paper on safety impressed me as being a very fine thing. He stated: "And the end is that the workman shall live to enjoy the fruits of his labor, that his mother may have the support of his arm in her age, that his wife may not be untimely a widow, that his children may have a father, and that cripples and hopeless wrecks who were once strong men shall no longer be the by-product of industry."

Gentlemen, I think that covers the safety situation almost completely. I think it is well worth thinking over.

CHAIRMAN CLAIR: I wish to thank Mr. MacMahon for his very interesting talk. Are there any questions or other discussion on Mr. MacMahon's remarks?

The point brought out by him in regard to removing the starting key or plug from the electric truck is perhaps the greatest precaution that can be taken, as far as my experience has gone; and I couldn't help thinking when he was reviewing the fatal accident which occurred to his mechanic, that it would be a good rule that all starting keys should be removed from all electric trucks while in the process of repair.

Efficiency the Outcome of an Accident

MR. MACMAHON: I intended to speak on that. I would like to take just a moment.

We learned quite a lesson from that accident. It is very unfortunate though that we have to have accidents to teach us things. The rule has been ever since the safety movement started that running keys must be removed from the rigs when they are being worked on in the garage. Running keys must be removed from the rigs when the driver absents himself from the rig. He must get into the habit of removing that key. He must put it in his pocket. One of our strictest rules today is that if a rig is found on the street with a running key in position the driver is immediately removed from the service of the company, regardless of what department he may be in.

In our department, after this fatal accident, we got chains that would reach from handle to handle at the cab entrance. We have firmly fixed to that chain a card that is almost indestructible, made of oilcloth or canvass. It is very substantial and there is written or printed on this card, "Hold, Man Working on Car." In addition we have a flag at the rear end of the car. Any man who works on a car, regardless of whether he is underneath the car or on the side of the car, who doesn't take these precautions which we have set up, we figure is an unsafe employee for our department and take the necessary steps to remove him.

But the running key rule has for years been in effect, and once in a great while we find somebody violating it. But since we had this last accident, this fatal accident, we have never found a man who has been guilty of negligence to the extent of leaving the running key in position. We make it so the man can't get into the car without seeing the chain barring his entrance and a large card warning him that there is a man working underneath the car.

CHAIRMAN CLAIR: We are very fortunate, gentlemen, in having with us today the next speaker on our program. Mr. Marcus A. Dow, of Vander Poel, Pausner and Jefferson, Inc., New York City, a past president of the National Safety Council. He is also a past chairman of the Steam Railroad Section of the National Safety Council and for many years was general safety agent of the New York Central Lines.

Telling the Driver How Accidents Happen

Marcus A. Dow, Vander Poel, Pausner and Jefferson, Inc., New York City

I have been asked to discuss for a few moments this subject of "Telling the Driver How Accidents Happen," and I think it is a very important thing in connection with motor vehicle or commercial vehicle safety movements.

There are, of course, two very important elements in safety. One of these is the mechanical element, and as far as the operation of a vehicle is concerned, the mechanical element includes the proper application to the vehicle itself of every known safety device or method of construction that will help to prevent accidents.

The other element, however, and I think really it is the all-important element, is the human element. It has been variously estimated by men who have spent years in safety work that from 80 to 90 per cent of the accidents that occur on the streets and highways or in industry are accidents which mechanical safety devices in themselves alone will not prevent. They can only be prevented by the exercise of proper care and caution on the part of the individual. In other words, safety is an individual responsibility.

I have had the experience during the past year of carrying on a safety service for a number of large fleets of motor vehicles, and I find that the majority of the drivers of commercial vehicles or any type of automobile for that matter, are not sufficiently educated as to the predominating or outstanding causes of accidents. The great trouble with the average mind of the motor vehicle operator is that when he thinks about an accident at all he thinks of the accident caused by major violations; and that is due to the fact that such education as he has received as to accident causes has been, for instance, by reading stories of accidents in newspapers. He will pick up a newspaper and he will read where in the dead of night an automobile running at a speed of 60 miles an hour crashed into a tree and the driver and occupants were instantly killed. Or he will read where a bottle of gin found about the wreckage told the story, and the accident was due to the intoxication of the driver operating that machine. Temporarily at least his mind will become impressed with the fact, as he sees it, that the majority of the highway accidents are due to the untold number of drunken drivers careening about. Or again he gets the impression that the traffic magistrate, doing what he humanly can to increase safety on the public highways, adopts a very laudable policy of inflicting severe punishment upon the so-called speed maniac brought into his court. Columns of publicity then give the public the impression that the majority of accidents are due to reckless speed on the highways.

I don't want for a minute to give you the idea that I offer any excuses for the drunken driver or the so-called speed maniac, because we all know that every automobile with an intoxicated driver behind the wheel is a potential death car, and every motor vehicle operated by a reckless speed maniac is a deadly weapon. We can't be too severe in our dealings with that class of offenders against safety.

However, I had occasion to analyze the accident experiences of a commercial fleet of about 2,000 motor vehicles. Neither speeding nor intoxication was a factor of any consequence in the accident experience of this particular fleet, although they were not having an enviable experience, by any means.

We found the majority of their accidents were due to seemingly inconsequential acts of inattention, thoughtlessness, and negligence on the part of the drivers. Therefore, it seems to me the educational feature of this work is the

all-important feature and that an educational campaign, to be effective, must be conducted along such intelligent lines that you will convey to the drivers of the automobiles not only the fact that you want them to be careful, but you must tell them how to do it.

The average motor vehicle operator, commercial or otherwise, desires to be a careful driver. But it doesn't get you anywhere to simply put up a few posters which say, "Drive Carefully" or "The Best Safety Device is a Careful Man" and let it go at that. You have to be more specific and get down to brass tacks before the best results are to be obtained.

In the lines of my experience with the motor vehicles we are serving, in the company I represent, I get around about every four or five or six weeks and by personal contact with the drivers convey to them specific information as to how accidents happen. To give you some idea of how this work is conducted in my particular instance, I am going to ask you to assume for a moment, or put yourselves in a frame of mind where you can consider yourselves, a group of motor vehicle drivers to whom I am carrying a safety message based on actual experience.

Many Backing Up Accidents Are Serious

Now we have found, during the past few weeks in this particular concern in which you men are operating motor vehicles that there was an unprecedented number of accidents, due to backing up, backing up carelessly, backing up quickly and suddenly, backing up without looking behind to see what the conditions were before backing.

Perhaps you will think a backing up accident is only an inconsequential thing, causing a slight damage to someone else's property or a bent-in bumper or something of that kind. I had occasion the other day to read a story, tucked away in an obscure column of a New York newspaper, which told of a man killed while cranking his car, because the driver of a truck parked a few feet in front of him backed up without looking behind and crushed this man between the rear end of the truck and the car he was cranking, killing him instantly.

We have another case of an employee who was injured by a fellow employee only three weeks ago. He got up on the seat of his car and without looking back to see what the conditions were before backing, without finding he had only three feet to back up, backed up suddenly without warning, and caught the fellow employee who was putting water in the radiator of his car and crushed his thigh bone so badly that this man today lies in the hospital with his injured body from his arm pits to his knees incased in a plaster cast, perhaps hopelessly paralyzed for life; and all because of a single moment of carelessness and thoughtlessness on the part of a fellow employee.

Tell your drivers how the accidents happen and tell them in such a way they will be forcefully impressed, and remember the lesson you convey to them.

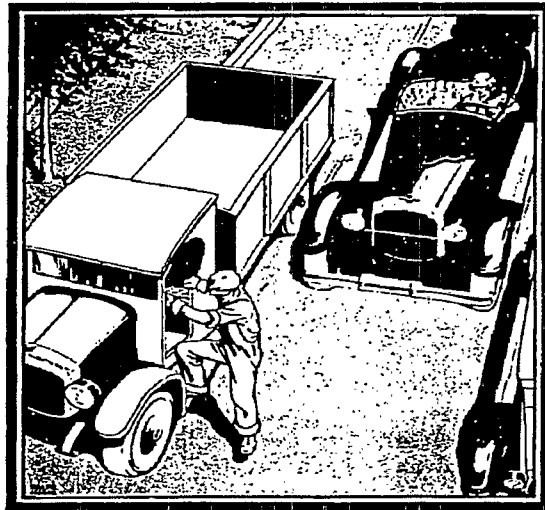
We had an experience with one of our fleets. (I am talking to you as safety representatives here for the moment). An employee of a large baking concern we serve was struck on a railroad bridge crossing, and the accident report indicated that this man approached the crossing at a speed of 45 miles an hour. His view was obstructed by a building on the corner. When he got to the first rail he discovered a freight car bearing down upon him. He was obliged to turn to the left and go down the track in the hope that he might be able to escape the accident. The vehicle was struck by the train, completely demolished, and the man is in the hospital in a serious condition.

I had occasion only yesterday, in talking to a group of drivers of commer-

cial cars, on the South Side of Chicago, employed by this particular concern in which the accident occurred, to tell them about this accident, and here is what I said to them—"You are now again a group of Commercial drivers and one of your fellow employees was badly injured at a grade crossing accident out here a few days ago."

"Some years ago, when I was a young fellow, living in Michigan, I went to a county fair and there witnessed a balloon ascension, one of those old-fashioned affairs where the gas bag is inflated with hot air. As we stood there watching that man performing on the trapeze, 2,000 feet in the air, we were horrified to see him slip from the trapeze and fall headlong to the earth 2,000 feet below. He landed on a brand-new plank sidewalk, and every bone in his body was broken into a thousand pieces.

AVOID LEFT SIDE EXITS



"Several days later I was riding on a railroad train, speeding at about 60 miles an hour. Suddenly the train came to a grinding stop. With hearts palpitating we got out to see what had happened. A completely demolished vehicle on a grade crossing told us the story. Over in the field where it had been tossed by the train lay a shapeless, lifeless thing, which a moment before had been a human being, and it looked like the remains of the unlucky balloonist on the splattered sidewalk up in Michigan a few days before.

"One of the passengers pointed to a sign located on the crossing the train had just passed. It was one of these triangular signs upon which were three short, stuck-full-of-meaning words—"Stop, Look, and Listen!" Now 'Stop, Look, and Listen,' boys, is only a simple rule. It is easy to learn, easy to master. Its observance takes but a minute's time. It is a simple thing, yet failure to observe it becomes a colossal act of negligence.

"The thing I want to impress on your minds, boys, is this: If you come into contact with a railroad train at a crossing, the result, as far as its effect on you is concerned will be just as serious as though you had fallen 2,000 feet out of a balloon."

Tell your drivers how the accidents happen, and impress on their minds in such a way that it will stick and they will remember it for a long time after you have given them the lesson.

Now then, there is only one good thing about any accident. (That is rather a strong statement to make perhaps, that there is something good about any accident). But the only good thing about any accident that I can see is that it might serve as a lesson, a warning that will help to prevent the occurrence of similar accidents in the future.

Something was said by the previous speaker about the accidents in the operation of electrics, due to the leaving of a switch or starting key in the vehicles. In a large baking concern for which I handle the accident work, we have had accidents due to that character, and they have a rigid rule requiring the operator to remove the switch key when he goes into the store to make delivery, put it in his pocket and have it here. But we had a serious accident where a boy was run over and probably crippled for life.

An Accident Because a Rule Was Violated

Once again you are motor vehicle drivers and I am bringing the lesson home to you.

"Here we have the report of a child, a boy about seven years of age, who was run over by one of these little electrics that can only attain a speed of ten miles an hour. Yet the boy is in the hospital and probably crippled for life, due to the fact that the operator of that car violated one of the most important rules this company has promulgated, requiring the operator to remove the switch key and put it in his pocket and take it into the store with him. It is the only evidence he would have of his freedom from fault, in case of an accident—to be able to produce that switch key from his pocket.

"But one of our men violated this rule. He probably violated it 100 times before and nothing happened, and he considered nothing ever would happen. But here is what did happen: The man parked the car in front of the store, went inside and left the switch key in the car. A boy of about 12 years of age started the car. It collided with an ice wagon in front of it, started the ice wagon down grade, and the ice wagon ran into a seven year old boy who was picking a ball from the curb stone at the gutter. His thigh bones were so badly crushed and his spinal column so badly twisted that the doctors say that boy will never again be able to walk on the streets or play ball like a healthy boy ought to do, all because one of our salesmen did a rotten, careless thing, which he knew he should not do, in leaving that switch key in the car, in violation of rules, because he did not think, did not take the time to remove it."

Analyze your accidents. Carry the lesson of how accidents happen home to your drivers, in a way that they will stop and think about accidents.

"Here is another case. A short time ago one of our men had an accident, due to a car starting up that was parked along the curb. Here is the reason for it, boys, here is a report that shows a car that started up while parked and struck a sedan and turned the sedan over and seriously injured a woman occupant. The report came over the desk reading like this: "I was inside the store making a delivery and my car started up and injured this woman."

"Now just stop and think about that: 'I was inside the store making a delivery and my car started up,' just as though there were something uncanny or supernatural about that. As a matter of fact, you are all motor vehicle operators, and you know and I know that that car did not start of itself, voluntarily and willfully, and take advantage of his absence in that store to injure this woman. That car was not endowed with ghostly power to enable it to do that thing.

"The fact of the matter is that the driver left that car parked on the hill. He failed to cut the wheels into the curb to prevent the car rolling, and he left the engine running. The vibration of the car and the force of gravity started the car down the hill where it struck the sedan, and an injury to an innocent person was the result.

"The car wasn't to blame. The brakes weren't to blame. The hill wasn't to blame. The responsibility rested entirely and solely upon the shoulders of a driver who was careless and did not park his car in a proper way on the street when he went into the store and left it here."

Tell your drivers how the accidents happen. Tell them repeatedly and list our accidents. Classify them as to causes and carry the message home to them so they will understand and realize that the things they are doing are the things that cause accidents, that the things they neglect to do are the things that cause accidents.

Many Accidents Are Caused by Little Things

It is a good thing also to impress upon their minds that the majority of accidents are caused by the so-called little things.

I have a story I like to tell the boys, which was told to me when I was a youngster. There was a young lad over in Holland, that country which is covered with canals so that they require the building of dikes to keep the country from floods. This boy was walking on the top of the dike and observed a thin stream of water trickling down the dike. He went to see what was causing the leak. He found a small hole in the side of the dike through which the water was coming.

The thought came to him that the hole might become enlarged and the greater the stream of water rushing through the opening, the greater the opening would become and possibly the dike would give way and the surrounding country become flooded and people lose their lives.

So he stuck his finger into the opening and held it there through the long, dreary night and into the next day, and finally help came, and he was able to remove his finger from the opening and the repairs to the dike were made.

That was only a little thing—that thin stream of water trickling down that dike—but in the mind of the boy it foretold the possibility of impending disaster. To my mind, that boy had the instinct and the courage and the wisdom of a real safety man. And that is what we want you drivers to be—real safety men, by remembering the little things that cause accidents and guard yourself against them.

"Oh, the pity of it," we say when a careless or drunken man backs up and rushes the life of an innocent child. The pity of what? The pity the child was killed. But do we mean beyond that, the pity that the driver was careless? You know, nine times out of ten the pity is that the concern which employed him had not pounded into his head a few of the fundamental little things about safe driving which he ought to have known but of which he seemed to be ignorant.

The reason for it was that even though he did not intend to be ~~careless~~, even though, as the average driver, he desired to be free from accidents, ~~his~~ mind had not been sufficiently trained along the lines of elimination of the common practices which cause accidents; that requires development of the mind and mental training.

During my experience in the police department (here is a little story I tell to illustrate my point) I had occasion as an official of the New York Police Department some years ago, to meet a great many strange and interesting people. One day they were having one of the annual police field day games for the benefit of the widows and orphans whose husbands or fathers had been killed in the line of duty. It was just after the Dempsey-Firpo fight.

Someone conceived the idea of getting Dempsey to the field as a drawing card. The police asked me to take care of him and see that he was properly cared for. So with a couple of policemen we got him into a private dining room and were serving lunch.

A Celebrity Who Is Always in Training

I sat next to him. The waiter leaned over my shoulder, and wanting to do the proper thing for the world's champion, said, "Shall I get a high ball for Mr. Dempsey?"

I turned and said, "How about it, Jack? Do you want a drink?"

He said, "No, thanks, I don't want any."

I said, "Speak up, if you do. You are not in training now."

His answer has stuck in my mind. Dempsey turned to me and said, "I am always in training."

This is a story I have told to our truck drivers with a good deal of result. If you are going to be successful in cutting out accidents, in being free from accidents, you have to do just as Dempsey says, keep in constant training. You have to be always in training. I don't mean necessarily in physical training alone but in mental training. What is training? If you are a prize fighter, constantly to be in training is to be constantly in trim to meet an adversary in the ring.

You must keep your muscles active that you are going to use in the performance of your driving, you men who are driving automobiles. If you are going to protect yourselves from an adversary and an incompetent, irresponsible driver, who will attack you from the left or the rear, you have to be in constant mental training. As Dempsey said, you have to be always in training. It is up to the men who are in charge of these motor vehicles to help the men along these lines and keep them in constant mental training, and I believe the way to do that most successfully is to tell them forcefully and effectively and repeatedly how the accidents happen. That, I think, is the most important thing in commercial fleet safety.

CHAIRMAN CLAIR: I want to thank Mr. Dow, on behalf of the Section, for his very worth while and interesting talk.

There has been a question asked as follows: "Which method of paying a bonus should prove the most effective—paying annually, semi-annually, or quarterly?"

Perhaps some of you who have had experience in awarding bonus money will be able to answer that question?

I might say, personally, that I have had a lot of experience in operating driver's contests, and I feel that the best thing is to make the contest short; if possible, not to exceed three months. In cases of taxicabs or fleets, it is

oftentimes more effective to pay them monthly. I believe the general theory is to make your contests short, give them awards often, and the effectiveness will be improved.

Are there any further remarks or any further questions, gentlemen? If not, I wish to thank you all for coming here and showing your interest, and I want to ask you this: Will you please, if we find it necessary to call upon you for cooperation during the year, through correspondence or otherwise, please do your best to help us along? We need everybody's help. We are going to work hard and we just want you to work with us.

ADJOURNMENT

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Textile Section

New Section Officers

Chairman, H. C. WASHBURN, The Fisk Rubber Company, New Bedford, Mass.
Vice-Chairman, DR. R. P. KNAPP, Cheney Brothers, South Manchester, Conn.
Secretary, D. FRANK LORD, M. J. Whittall Associates, Worcester, Mass.
Poster and Slide Committee Chairman, LEONARD HOWARD, Dunean Mills, Greenville, S. C.
Membership Committee Chairman, H. W. DONALD, American Mutual Liability Insurance Company, Boston, Mass.
Publicity Committee Chairman, ARTHUR BARLOW, Linoleum Division, Armstrong Cork Company, Lancaster, Pa.
Engineering Committee Chairman, G. W. COOK, The Travelers Insurance Company, Hartford, Conn.
Statistics Committee Chairman, HARVEY SAUL, The United States Finishing Company, Providence, R. I.
Program Committee Chairman, ARTHUR S. JOHNSON, American Mutual Liability Insurance Company of Boston, Boston, Mass.

Retiring Officers

Chairman, G. W. COOK, Travelers Ins. Co., Springfield, Mass.; *Vice-Chairman*, R. B. SHERMAN, United States Finishing Co., Norwich, Conn.; *Secretary*, HARRY C. WASHBURN, Fisk Rubber Co., New Bedford, Mass. *Committee Chairmen: Membership*, H. W. DONALD, American Mutual Liability Ins. Co., Boston, Mass.; *Statistical*, HARVEY SAUL, The United States Finishing Co., Providence, R. I.; *Poster*, IGNATIUS MACNULTY, American Woolen Co., Andover, Mass.; *Program*, DR. GEORGE VAN EMBURGH, JR., The Clark Thread Co., Newark, N. J.; *Publicity*, DR. R. P. KNAPP, Cheney Brothers, South Manchester, Conn.; *Engineering Representative*, W. H. HEINRICH, The Travelers Ins. Co., Hartford, Conn.; *Executive Committee*, The OFFICERS and BENJAMIN F. GRIFFITH, J. & P. Coats (R. I.), Inc., Pawtucket, R. I.

Tuesday, September 27, 1927

G. W. COOK, Chairman

Supervising Engineer, Travelers Insurance Company, Springfield, Mass.

The first session of the Textile Section of the National Safety Council was called to order at nine-fifty o'clock by the chairman, G. W. Cook, Supervising Engineer, Travelers Insurance Company, Hartford, Conn.

CHAIRMAN COOK: We will start the program gentlemen, with a report of the secretary on the meetings of the executive committees during the year.

Regarding the Membership Committee, Mr. H. W. Donald of Boston is chairman, but he is not here.

I won't report on Mr. Donald's work, but he has a very clever scheme which he has developed for getting new members into the Textile Section. He has listed about all the textile plants in the country and has divided them into zones and has endeavored to get one man in each zone to personally solicit the plants in his zone and explain to them the benefits they can derive from membership in the National Safety Council and also from association with the Textile Section. He has had this under way for quite a while and it is a matter of slow development, but I think something good is coming out of it.

Mr. Washburn, you were out when I started off. Suppose you give us a little report on the activities of the secretary during the year.

Activities of the Secretary During the Year

HARRY C. WASHBURN (Fisk Rubber Co., New Bedford, Mass.): The Textile Section held two meetings during the year, the first one through the courtesy of Mr. Finley of the Providence Safety Council, at the rooms of the Providence Safety Council in Providence. At this time the matter of organization mainly was taken up and such offices as remained vacant were filled on suggestions given at that time.

Mr. Sauls stated that in the near future, possibly about January or February, the Providence Safety Council had under contemplation a joint meeting of the Southern New England industrial representatives and thought that at the same time it would be well if the second meeting of the Textile Section was held with them. But for some reason it fell through and that meeting was not held.

The second meeting was held March 23 in the city of Boston in the offices of the American Mutual Liability Insurance Company. Six of the officers who were present at the first meeting were for some reason or other unable to be present at this meeting. We had as guests at that time:

W. Dean Keefer, Chief Engineer of the Industrial Division, of the National Safety Council.

D. Frank Lord, Works Engineer, M. J. Whittall Associates, Worcester, Mass.

A. S. Johnson, American Mutual Liability Insurance Co., Boston, Mass.

We attempted to draw up a program for the meeting being held here today and had considerable discussion on certain topics. As the meeting proceeds today the members will notice just what is going to be done and will learn about some of the things that were brought up for discussion.

It was suggested at that time that the chairman appoint a Nominating Committee to suggest names to fill the offices for the succeeding year. That committee met twice and has brought in a slate which is to be presented later.

CHAIRMAN COOK: We managed to hold both these executive meetings at the same time as the Textile Code Committee meetings so that most of the members of the Executive Committee meetings could attend both meetings; and we have tied the work of the two together pretty well in the last year.

One of the innovations we started, as Mr. Washburn stated, is also being followed out by all the section now, or will be; appointing a Nominating Committee along in the spring and having them arrange to prepare their nominations and bring them in at the annual meeting rather than appoint a Nominating Committee at the meeting to try to get together while the meeting is under way.

Dr. Knapp, we have been asking for reports from different members of the Executive Committee and I am wondering if you will say a word about the Publicity Committee's work for the year.

DR. ROBERT KNAPP (Cheney Bros., South Manchester, Hartford, Conn.): Pub-

licity for the year has not been what it should have been because it is difficult to get from the members contributions which should be made public in the letters. It seems to me that even if something small in the way of suggestions was contributed by every source, it would not be a difficult thing to get up a news letter at least six times a year. But I must confess that the amount of material which I have received is not at all adequate to get out that number of letters; in fact, there has been quite a dearth of it.

I would suggest that a very strong appeal be made to the members to send in material. I don't think it is a matter of not knowing where to send the contributions, but is a matter of being lax in sending it. Perhaps, some are in doubt as to whether it is valuable, but they could at least send it in and I am sure most of it could be used to the benefit of all the members in the section. Their laxity in sending in the material is the keynote for the failure in the number of news-letters that have been sent out. There isn't enough material for it.

CHAIRMAN COOK: I think this news letter is the best thing we have to tie the Section together. It is a fact that some of the smaller sections have the best news letters. I think the Marine Section has a news letter that comes out every month, and is almost a book. It is a wonderful thing, but I think it is purely the work of the man who gets it out who is very much wrapped up in that one thing. He gets all kinds of information from various sources other than the Marine industry. I think he gathers up clippings and puts them in the letter.

I am sure if we would cooperate we could get out at least six news letters a year, and I would suggest you keep in contact with the next man who gets the job and help him push this thing along and make it better than it has been in the past.

CHAIRMAN COOK: Mr. Washburn, did Mr. Donald ask you to report for him on the Membership Committee?

Growth of the Membership During the Year

HARRY C. WASHBURN (Fisk Rubber Co., New Bedford, Mass.): I haven't a report but I might give a few figures which I have obtained from time to time from the National Safety Council in regard to membership.

November 1, 1926 the total membership was 117 for the Textile Section. Since that time six have cancelled their membership and fifteen new ones have been accepted, which makes the present membership to date, as far as I have received the figures, 126, or a gain of nine members.

The membership is divided as follows, throughout the country:

New York	21	New Hampshire	2
Massachusetts	17	Alabama	2
Pennsylvania	16	South Carolina	2
New Jersey	12	Maine	2
Illinois	6	North Carolina	2
Rhode Island	5	Tennessee	2
Missouri	5	Texas	2
Georgia	5	Delaware	1
Indiana	4	Michigan	1
Wisconsin	3	Kansas	1
Ohio	3	Kentucky	1
Connecticut	3	Oregon	1
Maryland	3	Virginia	1

Three foreign members raised the total to 126 in all.

CHAIRMAN COOK: We will start our program with a paper by Mr. Arthur Barlow, Armstrong Cork Co., Linoleum Division, Lancaster, Pa., the subject of which is: "First Aid and Accident Prevention."

Mr. Barlow is a very old timer in accident prevention service and I was much gratified to have him agree to read a paper for us at this meeting.

First Aid and Accident Prevention

**Arthur Barlow, Chairman, Executive Safety Committee, Armstrong Cork Co.,
Linoleum Division, Lancaster, Pa.**

The text book on First Aid, Industrial Edition, issued by the American Red Cross, in the opening chapter defines first aid as, "A bridge that takes the injured safely over the danger of an exhausting or fatal hemorrhage or an infected or blood poisoned wound, a crooked leg or a stiff joint, and puts into the hands of the hospital or surgeon a man who has lost less blood, has a cleaner wound, a straighter leg, who suffers less pain, less shock and is in every way stronger and in better condition for the hospital and the surgeon's further professional care." And as prevention is now recognized as far better than cure in injury as well as in disease, modern first aid instruction also teaches how to prevent accidents.

The relation of first aid to accident prevention is obvious for as the burnt child dreads the fire, so does the man who is brought into contact with those who suffer, and hates to see any one get hurt. He naturally exercises not only common sense in trying to keep himself and those associated with him from getting injured, but his training makes him also an observant and devoted disciple of "Safety First," and he invariably constitutes himself, as it were, his brother's keeper. It is not a difficult subject to study, nor one hard to teach to those interested, and any effort put into trying to make one's self proficient is more than repaid by the knowledge acquired and the possibilities presented for rendering service that may mean saving the lives or limbs of our fellow beings.

For many years we have recognized the educational value of teaching our workers first aid as a mean to arouse an interest in their own selfpreservation and enlisting their active cooperation in the factory policy of accident prevention and comfortable working conditions with highly encouraging results.

We organized classes for the winter months every year, commencing in November, and bring them to a close in March of the following year. These are held under the auspices of the American Red Cross Association, and their Industrial Edition Text Book of First Aid, is used for the course of instruction. The classes meet one night each week, for one hour period. Our works doctor is the class instructor, and advanced students act as demonstrators and assistants in practical exercises. The classes are brought to conclusion by an examination for certificates of proficiency, medals or bars awarded by the American Red Cross.

Our custom is to present the awards earned, at a complimentary dinner to the successful graduates. This is arranged by the officers of our First Aid Association which is composed of certificated first aid graduates, with a present membership of 84, all of whom received their training in our factory classes and are still with the Armstrong Cork Co.

The factory executives make it a point to attend and the interest they have taken and continue to take in our first aid work has contributed immensely to the success we are enjoying in making the course of instruction popular.

In forming our class we try to confine it to about 50 members, and as far as possible endeavor to have each department represented. From 20 to 30 members is a big enough class under ordinary conditions, but we are able to double up on this by always having advanced students who help in training first course students. The Red Cross has arranged for a four-course series of classes and offers to students successfully passing examination tests, certificate for the first course, medal and bar for the advanced second course and bars for third and fourth advanced courses.

We started our last class November, 1926, with 60 registered, and finished March, 1927, with 40 taking the examination test. Nineteen of these were first course for certificates; 12 second advanced course, medals with bar; three, third advanced bars; five, fourth advanced bars; all of whom passed the examination tests creditably.

Our First Aid Association arranges an outing in the fall of each year, for members only, and provides a good old fashion picnic and playtime. A report of this is given prominent publicity in our plant publication and helps to boost interest in our classes.

All qualified first aid men in the factory are given keys to the departmental emergency first aid equipment. During daytime working hours, however, all cases requiring attention must report at the works hospital. Provision is made for care of the injured in every department during night working hours, by trained first aid men, and if a serious accident happens the first aid men make all arrangements for proper attention being given to the injured, takes care of his property and notifies his relatives.

Efficient Service of the First Aid Organization

A feeling of trust and dependance has been created by the efficient service our first aid organization is giving in our factory and we regard it as a compelling influence in winning the good will of our workers and their active cooperation in helping to reduce accidents. I unhesitatingly place teaching first aid to the injured as the very best way I know of to get workers to become interested in their own and their neighbor's safety and well being. And incidentally I might mention here that many who have been through the course of training in our classes have shown such commendable progress in the development of their personal character and ideals of loyalty and service, that they have been singled out for promotion, and in every case are proving worthy of the trust and responsibilities placed upon them.

Their advice and example in guarding their fellows and themselves from the common dangers surrounding them constitute the highest form of safety propaganda. We have experienced many tangible proofs of this in our system of accident prevention and welfare work in the Armstrong linoleum factory and we attribute a lot of the credit for any success we are meeting with in accident prevention to the wholesome influence of the trained first aid men amongst us; and not only in the workshop but in their homes and the community at large they are proving to be a valuable asset. One of our trained men is credited with saving the life of a companion recently by applying a tourniquet to stop bleeding from a severed artery, the result of an injury in an automobile accident.

We frequently read in the daily papers news of some one trained to render first aid saving the lives of others, by artificial respiration, by skillful handling of seriously injured, arresting bleeding, etc. But the thousands upon thousands of minor cases are rarely mentioned; yet were it not for the service rendered by first aid men, much unnecessary suffering and many lives lost from infection would result through ignorance or careless indifference in leaving minor wounds uncared for.

If first aid accomplishes nothing more than is represented by its value in minimizing the dangers of infection, it would more than repay all the expense and effort put into making the study of it universal.

We recognize that the problem of accident prevention is education, and that just so far as we can get the workers themselves interested in their own safety and well being, so will the accidents become proportionately reduced in frequency and severity.

So there has gradually evolved the policy of persuasive propaganda, of appealing to the common sense and self interest of the workers by inviting them to become

active agents in securing for themselves the full measure of safety and comfort our employers desire.

To this end and acting with a common purpose we have a Foreman's Association meeting twice monthly, and a shop committee meeting also twice each month. These meetings are attended by the factory executive, open and freely expressed opinion is invited and encouraged on all subjects relating to safety and industrial relations.

We post the National Safety Council posters and other safety cartoons and literature. We conduct a safety and efficiency competition with cash prizes as incentives. We have a departmental safety competition which is proving to be a dandy method of getting team work with the foremen and workers, who pull together to make good records in accident prevention.

We have a safety engineer devoting all of his time to safety supervision. An emergency hospital with nurse in attendance and doctor attending two hours daily. A welfare nurse who makes daily visitations to sick or injured, giving them help when needed in the homes of our workers.

An Employees' Benefit Association also provides sick and funeral benefits on a most generous scale.

A Building & Loan Association encourages thrift. A system of service bonus rises yearly to a 10 per cent rate at the end of 15 years of service. A vacation with pay is given after two years of service, and above all there is a very earnest and sincere desire animating our executives to give a square deal to all in their service. All this has made for us most enviable working conditions and created a feeling of good will and happy relationship.

But accidents do occur occasionally. I don't mean by this that we have not made satisfactory progress in accident reduction; our records will bear favorable comparison with any similar industry anywhere.

One thing we are proud of, however, is that accidents attributable to unguarded machinery or foreseen hazards have been practically eliminated. Analysis of the causes of such accidents as we have to contend with usually show that they resulted from carelessness, either of the injured persons or of those working with them.

The Company Has a Generous Policy

MR. BARLOW: We pay compensation according to the laws of Pennsylvania and we pay compensation for six days' disability from the time of the accident. Our company is most generous. We do not visit penalty on those who have been injured by making them suffer the financial loss, and we point out to them that we are sorry for the pain and discomfort and sorrow it brings to their own. We don't victimize them in any way by making them assume full responsibility as the law would allow us, even though their own negligence and carelessness may be the cause.

So you see, it happens this way in spite of anything that can be done, and we have, as good an organization, I think, as it is possible to have, and still we are trying to make it better.

Just another word. I believe the giving of rewards is an inducement to the class of men you want to interest and here is something we use for that purpose. (Displays medal.)

CHAIRMAN COOK: I know some of you will want to ask Mr. Barlow something about the details of his plan, and if you have any questions, please ask them at this time.

W. N. CLINTON (Metropolitan Life Insurance Co., New York, N. Y.): I should be very interested in learning a little more of his competitions and the way they are conducted, and what is done to form a basis of comparison between depart-

ments. I would be very interested in having you go into that to some extent, if you will, Mr. Barlow.

MR. BARLOW: Well, we have got to that point now, where the first aid classes have become so popular we have to use some sort of discretion in making up a class for the year, so that we shall not have too many from one department thus interfering with operations.

In making up a class we first get the foreman's association interested and we tell them we would like to have someone sent from each department to attend this class. We give them some names and let each foreman pick out the man he would like to have attend.

Among those we particularly want to see are those whom we regard as night workers. Our operations go on continuously during the night, so it is mighty fine to have someone there on the spot to render not only skilled service, but get the injured man to the hospital; and also to be a representative of the company and see that the injured man gets everything that is worth while. He must also attend to the domestic problems. After the injured man is taken to the hospital and it is found necessary to detain him there, the first-aid man has to go to the home of the injured man and break the news as kindly and gently as possible, and see to it that it does not come to the family or the injured through second-hand means. The first-aid man must do all he can to help them; get them to the hospital, if it is necessary, so they may see their loved one. He must also take care of the man's property which he has left in the locker, so no one will pilfer anything which belongs to him. In short we try to make him feel, through out representative, that he is one of us.

Careful Instruction Necessary in First Aid Work

HARRY D. IMMEL (Department of Labor and Industry, Harrisburg, Pa.): I saw Mr. Barlow's name on the paper here this morning and I couldn't resist coming into the meeting just because I happen to know Mr. Barlow and for nearly five years was supervising inspector of his company. I know what the Armstrong Linoleum Corporation is doing to advance safety in their plant and I want to add a word to what he has said from my own personal knowledge of it. It is representative of the best of what we are accomplishing in Pennsylvania for accident prevention and the advancement of the welfare of industrial workers. I feel that if it could be better known it would be a splendid inspiration to other industries.

DR. ROBERT KNAPP (Cheney Bros., Hartford, Conn.): I certainly agree on one thing Mr. Barlow brought out. First aid should be taught preferably from that book which he mentions—"First Aid, Industrial Edition," which is issued by the American Red Cross. The Prudential Insurance Company has published a small pamphlet on first aid, about half the size of our program here, and apparently has written to all the first aid men in the National Safety Council stating they would send a supply of the pamphlets wherever they could be used.

The only danger about this is the fact that these pamphlets fall into the hands of people who, without instruction, practice first aid in factories and which practice may lead to a great deal of bad results.

I think instructing classes from that "First Aid, Industrial Edition," is something that should always be borne in mind. The Prudential offered, I believe, to send enough of the little booklets to provide everyone in our plant; and supplying them like that would be dangerous because in this booklet it shows how to take foreign bodies out of eyes, which is something an inexperienced person ought never do. It seems to me the importance of that point cannot be emphasized too strongly. These books should be placed in the hands of persons who are qualified to instruct.

LEONARD HOWARD (Duncan Mills, Greenville, S. C.): I would like to ask you, Mr. Barlow, what time you hold your meetings.

MR. BARLOW: We hold them in the evenings, at which time we think we get the better class of men. Our day work comes to a close at five-thirty. We start the class at five o'clock and close it at six. In that way we pay them for a half hour and they give a half hour. You know, gentlemen, when you begin to give things away they don't appreciate it. When they get the right sort of inspiration they put in the spirit you want them to and they are willing to make some sort of sacrifice, especially when they see that you are also making a sacrifice, from which they are receiving benefits.

CHAIRMAN COOK: The second speaker on our program today is Mr. G. S. Bohlin of Cheney Brothers, South Manchester, Conn., who will talk to us on a subject which we have never before had covered in any way by a safety man in the Textile Section.

Safe Practices in a Silk Mill

G. S. Bohlin, Service Department. Cheney Brothers, South Manchester, Conn.

The subject of "Safe Practices in a Silk Mill" covers in a general way much the same ground as in almost any other industry, and can be divided into the customary general headings, of (1) Mechanical Guarding, and (2) Safety Education. There are, however, certain machines and certain hazards peculiar to the silk industry, and these specific conditions will be dealt with in more detail in this paper.

My observations are based on the experience of only one silk manufacturing establishment, namely that of Cheney Brothers, of South Manchester, Conn. Cheney Brothers, however, carry on every operation from the raw material to the finished product, and is the only silk industry which has all these operations, most of the others specializing in some one or more branches, such as throwing, weaving, dyeing or finishing.

Mechanical Guarding

Mechanical exposure is a very real problem in silk manufacturing, due to the fact that the proportion of mechanical machinery to employees is large, several frames or machines being attended by each employee. This condition exists in almost any textile industry.

Mechanical guarding therefore has been a very important item in our accident prevention campaign and a great deal of effort and money have been spent in this direction. In the past a fairly large proportion of the accidents were caused by mechanical hazards, but by consistent and earnest effort to safeguard these conditions this proportion has been reduced very materially. During the ten year period 1915-1924, inclusive, lost time accidents on moving machinery formed 21.4 per cent of all lost time accidents, while during 1926 only 6.5 per cent could be assigned to this cause.

Throwing Machinery. Under this heading is included a variety of machines such as winding, reeling, doubling, twisting, coning, tubing, and transferring frames. The drive belts and pulleys on practically all these machines should be guarded to a height of 6 feet from the floor. Most of these frames also have several set of gears which are exposed and should be properly covered.

Warping Frames. Warping frames of the ferris wheel type have presented a hazard which might be of interest, as this problem includes not only guarding against a real hazard but also the elimination of unnecessary noise. A gear is mounted on the end of each beam meshing with a pinion on the driving end of the frame on which the beam is mounted. Formerly this set of gears was left exposed and in addition a dog was employed to mesh into the teeth

of the large gear whenever the warping frame was stopped so as to maintain the tension in the warp. This dog was allowed to ride on the circumference of this gear continually, making a good deal of noise. A simple guard can be devised to cover these gears with the dog built into the guard and interlocked with the belt shifter in such a manner that the dog is raised while the machine is running and meshes with the teeth of the gear only where the belt is shifted to the loose pulley, thus guarding the gears, eliminating unnecessary noise and still maintaining the tension in the warp.

Looms. The outstanding hazard on looms, is the flying shuttle. Experience has proven that the most effective safeguard against the flying shuttle is proper adjustment of the loom. If the loom is kept in proper adjustment there is small likelihood of the shuttle flying out. However it often happens that

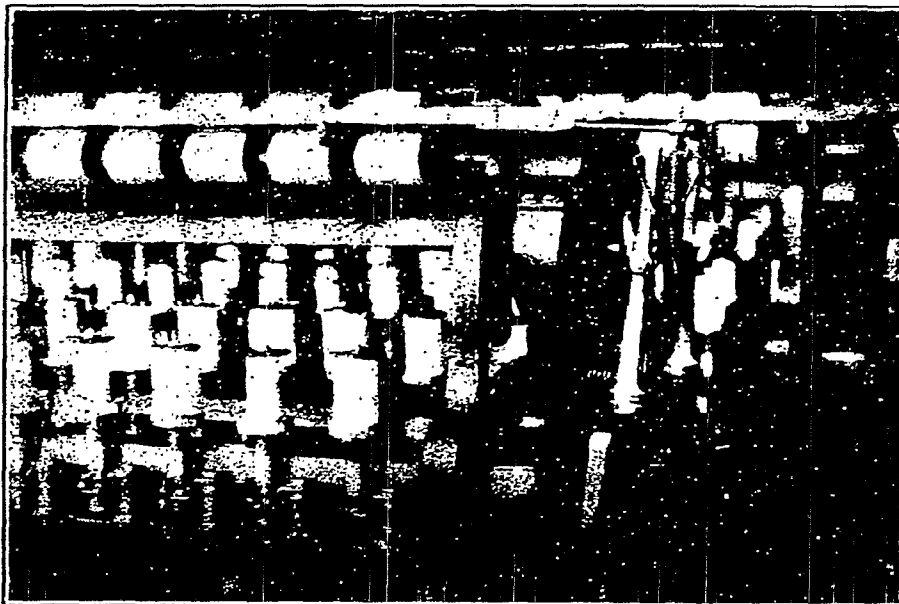


Figure 1. Two sets of gear guards have been installed on twisting frames of this type.

the weaver does not realize that the loom is out of adjustment until a shuttle flies out, making it necessary to provide shuttle guards. We are using a screen type of guard set in sockets on the floor, at the sides of the looms.

Practically all of our looms are individual motor driven, with the driving gears enclosed, thus eliminating the usual long series of drive belts and pulleys which have to be guarded. There are usually one or two sets of gears operating the head motions of the looms, varying with the type of loom employed, which should be guarded.

Spun Silk Machinery. Under this heading are included a variety of machines, such as a picker, dressing frames, drawing frames, spinning frames, etc.

Of these the most hazardous are the pickers. These machines comb out the silk fiber and remove some of the residue of the silk worm, and consist of a drum, revolving rapidly, on which are mounted two or more rows of pins forming a sort of comb. A guard has been devised over these drums, inter-

locking in such a manner that the machine is started in motion by turning the guard or cover down over the drum, and the cover cannot be opened until the drum stops revolving, which it does automatically as soon as the required amount of silk has been transferred to the drum. There is also a set of gears on this picker which should be guarded.

The other machines in this group, although not so dangerous have gears, drive belts and pulleys, and combs which should be protected. Some of these, particularly the drawing frames, also have horizontal shaft under the frame, which we have found it necessary to guard. Occasionally a sliver of silk would drop and become wound on this shaft, in which case the operator, in her

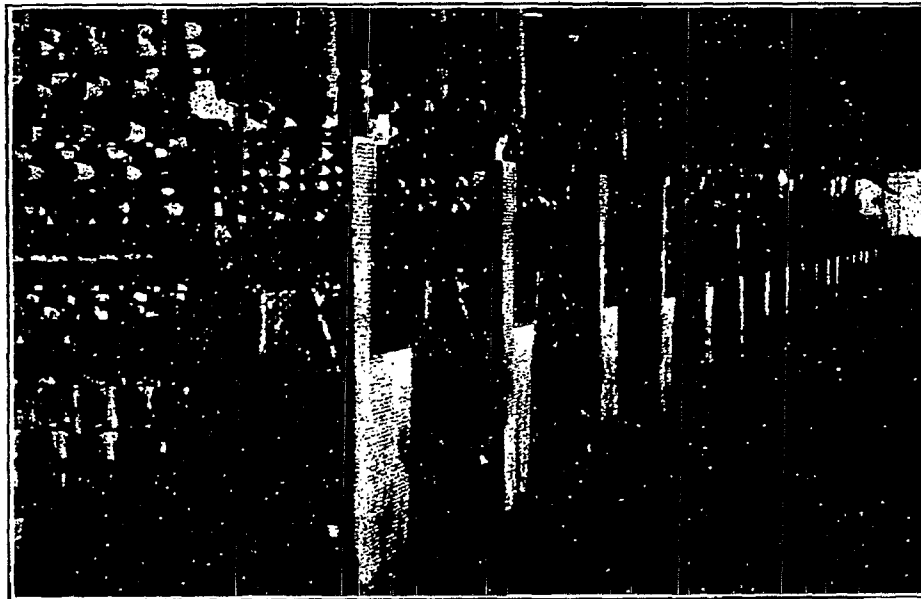


Figure 2. Typical installation of guards for drive belts and pulleys on doubling and twisting frames.

eagerness to save material, would attempt to remove it while the machine was still in motion, and an injury, sometimes quite serious, would result.

Dyeing and Finishing. These operations include a large variety of machines, each one with its own hazard, for the most part consisting of drive belts, gears, and in some cases rollers or drums.

Individual motor drives, with enclosed gears, and easily accessible stop buttons have helped to eliminate most of these hazards.

Dry cans should be equipped with the necessary guards and in addition, a steam gauge reducing valve and check valve.

Stairways, Aisles, etc. Stairways should be maintained in a good condition and provided with the necessary hand rails. On several stairways, which are used by a great many employees at quitting time, and which are four feet or more wide we have installed a hand rail on each side as well as a dividing rail in the center. This is a very effective means of preventing falls in case the employees crowd or push each other.

Aisles should be marked off and kept clean of all obstructions. This also applies to corridors, stairways etc.

Dust, Fume and Steam Removal. In some operations it is advisable to provide systems of ventilation for removing dust, fumes and vapor. This is especially true in shearing operations, dressing and combing rooms, and boiling and dyeing operations. In Cheney Brothers dressing mill we have a dust removal, air washing, system, which is very effective and which maintains an almost constant condition of temperature and humidity throughout all seasons of the year, providing very satisfactory working conditions, in what would otherwise be a very dusty operation. Rooms in which boiling or dyeing is done should be equipped with blowers for removing the steam and fumes.

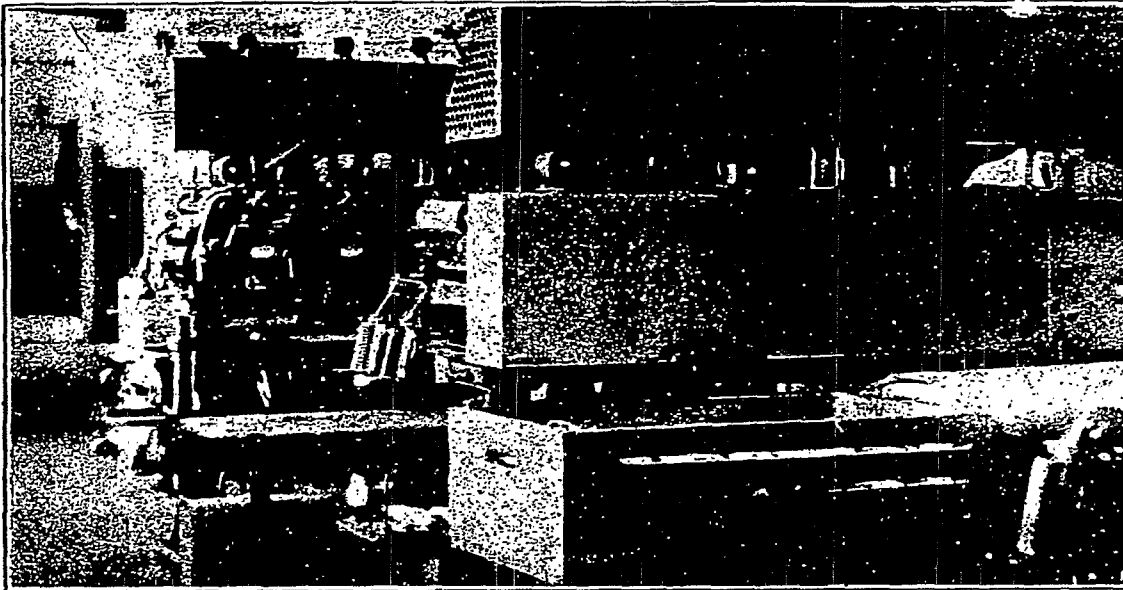


Figure 3. Coning frames have a series of small belts and pulleys on rear of frames which should be guarded. In this illustration the guard has been removed from the left hand machine to show the belts and pulleys.

Illumination. Proper illumination is very important. Although we have no figures to indicate the amount of accident reduction brought about by improved illumination we feel it must have a very marked result, and in addition provides better working conditions with improved quality of work.

Cheney Brothers have had one problem in illumination which might be of particular interest, as it illustrates an outstanding case of decreasing the possibility of accidents, as well as improving the working conditions and the quality of work to a marked degree. In our dressing mill we have a room for inspecting silk fiber which has been combed, preparatory to drawing and spinning it into spun silk. The main object in this inspection is to remove any foreign material which might still be contained in the fiber. This inspection is accomplished by laying out the fiber in thin layers on a glass with light transmitted through it from underneath. The original benches were made in such a way that daylight was admitted through a skylight in the roof or windows in the walls and

reflected from the inside of the bench through the glass. The reflecting surface, however, was horizontal and not directly under the glass, so that only a small portion of the light was reflected up through the silk fiber. The amount of daylight also varied considerably according to the weather.

In order to increase the light on cloudy days an incandescent lamp was installed under each glass, but this was found unsatisfactory as no provision was made for eliminating the glare of the filament. We are now using benches which employ only artificial light, thus giving a constant intensity of illumination, the lamps being placed out of sight in such a position that there is no glare, the light being reflected from a reflecting surface consisting of a combination of two parabolic curves. In these benches only one lamp is required for two operators, who sit opposite each other and a very soft, pleasant working light is furnished which is amply intense for the work. With the original



Figure 4. Showing screen shuttle guard and gear guards on looms.

benches practically all daylight was excluded from the room proper, while with the new benches it has been found possible to admit a great deal more daylight, thus furnishing a much pleasanter and safer room in which to work. Ventilation and supervision have also been improved, as there are now no shafts extending up to the roof to subdivide the room into sections, decreasing the efficiency of ventilation and making supervision of the room difficult.

In addition to the hazards mentioned which are more or less peculiar to the silk industry, there are a great many other hazards common to all industries. The maintenance departments are the source of a large number of our injuries. These operations have the usual problems of protection and education of the employees and a great deal of attention has been paid to the reduction of accidents in these departments. This phase of the problem, however, is not dealt with in detail in this paper as it is covered in the various other sections.

Skin Infections. Occasionally there are cases of dermatitis, or skin infections of the hands, among employees using dyes and printing inks and also on

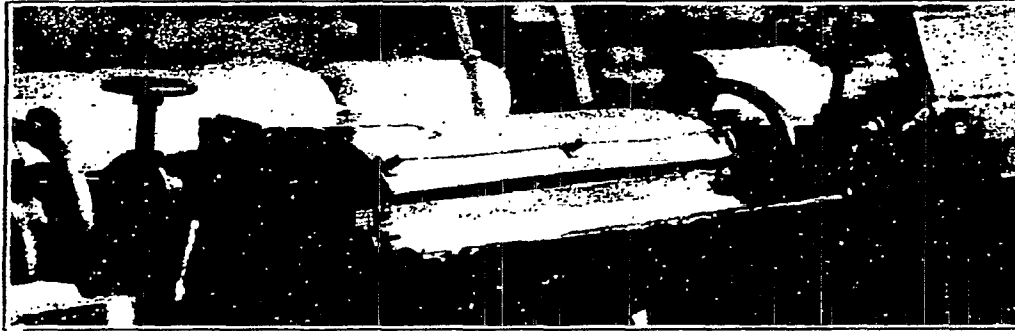


Figure 5. Picker machine with cover for drum in running position.

certain silk winding operations. Most of the employees hired for dyeing and printing operations are not affected in this manner, but occasionally we find an employee who is peculiarly susceptible to this form of infection and another from of employment has to be secured for him. In the case of the winding operation there are some individuals who are more susceptible to skin infections than others, and experiments have indicated that these individuals seem peculiarly susceptible to protein infection. Our experiments, however, are not completed, but we hope to find some method of overcoming this difficulty in the near future.

Safety Education. There are so many accidents of a non-mechanical nature, usually less serious but in many cases resulting in lost time, which apparently could have been prevented by the injured employee himself, that a campaign of educating the employees to realize and anticipate hazards has been found necessary in the silk industry as well as in every other industry.

Bulletins and Posters. Bulletins and posters, both those issued by the National Safety Council and home made ones, have proven of value in bringing to the attention of the employees the right as contrasted with the wrong way of performing certain operations. The amount of reduction effected by the use of bulletins is difficult to determine, but no doubt some reduction will result from their use.

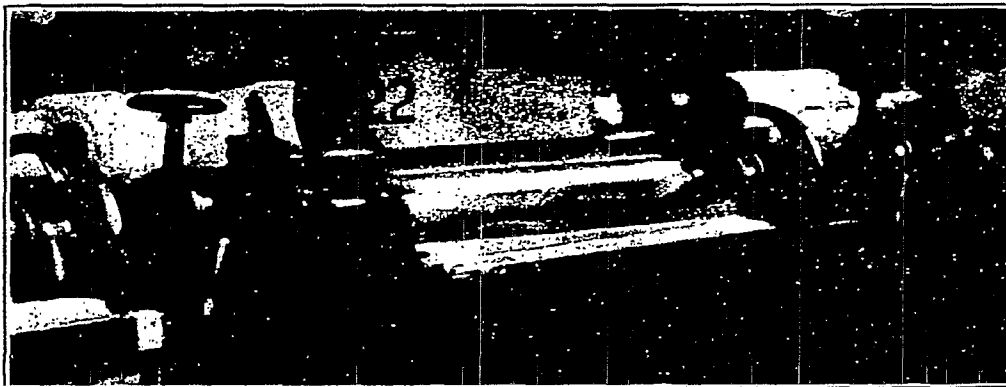


Figure 6. Picker machine with cover open when not running.

Training New Employees. The best possible time to impress an employee with his own responsibility in preventing accidents is when he is new and under training. If properly instructed from the beginning he will form a habit of performing his work in the safest manner. Cheney Brothers have instituted a training department which takes charge of all new employees for a certain length of time under the supervision of a trained instructor, who trains the new employees in the best and safest manner in which to perform their particular jobs; he also impresses them with the importance of reporting an accident immediately and receiving first aid treatment promptly, etc.

Group meetings are held of the new employees after they have been employed a short time, at which pamphlets on various subjects are given out and thoroughly explained. These pamphlets include, a Book of Information, the Pension Plan, the Thrift Plan, the Benefit Association, etc.



Figure 7. Properly guarded drawing frame, showing guard over combs.

Foreman's Meetings. It has often been stated that the foreman is the key-man in industry. There is no doubt that the foreman holds a very important position and a great deal can be accomplished along accident prevention lines as well as production lines, by training the foreman in his responsibilities. We have held group meetings of foremen, at which many subjects including accidents have been discussed, and we feel that these meetings have been very much worth while. They have impressed upon the foreman the fact that they have a very important and serious responsibility toward their employees as well as to their employer, resulting in the foreman warning the operators against unsafe practices, more prompt reporting of injuries, and more prompt first aid treatment.

We have also started a Foreman's Manual, a loose leaf book in which are issued printed summaries of the various subjects as soon as the discussions on these subjects have been completed. These books are kept accessible by the foreman and can be referred to when occasion arises. Following are two pages referring to the foreman's responsibility in regard to accidents.

The Foreman and Accident Prevention

Your duty and responsibility in this connection is to:

1. Recommend improvements to make working conditions safer.
2. See that your equipment is properly guarded.
3. See that safeguards, goggles, etc. are properly used.
4. Instruct your employees relative to safety regulations.
5. Correct the unsafe practices of your employees.
6. Enforce safety rules and regulations.

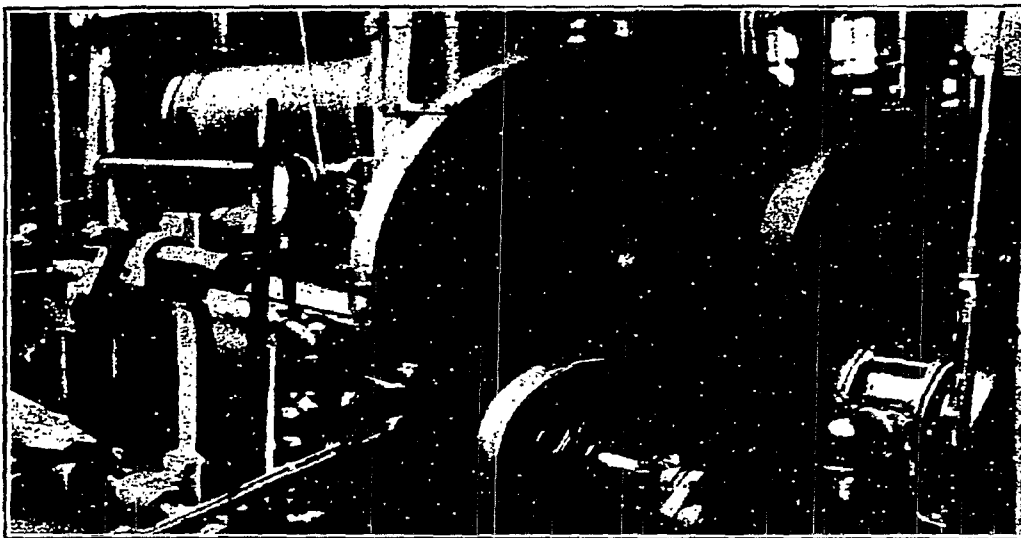


Figure 8. Finishing machine with individual motor drive, driving gears enclosed, and easily accessible stop button control.

General Safety Regulations

In order to make the plant safer and to prevent accidents, you are instructed by the Management to see that the following regulations are observed and to report any infringements.

1. Do not run or push other employees in corridors or stairways.
2. Do not leave trucks, boxes, etc. in aisles or corridors, except in places designated.
3. Do not leave quills, spools, spare machine parts, etc. on the floors.
4. Do not run with trucks or ride on them in the aisles and corridors.
5. Do not throw anything out of the windows.
6. Use guards, goggles, etc. as provided.
7. Do not ride on elevators unless authorized to do so.
8. Do not fool with anyone while at work.

9. Do not wear ragged or loose sleeves, flowing ties, or loose waists and jumpers when working around machinery.
10. Women should not wear their hair loosely, around moving machinery.
11. Report all injuries to your Foreman immediately and follow his instructions relative thereto.
12. Report all defects in machinery and equipment to your Foreman.

Works Council. Cheney Brothers have a form of employee representation called the Works Council. This consists of employee representatives elected by the employees in the various departments. Meetings of these representatives are held regularly. This has been a means of bringing to the attention of the employees the fact that Cheney Brothers are making every possible effort to

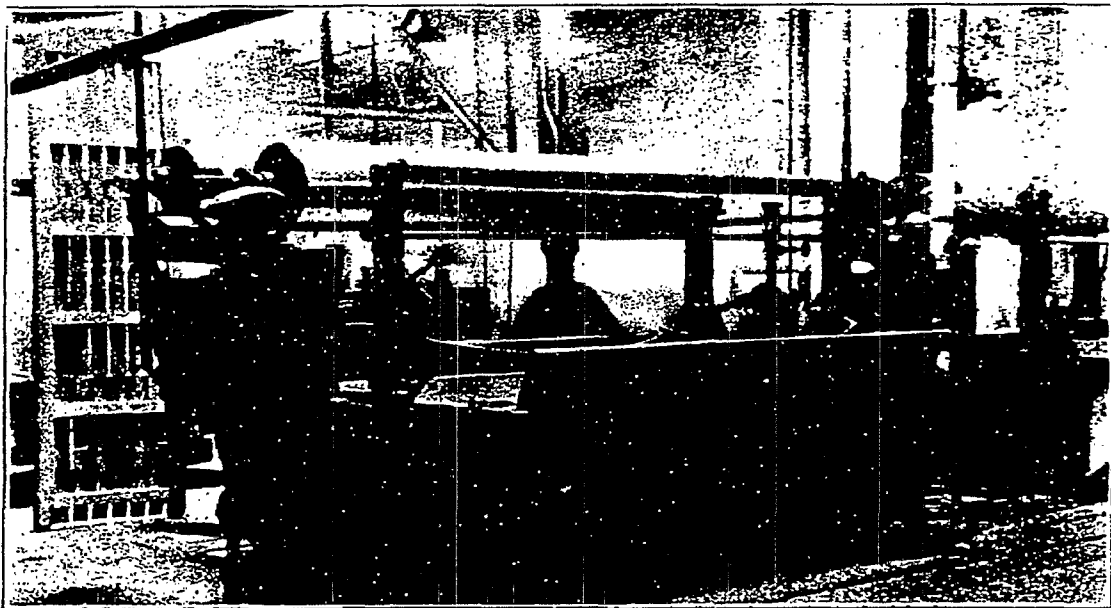


Figure 9. Dyeing machine with individual motor drive, enclosed driving gears, and stop button.

reduce accidents, and of impressing on them their own responsibility in this connection.

Safety Committee. The only form of safety committee which Cheney Brothers have employed is a committee consisting of members of the Works Council. This committee makes inspections of all departments of the mills at intervals, and has brought out many conditions which should be corrected, which might otherwise have been overlooked. Through this committee also Cheney Brothers have succeeded in impressing the employees with their own responsibility in preventing accidents to themselves. The members of this committee are appointed by the chairman of the Works Council representatives, the members being changed at intervals, thus making it possible to give this training to a number of employees in various departments.

Suggestion System. A suggestion system has been in operation for some time, which grants employees awards for useful suggestions, the award varying with the value of the suggestion. Although instituted primarily for the purpose of receiving suggestions which will tend to decrease the cost of production, a good many have been received which related to accident prevention, indicating that some of the employees had benefited by our campaign, and were on the lookout for dangerous conditions.

Safety Rules and Regulations. Copies of the Safety Rules and Regulations which have been adopted are posted on the bulletin boards and in addition a copy is included in each of the foremen's Manuals previously mentioned, with instructions issued to each foreman to make it his business to see that these regulations are lived up to.

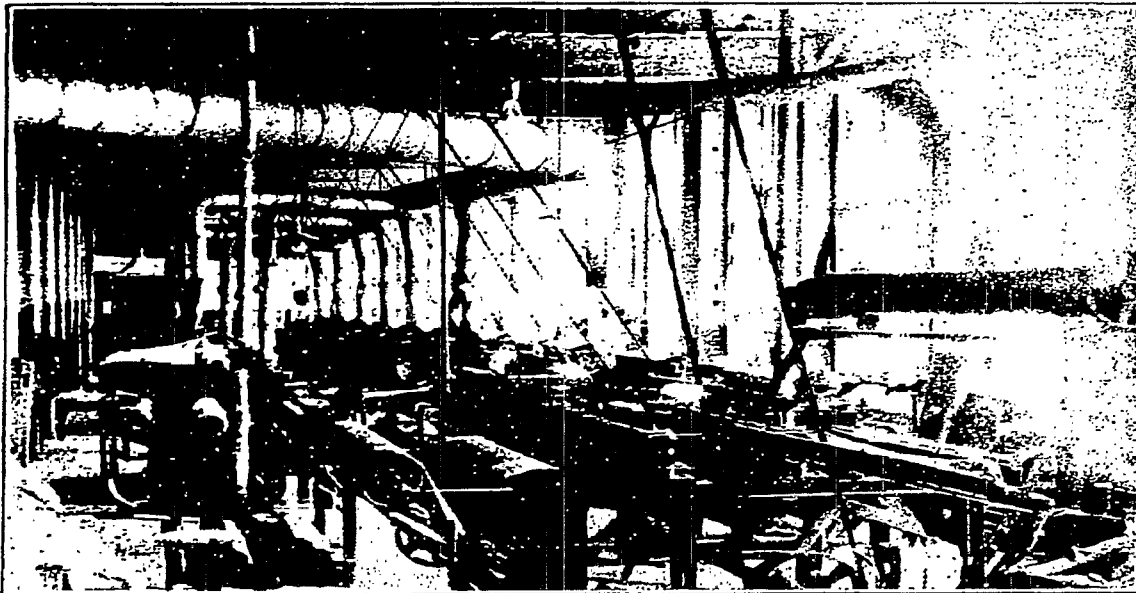


Figure 10. Dust removal system for battery of velvet shearing machines.

Accident Statistics. Detailed accident information has proven a great aid in determining along which lines our efforts should be concentrated. Investigating thoroughly every accident which has been reported, whether it involved lost time or not is good practice. This involves considerable time, but it is time well spent, as it brings to our attention conditions and unsafe practices which although the accident involved in many cases may be slight might result in more serious lost time cases. This investigation has also brought to our attention quite a number of cases which were not compensable at all, but which might have been so considered unless a thorough investigation had been made.

Cheney Brothers do not carry compensation insurance, but pay compensation from their own funds, according to a special compensation plan which nets the injured employees more than is required by the Connecticut Compensation Act. However, in order to receive this additional compensation

it is necessary that the injured employee report the accident within 24 hours after its occurrence. This has resulted in prompt reporting and prompt treatment of all injuries, resulting in less lost time and less infections.

CHAIRMAN COOK: I know you all appreciate the paper Mr. Bohlin has just given us; I know I did. He has carried out ideas which, we have been told by silk mills, could not be done.

With regard to the shuttle guard, Mr. Bohlin, there is going to be a shuttle guard perfected soon to be used in cotton which I would be glad to have you criticize from the viewpoint of silk mill process. There is one which has been in use for some time and is 100 per cent successful. I would like to get your opinion on it and see if it can be used in the silk mill.

HARRY D. IMMEL (Dept. of Labor and Industry, Bureau of Inspection, Harrisburg, Pa.): I would like to ask what experience you have had, Mr. Bohlin, with accidents resulting from flying shuttles, and if you have analyzed those accidents?



Figure 11. New type of inspection benches using only artificial light.

MR. BOHLIN: We have had very few of them, and fortunately they have not been serious. I remember but one this year. Do you, Dr. Knapp?

DR. KNAPP: Had one who was hit a half inch below the eye.

MR. BOHLIN: By using the screen type of guard it protects the operator from the next loom and she is not so liable to get in contact with the shuttle.

MR. IMMEL: In Pennsylvania we don't accept the target guard as being sufficient, and we have to use the bar guard over in Louisiana. I think in Pennsylvania they have these guards and they are very satisfactory.

MR. BOHLIN: I don't doubt but that they can be used, but we have never been able to get the employees to accept them as yet. We would rather have the screen type and have it as fool proof as we can, but we don't feel that this entirely covers the situation at all.

MR. IMMEL: We have had numerous accidents with the target guard, but in Pennsylvania we have had a full year's experience with the guard they are requiring, and it has done very well.

CHAIRMAN COOK: I would like to have you hear about, and see from slides, the shuttle guard we are going to show you tomorrow. I am sure you will be interested to know about it.

H. C. WASHBURN: Last year I brought up the question of those bar guards and tried to get an opinion from the party who made the address as to whether the guard, as suggested by the commissioner of Pennsylvania, was fool proof, and I succeeded in pinning him down to a statement that they were not fool proof. I was very interested in that guarding question and the question of flying shuttles last year, and I made it a point to ask as many questions as was possible. The main thing I wanted to find out was whether they were fool proof and if they really did guard against those flying shuttles 100 per cent. The gentleman stated at the time that he could not guarantee them as being fool proof.

Now this other guard Mr. Cook speaks of is, he says, 100 per cent fool proof, but I do not know whether it will work on silk.

W. DEAN KEEFER (Industrial Division, National Safety Council, Chicago, Ill.): Is it necessary, in the opinion of the people attending this section, to put in both the

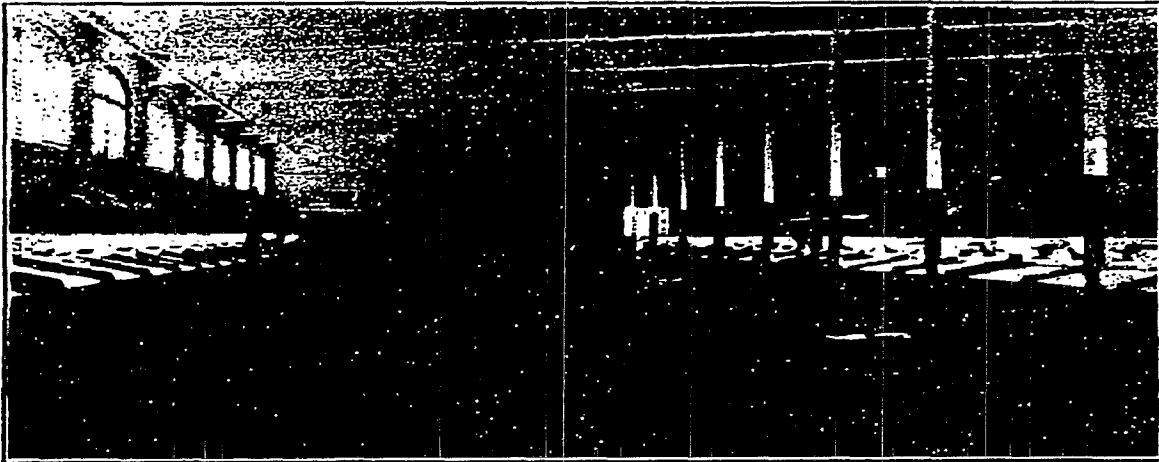


Figure 12. Showing room with new type of inspection benches. Note increased amount of general illumination possible in room.

bar guard and the target guard? That question has come up with reference to the code. I don't know whether it has been definitely decided, or not.

MR. BOHLIN: I don't know as I can answer that definitely. We have not used other types of guards sufficiently to know whether they would be fool proof, that is, to know whether we could get along without the target guard. I don't know if anyone has had experience with that or not.

MR. IMMEL: The time when the bar guard has a weakness is when it is not properly adjusted, or if it is bent intentionally or by accident. If so, it may not confine the target guard and will stop the shuttle. We don't want to cut off any more light or build up any more fixtures around the machine than are necessary, and the target guard does cut off some light. Using both the target guard and the bar guard you would have a higher percentage of shuttles stopped if they are not properly adjusted.

CHAIRMAN COOK: I told you a little while ago that if we could get Mr. Keefer to come in we would get him to give us a little talk or report on the textile code. He is here now, so we will give him the chance to speak.

MR. KEEFER: I have spoken on the same subject several times before so this may be old to some of you.

The textile code, as you know, is being written and prepared under the sponsorship of the National Safety Council and the general American Engineering Standards Committee.

The textile code, as well as any other code, is gotten out for two reasons: to promote uniformity between states and insurance companies, and to save limbs and lives of men. I don't believe I need to elaborate on the subject of saving limbs and lives of men. I will talk about that which is a little more obscure.

The number of companies doing good safety work in the country is comparatively small with regard to the great number of companies operating, and the Code Committee has tried to study safety in textile plants, that is, the safety work being done in some companies, so that it can be made available to, or brought to the attention of, those who, apparently, are not interested enough in safety work; and we think the code will, through those means, help to save limbs and lives.

Several Sections of the Code Are Almost Finished

This committee is composed of 25 experts who have been working for two or three years on this work. When we first started the job we realized we could not get up one code to cover the entire industry. We had to subdivide it into three or four and perhaps more groups. In the first place, there had to be a separate code for the cotton mills; another for bleaching, mercerizing, dying and finishing, all in one; another for woolen mills; another for silk, and so on down the line. We have gotten a start on two out of the whole bunch. The cotton code is pretty well along and I believe if we would submit it to the committee they would O. K. it as it now stands. This is to be done shortly. Bleaching, mercerizing, dying and finishing is 85 per cent complete.

We are now waiting for the subcommittee on this Section of the code to give us some additional data on principles of printing, and as soon as we get that we will be able to submit that code to the committee for final approval.

There are other subcommittees that have been appointed; one on woolen mills and one on worsted mills. We understand they are working now and will come through with their first draft in a comparatively short time. We thought we had a fourth subcommittee organized under the leadership of Mr. Leveridge for the state of New Jersey. Unfortunately, Mr. Leveridge's death interfered and we are now re-organizing that subcommittee.

We hope Mr. Bohlin has enough fundamental data to make it the basis for this section on silk mills. I assure you it is a slow job. Men on the committee are scattered throughout the different parts of the country and we seldom get together. The majority of our work is done through correspondence and we think we are making some progress and that progress will eventually bring the uniformity we want and actually save limbs and lives.

MR. BOHLIN: Before any compensation act was passed in the state of Connecticut, Cheney Brothers formed a benefit association and the employees pay a certain amount of their wages as a contribution to take care of sickness and death benefits. Cheney Brothers pay 25 per cent of what the employees pay and put that into the fund, and in addition to that they have incorporated the scheme, put through by the supervision of the insurance commissioner, of paying compensation insurance for compensable accidents, and we are still operating under the same plan. We operate under the insurance commissioner's plan and not under the compensation commissioner's plan.

The employees are entitled to a pension and also entitled to extra compensation, so instead of receiving one-half of their pay, which is the amount specified by the Connecticut Act, they can receive as high as 75 per cent. It depends on length of service and the number of children they have.

Now the whole scheme of paying compensation or deciding whether it is a compensable case rests with the operating committee and the trustees of the benefit association. In order to properly take up these cases, we have a meeting with the benefit association and the operating committee every Wednesday morning and go into detail and discuss every accident which has occurred during the week previous.

We found that for some years the operating committee was not operating, with the result that we were accepting quite a few cases which were not really compensable injuries at all, and paying compensation for them. By investigating every single one that is reported for first aid treatment, and talking it up with the operating committee, we have been able to eliminate those which have not been compensable. That has helped a lot and has brought up a lot of conditions we did not get in touch with in any other way.

W. N. CLINTON (Metropolitan Life Insurance Co., New York, N. Y.): About what percentage does the company pay into the benefit association, and what percentage does the employee pay?

MR. BOHLIN: Twenty-five per cent is paid by Cheney Brothers and 75 per cent by the employees. In addition to that the company takes care of all administrative expenses, stationery, ink, et cetera. None of that comes out of the fund. The salaries of the superintendent of the association and his assistants, and all of the operating expenses, are paid by Cheney Brothers. There are 90 per cent of our employees belonging to this association.

E. F. CARTER (State Child Welfare Commission, Raleigh, N. C.): Is it optional with the insurance commissioner or board to set up council or prove cases in compensation machines?

MR. BOHLIN: We have been allowed to continue under this jurisdiction in lieu of taking out insurance with the company, or in lieu of taking out compensation insurance. We have made use of him only as an arbitrator and his decision is absolutely final and, therefore, no appeal can be made to a higher court.

W. C. WROE (American Mutual Liability Insurance Co., Atlanta, Ga.): Isn't it true that your agreement of payment is in excess of the compensation law?

MR. BOHLIN: It is, if they belong to this benefit association, they get more. We have to pay at least what the law provides, but we do pay more, sometimes as high as 75 per cent. That does not come out of the benefit association's funds; that is entirely separate from that.

CHAIRMAN COOK: I am afraid we are liable to get into a discussion on compensation laws, if we keep on, and that is a rather complicated subject. Unless someone wishes to ask a question aside from compensation laws or tuberculosis, I think we will now continue with our program.

Unfortunately, gentlemen, Dr. Sawyer was unable to be with us, and Mr. MacNulty, who is on the program for tomorrow, kindly agreed to be the third speaker on our program today.

Safe Practices in a Woolen Mill

Ignatius MacNulty, Chairman, Department of Labor, American Woolen Company, Boston, Mass.

Accidents, as distinguished from occupational dangers, are things that theoretically need never occur and in practice need only occur to the degree in which they are due to unforeseen or unpreventable causes.

The agent should feel it his personal responsibility to decrease avoidable accidents to a minimum through the influence of good preventive measures, such as the setting up of a permanent safety organization in his mill.

If we are to get any of the benefits expected of safety work in woolen

mills, we are of the opinion that those benefits can be obtained best by the organization of a safety committee set up in each mill and functioning as a permanent organization. It is therefore suggested that you appoint such a committee.

The Overseer's Responsibility

By his attitude the overseer should show to the help that he, himself, should obey the rules he is trying to enforce. Let his example be correct. There will be no trouble in his department. Men will follow correctly.

The workman's attitude toward safety depends absolutely on the attitude of the foreman. If he is indifferent the workman will be indifferent. But if he believes in safety, if by what he says and does each day he convinces his men that he is in earnest and is doing everything in his power to protect them, the foreman will get his men with him. Just as the corporal, more than the captain, determines the morale of a military company, so the foreman and subforeman determine the spirit of safety in a plant.

The workman should see to it that he observes all safety rules and regulations set up by the management. That he should cooperate and help his overseer and also by his individual attitude show to other workmen that disorderly conduct, carelessness, indifference, neglecting his small cuts and minor accidents all tend generally to making his job just so much more hazardous and unsafe for them all. He should be instructed that to a very great extent he himself is the hazard and not the machine and very often he contributes with others in creating new hazards.

It is well known that accidents represent a monetary loss as well as human suffering, and a well set up and organized safety committee in a mill should in a short time be able to show its value, by reducing the number of accidents which will be reflected in the reduction of the insurance premiums and lessening human suffering.

The general subject of accident prevention is gradually assuming greater prominence in industrial and public life. Both employers and employees are becoming more receptive to the idea that accident prevention has a moral and human significance and we have no doubt when you adopt the safety committee idea in your mill that safety will have the same local significance among your operatives that it has in its more general and social aspect outside of the mill.

An accurate knowledge of the frequency, severity rates and the causes of accidents is the foundation of all safety work. Therefore each overseer should report every accident in his room to the committee in writing. The committee should try and establish responsibility fairly and justly. This would have a tendency to draw their attention to the fact that all accidents would be checked. A notice should be placed in a prominent position notifying all the employees that a safety committee is working in the mill for the best interests of everyone and ask for the cooperation and help of all operatives to make the safety work a success in the mill.

In many cases the overseer tries to enforce rules with the men which he, himself, does not obey. It is impossible to enforce rules in this fashion, for it is up to the overseer to set the example. The general attitude of the workman is, "what is right for the overseer to do is right for me." This, of course, makes it necessary for the overseer always to think and do the right thing if he wishes to have his men do it.

Causes of Accidents

Ignorance and curiosity of green and ignorant workers.

Fatigue: Statistics show that this is cause of a number of accidents during the closing hours of the day.

Inappropriate and unfit clothing: Loose and flowing clothing should never be worn by anyone working near moving machinery. Reasonably proper clothing and shoes should be insisted upon.

Improper ventilation and poor air: Mental and physical alertness and activity are impossible in a foul atmosphere. This has a considerable bearing on fatigue. This condition has also an effect on the personal health of the average worker and is a cause of sick absenteeism.

Absence of safeguards. As all machinery is more or less dangerous, local management should carefully look into this matter and decide what is safe or unsafe under proper efficient working conditions. Where there is reasonable doubt give the benefit to some form of guard.

Carelessness: This is a characteristic which can never be wholly eliminated



in human nature. It is perhaps the cause of more accidents than any other one characteristic. Not only does it threaten the safety of the worker himself, but also endangers his fellow workmen. A strict observance of rules and a warning against continued carelessness should be insisted upon. By the most stringent methods only can injuries resulting from carelessness be reduced to a minimum.

Disorderly arrangement and unclean conditions: Things lying around in a disorderly fashion, and waste material left lying, furnish a very good possibility for the workman tripping over something. When tools and other equipment are not in use they should always be put in their proper place. Materials placed in passage ways and near moving machinery are the cause of many injuries. Greasy and slippery floors sometimes cause accidents, and some means, such as sand or some other material furnishing a firm footing, should be secured and applied to avoid this condition.

Lack of organization and cooperation: One foreman doing his safety work in one way, another in a different manner, and some discrediting the safety

work in general, have often reduced the value of safety work to a low level; and this results in a condition worse than as if there were no safety practices at all. Local management should try to avoid this condition and set up an example through the medium of his overseers' group meetings that a uniform system of safe practices should be carried out in his mill, each working with the other for the elimination of this form of waste called accidents.

Lack of discipline: This causes a number of accidents, through crowding in passages at stopping time and rushing out of doorways. Discipline has an important part to play in safety work.

The effectiveness of the first aid department in caring for the man and preventing infection depends largely on the cooperation of the foreman in instructing and disciplining his men. He must make his men understand that minor injuries must receive prompt attention, and must show them why a slight break of the skin, if neglected, may cause infection and possibly result in death.

Departmental meetings of workmen conducted by the overseer once a month have proved most valuable in keeping up interest and enthusiasm in safety. These meetings give the overseer an opportunity to place himself on record as to what he is willing to do to protect his men and what they should do. The workmen should also be encouraged to talk and a friendly get-together spirit should be fostered.

General Sanitation Should Be Strictly Enforced

Sanitation in toilet rooms: This should be a very important part in safety and health practices in any mill. Management and overseers should see that this very important and necessary duty is carried out in a very efficient manner. The operatives will appreciate any effort in this direction and should be encouraged to cooperate in this valuable work. Should this be neglected there is danger that the safety effort will be measured by the effort put into sanitation.

Accidents and their painful and costly results are not the problem of an insurance company, but are the problem of good management (outside of the legal and humane aspects of it), as the costs of accidents enter into the price of the cloth and very largely affect its selling qualities. Accidents also affect good production as they affect the productive efficiency of the operatives.

Fewer accidents mean better production and cheaper cloth. Lower costs mean more orders—more work for everybody. Good safety practice is, therefore, good scientific management. And it is here that men will judge you by what you create, and not what you correct.

CHAIRMAN COOK: Mr. MacNulty has given us a lot of good ideas and I am sure there are some of you who will want to ask him some questions. We haven't a lot of time, however, as I notice several of the sections have already adjourned, so, perhaps, your questions can hold over until tomorrow when I am sure Mr. MacNulty will be glad to answer them. At the end of our session tomorrow, I believe there will be a little time for a round table discussion and if you have anything you wish to discuss thoroughly, it can be done at that time.

DR. KNAPP (Cheney Bros., Hartford, Conn.): I don't like to pick on the women, but where do you get the idea they don't have accidents.

MR. MACNULTY: I didn't say they don't have accidents; I said women had fewer accidents than men. Where woman controls her destiny she has less accidents than man, and I have found that to be a fact in every mill I have analyzed. In some mills the average is twenty to one, generally it is five to one. I have found in industries where women have to face the same physical conditions, working in the same at-

nosphere, on the same process, getting the same wages, there will be less women injured than men.

DR. KNAPP: Are the proportions the same? That would make a difference?

DR. MACNULTY: If there are 50 men and 50 women there will be four or five men injured to one woman, working in the same room, doing the same type of work under the same compulsory effort.

R. P. BLAKE (Independence Bureau, Philadelphia, Pa.): I have studied that question and all the statistics I have been able to get ahold of indicate the fact that the frequency of accidents on the part of women is much less than with the men even when, as Mr. MacNulty has stated, the conditions are identical. Women are safer, but why it is so is impossible to understand. Perhaps the answer is that we have a tendency of putting the heavier work onto the man rather than onto the woman.

MR. MACNULTY: That isn't always so. In the modern worsted weaving room the woman is working under exactly the same conditions. There are the same number of looms and under modern production methods she will be working the same number of hours producing the same grade and quantity of work. I have seen the tables and the law of average is equal, and yet they will not be susceptible to the same number of accidents. And why that is so is something I should like to get out of this meeting before I go back East, and I don't care if it comes from a round table or square table as long as I get the information.

ADJOURNMENT

Wednesday, September 28, 1927

The second session was called to order at nine-fifty o'clock by the chairman, G. W. Cook.

CHAIRMAN COOK: We will start our meeting today with nomination and election of officers for the coming year.

A new system which we have adopted, and which has been adopted by all sections, is to appoint a nominating committee at the last executive meeting (in our case it was held in April) and the Nominating Committee we try to appoint is one made up of old officers who know whom they can bring in on a slate at the end of the year, and in that way we avoid some of the mistakes and confusion which arise by appointing a committee in the last minute who brings in a slate of officers whom we are not sure will serve. Heretofore, we have elected officers only to find out a month or two later that they could not serve and then it was necessary to get out and straighten the whole section again. The other sections are doing this same thing now.

In April I appointed a Nominating Committee consisting of the following members:

Mr. Harvey Saul, Past Chairman.

Mr. B. F. Griffith, Former Secretary and Vice-Chairman.

Mr. H. C. Washburn, Present Secretary.

Mr. Saul is not here, but Mr. Sherman, I believe, has brought in with him the decision of the Nominating Committee. Mr. Sherman, will you report?

Report of the Nominating Committee

R. B. SHERMAN (U. S. Finishing Co., Norwich, Conn.) The nominations, as agreed upon by the Nominating Committee, are as follows:

Chairman, H. C. Washburn, Fisk Rubber Company, New Bedford, Mass.

Vice-Chairman, R. P. Knapp, M. D., Cheney Brothers, South Manchester, Conn.

Secretary, D. Frank Lord, M. J. Whittall Associates, Worcester, Mass.

Chairman Membership Committee, Harry W. Donald, American Mutual Liability Insurance Co., Boston, Mass.

Chairman Statistics Committee, Harvey Saul, The United States Finishing Company, Providence, R. I.

Chairman Bulletin Committee, Leonard Howard, Duncan Cotton Mills, Greenville, S. C.

Chairman Publicity Committee, Arthur Barlow, Armstrong Cork Company, Lancaster, Pa.

Engineering Representative, G. W. Cook, Travelers Insurance Company, Hartford, Conn.

CHAIRMAN COOK: You have heard the nominations as presented by the Nominating Committee. Have you any other nominations you would like to put before the Section. If not, will someone move that the secretary cast one ballot for the slate as proposed?

(Mr. Arthur S. Johnson, American Mutual Liability Insurance Co., Boston, Mass., moved that the secretary be instructed to cast one ballot for a unanimous vote. The motion was seconded and carried, and Mr. Washburn, the secretary, cast the ballot.)

CHAIRMAN COOK: We will now open our program with a paper from a division of the textile industry which we have never had represented in the Section—the

carpet industry. Mr. Lord will read a paper on the organization and functions of a safety committee in a carpet mill.

The Organization and Functioning of a Safety Committee in a Carpet Mill

D. Frank Lord, Safety Engineer, M. J. Whittall Associates, Worcester, Mass.

I have been asked to talk to you today on a subject that is very near to my heart and one that I hope will be of some interest and benefit to you. There seems no good reason why this organization should be restricted to a carpet mill, so any of you who are not connected with such a mill need not feel that my thought I may be able to give to you is applicable only to a carpet mill, but may be applied to any industrial plant.

Not very many years ago, such an organization was not known to be as essential to the successful operation of an industrial plant as it is today. Men had their part to perform and they did it to the best of their ability. As they did not have the modern machinery to aid them in their tasks, they were not exposed to as many hazards as they are through the hustle-bustle methods of the present time.

Neither were "Compensation and Liability Acts" in force and a working man was more or less responsible for his own actions in regard to accidents, but today the operators, through the aid of numerous organizations and the cooperation of their employers, are being given the consideration that humanity and good business methods demand.

That there is an interest now being taken by the wage-earner himself in accident prevention puts me in mind of a little story regarding a negro on a piece of construction work. This negro applied in the usual manner for employment, was accepted by the foreman and told to go to the timekeeper for registration and his number check. Among the questions that were asked each new employee was, "Who shall we notify in case of accident?" The negro, much alarmed and with fear expressed in every feature, nervously replied, "Well, massa, if dere is goin' to be an accident round here, why just you notify me."

There is all around us a growing interest and practical effort on the part of wage-earners themselves in accident prevention. Plant safety organization is the manifestation of this employee interest in safety. The fact that the employee's interest in safety may have been inspired by educational efforts and examples of others should not obscure the fact that a growing interest has come about and is one of the notable manifestations in the accident prevention movement. It is common knowledge that compulsory compensation for accident injury growing out of employment has been a great stimulus to that which is better than accident compensation, namely, accident prevention.

In the substitution of compensation for the old employers liability principle, there is seen the displacement of a conflict idea by the cooperative idea as the basically just and sound principle upon which to deal with the whole matter of industrial accidents.

The liability according to negligence plan was one of leaving employer and employee to themselves, each standing on his individual rights as to accidents. The compensation plan, on the contrary, is that of treating industrial accidents as a common liability of modern industrial life to be cooperatively dealt with by society as a whole. It is a combination of all concerned to share the burden imposed by accidents, and it is because this burden is now so widely understood that it has stimulated the work of complete prevention.

And so in this country it has become the pride of many well conducted busi-

nesses to take care of their problems of safety; and why? My answer is, "Because it pays." It pays in money and pays in terms of satisfaction. It pays in money because the operator can be found at his accustomed place, producing goods that the employer supposedly sells at a profit, and in satisfaction because the employer likes to see his workers on their job, hale, hearty and able to fill their accustomed places in the economic fabric in this great industrial world of ours.

I cannot refrain from quoting the managing director of the National Safety Council, W. H. Cameron, in a statement made by him as follows:



Typical safety committee of employees. M. J. Whittall Associates, Worcester, Mass.

"The benefits accruing from accident prevention work among employees are manifold. To the companies involved, the movement has meant a saving of millions of dollars and thousands of lives. To the workman, it has meant the prevention of a tragedy and the possibility of pursuing his work with the knowledge that he is safe from injury and in pleasant surroundings!"

Insurance companies which have taken over the burden of assuming payment of compensation, have made definite allowances on the premiums for certain conditions as outlined by them, provided the insured will adopt their recommendations, and one of these is an organized safety committee for the plant. So you see that there is a direct money saving here. Also direct saving in money is made to the insured for having had good accident experience, and this reflects on the amount of premium paid.

I feel that it is a very commendable idea that a general safety meeting should be held at which the plant manager or someone to speak for him should address his employees and tell them in unmistakeable language what he intends to do

in respect to accident prevention and what he expects them to do. Many times meetings for the executive and supervising staff of large plants are held where the manager has explained exactly where he stood and what he expected; yet at a meeting held perhaps a year later, it developed that many of the same men had entirely forgotten his earlier statements, were uncertain of his attitude towards safety, and as a result were themselves blundering hopelessly. This discovery gives manager no little surprise as he has assumed that one public explanation of his personal attitude would last indefinitely. On the contrary, a continual follow-up is as necessary in accident prevention work as in any other phase of industrial management. Of course, we all know that the managers of our large industrial plants have many and various duties to perform and that their time is pretty well consumed; but I do not recall a single instance where I have suggested that the manager of our plant send some word either of encouragement or criticism to our safety organization, that it has not been done and it is an absolute fact that whenever such communications are received, encouragement is spread throughout the entire organization and a great feeling of satisfaction is felt.

Assuming, then, that the management of your plant has been sold on the safety movement, it is up to you to carry out their desires.

Qualifications of the Safety Engineer

In the first place, it is necessary to select a man as a safety engineer who can cooperate with other safety engineers from the various organizations who have laid down certain essentials. These may or may not be applicable to the conditions in your individual plant, but with the aid of a good safety engineer many thoughts may be brought out modifying and improving the requirements. The following qualifications I consider essential in a successful safety engineer.

1. Knowledge of safe practice. A general knowledge of what constitutes a safe machine or a safe condition is essential, but with all the diversified industries it is impossible for any one to be sufficiently acquainted with all the manufacturing processes to immediately pass on the safety of them. However, there are certain basic principles in safety engineering, the same as in other engineering, and if he knows these basic principles he can shortly get the details required.

2. Knowledge of human nature. Human nature being so different every person cannot be handled the same. One man may be driven, another may be led. Therefore, to get men to play safe, a successful safety engineer must know which method is most effective. Whether it is better to appeal to a man's reason or to threaten him with discharge, or to picture misery and suffering in order to get him to follow safe practices, the safety engineer should be able to decide. In this he must use what is commonly known as tact, for the wrong approach will often lose a man to the safety cause. The safety engineer must have the right approach, just as much as the salesman.

3. Personal characteristics of a safety engineer. He must also be sympathetic. It is sometimes unpleasant to have to listen to the troubles of a workman when you have plenty of your own but it is often worth a lot in future safety dividends. The successful engineer must have a likeable personality and quality of leadership, for men will follow those in whom they believe and trust, and a pleasant personality combined with a sensible mind will make for this leadership.

He must not be afraid of getting his hands dirty. Many a would-be safety engineer has been a failure because he felt his position to be very important instead of letting others feel its importance. It has been said that you can't

teach safety from behind a desk and I know of no truer maxim. The office of a safety engineer should be the whole plant and he should spend most of his time there. Neither can you teach safety by writing letters. Personal salesmanship is the most successful method.

4. The right mind for a safety engineer. Three of the attributes necessary to successful safety engineering are judgment, initiative and vision. To these I would also add a fourth—an analytical mind.

The question of judgment often enters into safety work especially in mechanical safeguarding, for in many suggestions put up to the safety engineer he must be able to recognize the good points and cull out the bad ones. At the same time in discarding the bad or impractical suggestions the question of fact must enter and the suggestor be left without offense.

Initiative is a very important quality in any job but in safety work it is all important for many of the old ideas in educational safety work are "done to death" and the successful safety engineer is the one who thinks up some new way of teaching safety and puts it across.

One of the most important qualifications for a good safety engineer is to be able to get things done. I have seen more embryo safety boosters lost to the cause by the fact that their suggestions for safety were not promptly carried out, than for any other reason. This is partly a management proposition, but the safety engineer should fight for the carrying out of good ideas and not let them die an early death or lose a good booster by not carrying them out promptly. If the idea is not good, let the suggester see why, but don't simply put it aside to be forgotten, for the author will not forget.

Finally the safety engineer must have an analytical mind and be able to take the accident report and diagnose the plant's trouble from this report, and act on the results. In fact, on starting safety engineering that should be his first task. The analysis of these accidents, together with a close inspection of the plant should at least do away with the accidents due to lack of mechanical safeguards, provided, of course, action follows by furnishing these safeguards.

The Ideal Safety Engineer a Wonderful Man

As safety engineers you should visit other plants and see what is being done, in fact, the broad-minded safety engineer would invite a brother safety engineer to visit his plant and criticise or offer suggestions. I always like to have them come around because they give me suggestions and see things which, because I was used to seeing them, had gotten by me.

Summing up, I find the ideal safety engineer is a rather wonderful man for he must be:

1. A mechanical engineer.
2. A civil engineer.
3. An electrical engineer.
4. A diplomat.
5. An orator.
6. An educator.
7. An executive.
8. A public health expert.
9. A sanitary engineer and
10. Finally a good mixer.

A good parliamentarian is a necessity to preside over the committee meeting. This will tend to keep up interest and will certainly demand respect for the meetings, which should never be allowed to move along in a loose, slipshod manner.

I feel that the safety engineer usually makes a good secretary, as he is at all times informed regarding the requirements, and usually has a discrimination due to his training and therefore is able to help greatly in keeping suggestions and reports in a direct line with safety measures exclusively. A safety committee meeting is the place for the discussion of safety measures only.

My experience has brought me to feel that the best persons for this committee are found in the heads of departments, overseers and foremen. I believe it wise to teach the leaders and they in turn pass their knowledge on to the worker. I feel very strongly in regard to this point and I would suggest to any of you who may feel that this safety committee is not functioning as he might wish, to scrutinize the membership closely and see if there are any members who do not appear to be leaders in the plant among their fellow workers. Let me emphasize the word *leaders*. Never allow any of your so-called "drivers" to dominate in your committee, as there can never be true cooperation with your workers if they feel that they are being driven instead of being led.

Details of the Safety Meeting

Now as to the meeting, place and time. This should be arranged to be held at a time to interfere as little as possible with the duties of the members. I find that a meeting held on the first and third Wednesdays at 2:00 p. m. seems to be the most advantageous in the plant with which I am connected. I feel very strongly that two meetings a month are none too many and that the time allotted, namely one hour, allows a sufficient time in which the member may properly bring to a close his day's work. And as to the opening time, I find that this also allows the member to get his work started before coming to the meeting. As to the place of meeting, I cannot too strongly recommend having a room especially prepared for this meeting. I do not feel that the proper amount of respect can be demanded if your meeting is held in the corner of a shop amid boxes and bales which may form the seats for members and officers. Every plant has some room that can be made available for this purpose and the members are not liable to have their minds distracted by the operations going on about them. Have a desk for the chairman and the secretary. Have safety pictures, posters, diplomas and other ornaments on the wall; and above all, provide comfortable seating accommodations for all members. This may seem to be a little thing but you know how true it is "that the little niceties in life attract many."

Now as to the meeting itself, I am going to give you a description of one of the meetings as it is held in my own committee, and you may be able to gather some material for your own use.

The meeting is called to order promptly at 2:00 p. m. by the chairman and if the chairman is unable to be present, the vice-chairman occupies the chairman's seat. Then a roll call of the members is taken, and right here, let me say that there are many times when it is not possible to attend, and so the member sends a substitute. Should the member be unable to attend regularly, his substitute may become a regular member. As the time allotted to this meeting is during regular working hours, absentees are rare and when they continually occur, their names should be dropped and other appointments made.

Next, the minutes of the preceding meeting are read. Then come the reports. First, the report of the nurse at the first aid room is read and acted on. Then the detailed report of any accidents that have occurred since the last meeting are read. These are thoroughly discussed and causes of accidents analyzed and measures to prevent repetition recommended and referred to the safety engineer for action.

At the meeting held on the third Wednesday of each month, the report of the Workmen's Inspection Committee is read and as this is a very important part of the safety organization, I will go into this phase of the work more at length later. Any communications received are next read and referred to proper persons for further action. Unfinished business comes next and I am going to be perfectly frank with you, that this phase is one that reflects the most credit on your committee by keeping the volume down to a minimum and should only be tolerated when there may be absolute necessity.

Then comes new business at which time an open discussion of all safety measures applicable to your plant should be had. It is here that the greatest good can accrue to your work.

At the meeting held on the first Wednesday of each month and under the heading "For the Good of the Safety Movement," it is our intention to always have a speaker or some type of entertainment for approximately 30 minutes. These speakers usually are available from many sources and if your secretary watches out carefully, he will be able to secure many good speakers from the National and State Councils and also local Councils; leading engineers, men from insurance companies, doctors, nurses and many others.

Adding Interest to the Safety Meeting

Recently I have tried to have an occasional meeting, where after the routine work has been disposed of, someone entertains us with something that does not bear directly upon safety. You know that diversion, if not carried too far, proves very beneficial. A short time ago, the Silver Masked Tenor, whom you have all heard over the radio, was at one of our meetings and sang for us several selections and the members all voted that we had had a good meeting and the time was well spent. A real, live secretary can arrange for an occasional meeting of this kind without prejudicing the value of the meeting a particle.

The records of the meeting are now written up by the secretary and copies of same sent to each member of the committee as well as the administrative officers of the plant. This gives a close touch with the committee and the management, and an occasional letter from the main office lends encouragement if a good period without accidents has been enjoyed and also gives us a decided impetus to do better if we have fallen down on anything. I cannot be too strong in my recommendation to keep this close touch.

Now, just a word concerning the Workmen's Inspection Committee. It is the duty of this committee to make a monthly inspection of the entire plant with a view to finding any items which may be the cause of an accident. These items are all too familiar to any of you for me to take the time to enumerate. This inspection is in addition to the weekly inspection made by the safety engineer and you can readily see that the chance of missing any of the dangerous points in connection with the buildings or the machinery is reduced to a minimum.

This committee consists of three men first appointed to serve 4, 8 and 12 months respectively. As each term expired they (or their successors) were appointed for a period of one year so that the committee is never without the membership of someone experienced. The report from this committee is due at the second meeting of each month. Just prior to this meeting the safety engineer calls the Workmen's Inspection Committee together in his office and goes over their report before it is submitted to the safety committee as a whole, for the purpose of segregating any items which do not necessarily come under the safety committee's jurisdiction. This is also an opportune time for the safety engineer to check up with the inspection committee any items which

have been previously reported, acted upon and recommended for correction. It is also a good time for the safety engineer to impress upon the minds of the members many fine points that might escape their notice, and I feel very sure that the intelligent and comprehensive work performed by this committee has brought about many changes in our plant that have been very beneficial.

You may feel that this preliminary meeting may have the effect of the so-called "parlor caucus," but I sincerely believe that this little get-together before the report is turned in not only strengthens the report but keeps the committee alive to their duty. The report is then submitted on standard forms to the secretary of the safety committee by whom it is read at the next meeting under the heading of "Reports," is then laid on the table and taken up for consideration, under the heading of "New Business." At this time the members of the safety committee discuss the questions openly and such items as are questionable are referred to the safety engineer for his consideration and report at the following meeting. The real, live safety engineer will not allow any of these suggestions to pass without giving them his very best consideration.

Accurate Knowledge of Accident Experience Necessary

James J. Hill, of Railroad fame, once wrote, "Ample and accurate information is the best step toward success for everyone." Accident prevention cannot be intelligently and effectually applied to the conditions of work obtaining in any industrial establishment except on the basis of knowledge of accident experience.

To some extent, this experience may be that of others; in other words, such information on accident cost and occurrences as can be gathered from known experiences of similar establishments. However, valuable this may be to the industrial institution or safety engineer, it is manifestly of much less importance to him than the experience of his own establishment. Lessons from the latter are learned in two ways. By study of mass experience and by scrutiny of individual accidents.

The most valuable knowledge we possess is that which comes to us through making a mistake, through experience. Accidents are mistakes as well as experience. To realize on an accident is collecting revenue from the refuse.

We cannot get the full value out of the accident experience unless we are able to interpret the meaning of individual accidents and in particular uncover their true causes.

I believe a permanent record of individual injury cases and of the plant's accident experience as a whole is essential to good industrial management. Even the small industrial concern which employs but a few men having infrequent accidents cannot afford to be without an insurance record.

Instead of relying upon snap judgment and upon mere recollection of where accidents have previously occurred or upon fancied ability to predict where they will happen in the future, each industrial concern should be engaged in building up an accurate comprehensive record of its own experiences which in the end will prove to be its most reliable guide to effective preventive work. The fact that no serious injuries have ever occurred in a plant and that any sort of injury is so rare, should not deter the safety organization from collecting full information on even minor injuries and near accidents. For it is often such plants that operate with a false sense of security brought about by ignorance of their own operating hazards. It may also be said that such plants are apt to suffer severely from lowered morale, uncovered losses and increased insurance rates when the unexpected accidents arrive.

If a plant has over two or three losses from injuries a year, or is large enough to maintain its own hospital, part or full time physician, or even a

first aid room, it is desirable that injury records be kept on forms or cards with which the physical examination record of the injured and the record of any other injuries or sickness may be conveniently filed. The whole constitutes a complete physical history of the individual during his employment. Whether the records are kept in a ledger of the loose-leaf form, on cards, or upon forms in a letter file, every injury requiring first aid attention and every case of sickness developed at the plant or coming under the care of its foreman, nurses, first aid men or doctors should be made a matter of record. Copies of reports to State Labor Departments, insurance companies and others should also be preserved as well as all other data, pertaining to the accident or health history of the individual employee. Such records should be filed in convenient form and always be readily accessible. These records also form the basis of reports to the safety organizations and also form the basis of reports of competitive departments in the same plant.

We have already noted the value of leadership. Each industrial establishment must have leadership in its accident prevention work and above all intelligent and far-sighted leadership.

A leader of recognized standing is essential and he might well be an operating official or at least one of the manager's immediate assistants. An operating official is desirable for this post in order that the effort may be recognized as a distinct part of operating procedure and not as merely subsidiary to it. The selection of an official of relatively high rank not only gives the work dignity at the outset but makes possible prompt decisions on important matters.

It is obvious furthermore that work which is later to become a beneficial part of the operator's duties should be supervised by one of the operating officials. This same official should also have general supervision over first aid and medical work, compensation and relief and fire prevention since these subjects are closely related to accident prevention. By such an arrangement any possible conflict with these subjects is avoided.

Getting Highest Value Out of the Bulletin Board

There is no doubt of the value of safety bulletin boards as a medium for disseminating general and special information on accident prevention, for maintaining interest and for strengthening the conviction among the employees at large that accident prevention is not merely the hobby of the manager or the safety committee but is an integral part of the great industrial movement.

The form and type of bulletin boards, of course, can vary with the size of the plant and this matter can well be left to your safety engineer. They must be so placed and maintained that they may be examined by the men without personal inconvenience during moments when they are not otherwise employed. I find that the posters issued by the National Safety Council serve the purpose very nicely. The material presented by these posters is fresh, interesting, appropriate and true.

One unsound or amateurish poster that provokes ridicule may queer a board for weeks to come. The board itself must be neat, well-painted and suitable for the purpose. A shabby and unkempt board repels attention and labels the safety movement unimportant. Safety bulletin boards do not alone prevent accidents and the mere posting of safety posters, no matter how strong and compelling their message, will not of itself engender a spirit of safety in the plant.

No poster should be allowed to remain in place any great length of time as the material on them will become stale and unprofitable. I also find that if an operator continually persists in doing something about his machine that appears to be dangerous, such as grinding without goggles or running a saw

table without the guard in place, it works to great advantage to find a poster that is suited to his actions and fasten this poster directly in front of the place where the man is working. I have known instances where the worst offenders have become converted. Too much emphasis cannot be placed upon proper selection, placing and handling of the poster phase of accident prevention. There are so many sources from which appropriate safety posters can be obtained that there seems to be no excuse for the smallest plant not being adequately supplied with them.

Even in old age men retain their interest in sports and contests, but in youth they demand to be something more than mere spectators. They desire active participation. It is quite apparent that the games which endure are those which present opportunity for exercise of personal strength, endurance, foresight or skill and in which there is at the same time an element of chance.

Accident Prevention is a Good Game

Another element, however, is required, a similitude to the experiences of life itself. The game of accident prevention meets all requirements and if safety is staged as a contest, men who might otherwise give it but passing notice will enter into it and soon become absorbed; but, like any other game, the objective must be clearly defined. The manner of playing and scoring must be readily understood and the score itself must be made known. Furthermore, this is a game in which men are not opposed to each other but are as a team pitted against obstacles and hazard. To win, the entire team (the plant personnel) must play the game; otherwise the goal line of effective accident prevention will never be crossed. For this purpose, records must be kept of the accidents happening in each department. Careful scrutiny must be made so that every department will be as nearly as possible on the same footing. You can all see how unfair it would be to put a machine shop in competition with a weave room, and so in order that all departments may be on a fair basis, a system of scoring by percentage is necessary.

In order to maintain the utmost interest in safety work, it seems necessary to give as much publicity as possible to the work of the safety committee and they must be supplied with information that will be both helpful and inspirational.

The Workmen's Inspection Committee in particular should have ready access to all safety standards and to the report of regulations of the State Department of Labor, as well as such publications as deal with accident prevention. I find that the NATIONAL SAFETY NEWS, *Safety Engineering*, and "The National Safety Council Transactions" serve this purpose admirably and it is the custom in the plant with which I am associated to have sufficient copies of each one of these publications to pass around among the members and they are continually being encouraged to peruse them at their leisure.

Another feature which can be brought into play in the accident prevention game is the maintaining of suggestion boxes, placed so that any workman in the plant can put his suggestion in the box unsigned if necessary but to bear some identifying number. In arranging these boxes, it is also a very important thing to place at the side of each box, a supply of properly printed and methodically arranged blanks, together with a lead pencil fastened by a string to the box itself. You have got to make it easy for the workmen to put in these suggestions, and if he is required to hunt up a piece of paper and a pencil, he is very apt to have his mind diverted from what might be a good suggestion.

Some plant managements feel that the promiscuous talk that can be made about accident prevention is a detriment to the cause but I feel personally

that the more talk you can create about the plant, the more interest you can build up.

I am not entirely in favor of a long list of safety rules, regulations and instructions. I am more convinced that good leadership which must be maintained throughout the safety organization is far better and will give greater results than to place in the hands of the new workman too many rules and regulations for him to follow.

The chances are that he will spend so much time trying to evade the rules and regulations that his production is liable to suffer. This belief on my part may be due to the very small turnover of labor which is in our plant and I feel that every man knows what to do and how to do it.

If you have boys employed in your plant, don't forget that you were once a boy yourself, and try to impress on the boy's mind that skylarking and horse play are no part of his daily work. And if you are able to show him the error of his ways and appeal to his sense of decency you will always get good results. Don't drive the boy! Lead him along in the way he should go.

Boys Will Take Advantage When the Whistle Blows

There is one thing that has always amused me, when the whistle blows at our plant at quitting time; and that is the sight of perhaps 25 or 30 boys running from the door of the mill toward the gate. There seems to be a little rivalry as to who will get home first to get the big potato. Of course, where these boys run out into the driveway, which by this time has become pretty well congested with the older operators, there is a danger of their bumping against them or tripping them up. So I had occasion to talk to these boys and told them that I didn't want them to do it any more; but just as soon as my back was turned, the running became more violent than ever, in fact two of the boys collided and fell, one skinning his shin pretty badly and the other his arm. I tried to make an example of these two boys, which succeeded very well, and now, much to my surprise and pleasure, the boys leave the mill in a perfectly orderly and sane manner. Running has been discontinued and I think it perfectly proper to say it was a result, not of driving but of trying to show where it was wrong.

The first impressions of the new employee are vivid and apt to be retained. He is probably more influenced by what he sees than by what he is told. If he sees safety signs, safety bulletin boards and various safety devices, he will probably be somewhat impressed. If he is talked to on the subject of safety, he will undoubtedly listen but for final confirmation of what he has seen and been told, he will look to the action of the men around him.

In conclusion I want to say that there is overwhelming evidence of the success of accident prevention efforts in hundreds of scattered and diverse industrial establishments. Their experience has proved beyond question that in both large and small plants, safety work can be made to pay for itself in actual savings. As industrial accident prevention spreads, as it passes out of the experimental stage and becomes an admitted requisite of efficient industrial management, its true value will be indicated by consistent reductions in the statistics of the larger groups, industrial as well as others. That such reductions have not yet manifested themselves to a larger extent clearly is no discredit to a movement, the success of which depends so largely on educational effort.

No industrial executive, however, has justification for delaying the adoption of an accident prevention policy pending a more universal demonstration of the success of the safety movement. Sufficient evidence of its success is already

at hand. Further delay in organizing and prosecuting the work will only lead to additional accident expense and the loss of many indirect advantages that accrue from safety work. Furthermore, an executive who fails to take his proper place in a movement that has been generally accepted and bids fair to become universal, retards industrial progress and permits the continuance of an inconceivable amount of human suffering that he might be instrumental in obviating.

CHAIRMAN COOK: I know Mr. Lord has said a lot of things to which we all agree.

I hope someone here has something on which they can disagree with him, because I am sure he is going to defend his ideas before us today.

We will then proceed to the next feature, which means we have to use the stereopticon machine. Mr. Washburn.

H. C. WASHBURN (Wingret Division, Fisk Rubber Co., New Bedford, Mass.): I thoroughly agree with one little portion of Mr. Lord's paper, because of the fact that most of these little suggestions which you will see displayed on the screen are the result of suggestions made by employees in the plants over which I have supervision. Too much stress cannot be placed on the advisability or the advantages to be gained by suggestions coming from employees, either with regard to guards or safety suggestions.

The most important thing is to give the employee the impression that his suggestion has merit. In almost every case where the suggestion is not feasible or, in some cases even foolish, he believes himself that he has a wonderful invention or suggestion, and you have to encourage him and not tell him that it doesn't amount to anything, or can't be worked out. You have to give him to understand that it has possibilities, that you will consider it and take it up with the management, and after it has been given due consideration a report will be made to him as to whether it is advisable at the time to follow it out, or whether because of a financial standpoint it is better to postpone it to another time.

In every case it is important to bring back a report to the man who makes the suggestion. If you don't, he not only gets the impression that the management does not care anything about his suggestions, but that they are not sincere when they say they want suggestions; and, as I say, if the report does not come back to him or her, nine times out of ten that employee is going to tell some other employee and our aim for more and better inventions or suggestions will not be forthcoming.

New Developments in Safeguards for Textile Machinery

H. C. Washburn, The Fisk Rubber Company, New Bedford, Mass.

In this paper no mention will be made of such general guarding as can be found in plants making sincere efforts to reduce its accident experience. In safety work, as in all lines of endeavor, it is the little things that count, and I will mention some of the simple developments in new safeguards which have recently been devised and which have given such favorable results in our plants.

Although many of the newer types of textile machinery are equipped with slipper locks when delivered from the manufacturers there still remains grave danger of accidents from machines now in use and without such attachments. Regardless of all rules and regulations governing the cleaning of machines while they are in motion, employees are prone to take a chance of injury, especially if the size of their pay envelope is rated on a piece work basis. Such work should never be attempted until the machine has entirely stopped. However, after this precaution has been taken an occasional accident will occur due to a belt creeping from the loose to the tight pulley or in consequence of another employee starting the machine without first ascertaining the reason for its remaining idle.

Such danger is particularly present on speeders and slubbers. On these frames the shipper rod usually extends across the entire length of the machine. Interlocking devices are not feasible from a production standpoint as it would become necessary for an employee who is piecing up ends at the further end of the frame to return to the head end in order to detach the locking device.

One of our second hands devised a simple latch or locking device which effectually prevents the possibility of an accident arising from the causes previously mentioned. Made of one-eighth-inch angle iron and two inches in length, with a square hole at each end, one end is loosely attached to the set screw nearest the shipper rod on the creel stand at the head end of the frame. When the machine is in motion the latch hangs suspended from this set screw. Twisted at the center the halves are at right angles, and after the machine has been stopped the operator slips the free end over the head of a set screw on the shipper rod. Slipping of the drive belt is thus prevented and repairs or cleaning may be done in safety. As an additional precaution the device is painted red and a letter "S" in red is painted on the creel stand rod immediately above it.

On another type of speeder the attachment is constructed of heavier material and in two parts. One part is securely bolted to the curved top surface of the frame head just above the shipper rod guide. The other part is fastened to the first by a bolt on which it may be turned. When the speeder is running this second part rests on the frame head surface. In the locked position it is thrown over and down, the end resting in the opening where the shipper passes through the guide.

Almost a Fatal Accident and Its Result

On a third type of speeder having a shipper rod at the rear and penetrating the frame head, the attachment is similar to the preceding, but fastened to the frame head below the shipper rod. To lock this frame the latch is thrown up and over with end resting on the rod between the head and shipper rod collar.

This locking device, differing only in its adaptability to the machine on which it is to be used, has been attached to slubbers, drawing frames and combers. On slubbers one-half is bolted to the back surface of the frame head. The other half has a slot in one edge which slips over a set screw in the shipper rod collar effectually preventing moving of the rod.

For drawing frames the device is much like the first-mentioned speeder latch, differing only in that this latch is flat instead of twisted. The locking system, however, is the same.

Since the installation of these inexpensive devices we have had no accident on any of the frames due to the causes which the attachment is designed to prevent.

The feasibility and application of a safety lock for starting switches in our plants is the result of an incident which most fortunately did not result in an accident. An overseer, noticing that one of his twistlers was not in operation, inquired of an employee as to the reason. The employee replied that a fixer had been making repairs at the opposite end of the frame, but had completed the work and probably had neglected to start up the frame again. The overseer therefore threw on the switch, but observing that the rolls were not turning, immediately threw it off again and rushed to the further end expecting to find a fixer with mangled hands or arms. Fortunately the fixer had gone to the shop after additional equipment without notifying anybody that the machine should not be started pending his return. The incident so affected the overseer that he resolved a repetition of the possible accident should never occur again, at least in his department. Locking the switch in the off position

on each machine appeared to be the logical solution of the matter and steps to this end were immediately taken.

The result is an iron casting consisting of a grooved base, curved on the inner service to fit the front contour of the switch box, the upper portion a four-inch disk with "Safety First—Do Not Start" in raised letters on one surface. The attachment is black, the disk face is red with letters gilded. When in locked position the groove fits over the switch handle securely wedging the device to the top and front of the switch box and effectively preventing the switch from being thrown or frame started. When the switch is off the attachment hangs suspended below the box by a short chain. When in use full protection from the inadvertence of employees is accorded anybody working on or about the frame. As in the preceding cases, the device is easily adaptable with slight changes in design to other types of switch boxes.

One of the Great Hazards in the Mill

One of our greatest hazards coincident in all of our plants presented itself in the compressor warpers. Admitted a dangerous machine at four different points, namely, the compressor roll, compressor chain weight, compressor gear and drive belt assembly, the safety department decided to devise a suitable method of preventing an accident at each of the points involved, notwithstanding the fact that the experience at each plant had failed to show an accident ever having occurred on any of its machines. Information was available, however, that serious accidents resulting in crushed and broken arms and legs had occurred in other plants. In one case a fatality resulted. As far as we were able to learn no method of guarding had previously been attempted. Considerable time was devoted to devising a feasible guard for the greater hazard, that is, the liability of an employee becoming caught between the beam and the compressor roll carrying a pressure of some 2,500 pounds. The other three hazards presented little difficulty and were rectified by recognized standard guarding. Not only should the guard serve as a prevention of accidents, but production must not be retarded. After considerable experimenting, a guard was made and installed at one of the plants and later at the other two. They have been very satisfactory, do not in any way interfere with production, the operator appreciates its value as a means to his protection and the cost of manufacture is nominal.

In detail the guard consists of a wooden frame sixty-six inches in length, nineteen inches in width, made of one-half-inch by two-inch pine stock covered with one-half-inch mesh galvanized iron wire. It is attached by three collar hinges to a one-inch cold rolled steel rod fastened to the sides of the frame on which it may be thrown back at any time should the beam need attention or is removed. The base of the guard is faced on the under side with five-eighth-inch half round cold rolled steel and rests on the yarn as the beam revolves.

Almost every experienced weaver realizes the seriousness of accidents arising from flying shuttles. Consult any one of our weavers and they will invariably tell you that a flying shuttle is one thing connected with the operation of a loom with which they hope they will never come in contact. A flying shuttle may be due to any one of a number of mechanical causes—a loose or broken picker stick, a loose rocker shaft, a loose picker stick bolt, etc. Various guards have been devised to overcome this hazard of the textile industry and although today most looms are equipped with some type of shuttle guard, in many cases they serve only to divert the course of the shuttle in its flight to a direction where the danger of injury to an employee is the least.

Our plants were no exception to this rule. The larger looms were equipped with guards of heavy wire in two halves screwed to the top of the reed cap.

Investigation of the many and continued accidents to our employees showed the guards to be unsubstantial and easily bent or moved out of shape and position when struck by the shuttle. Our line of work demands a shuttle weighing about a pound and a half and nineteen inches in length. The severity of an injury resulting from the blow of a shuttle of this size may readily be envisioned. We also found that although the shuttle occasionally left the loom before striking the yarn, as well as at any place through the yarn, it usually left on the magazine end. We needed a guard that would remain stationary at all times and after some experimenting we have devised one that not only meets this requirement, but has solved the flying hazard. Our present guards are made of three-quarter inch by one-eighth-inch steel, twelve in number, machine screwed to either the top or front side of the reed cap, about seven and one-half inches apart with the exception of the first three.

The first prong, so called, is fastened to the reed cap just above the mouth piece of the box on the magazine end; the second just inside the filler motion about two inches to two and one-half inches distant from the first, while the third prong is far enough away from the second to allow sufficient room for the temple and filler cutter. This arrangement makes it impossible for the shuttle to leave the shed when in motion. To insert or withdraw a shuttle but one way is possible, namely, to slide the same under the second prong and withdraw between the second and third.

"D" Stands Both for "Danger" and for "Don't"

If it is necessary at any time to change the width of the fabric our filler motion remains stationary and the change is made on the off side of the loom. The temple is moved to position between the next two prongs.

Although designed primarily for coarse work we believe that this type of guard should be adaptable for finer work on any loom having a reed cap, the number of prongs and their distance apart depending of course on the length of the shuttle. No better proof of its effectiveness can be asked for than our frequency reduction in accidents from flying shuttles since its inception. We have never had a shuttle leave the loom since the installation of this type of guard and we are fully convinced that it never can.

In conclusion I will mention one other development adopted as a further safeguard against accidents in our plants. It is not a guard in the strict sense of the word, yet it might be considered as a prevention against carelessness or inattention. Occasionally an operator will remove a guard while the machine is in motion, regardless of all rules or instructions to the contrary. On many of these guards we have painted a letter "D" in red as a cautionary measure. Should an operator attempt to lift or remove a guard or cover, the letter appears prominently before him as a warning that danger is hidden beneath; that the frame should be stopped before he proceeds. Posted on the bulletin boards and about the room were different bulletins, some illustrated, advising the employees that the "D" stands for danger. These were removed as soon as it was believed all were familiar with the meaning and object of the letters. Possible results of the application of this idea may be realized by anybody interested in safety work. In the application, however, care has been used lest the "Ds" appear too frequently and the employee gain the impression that nothing about him is safe. In this case the lettering defeats the purpose for which it is applied.

All the safety devices which have been mentioned were devised to rectify hazards pertinent to the textile industry; hazards which have or might arise in our plants. Some of them might be used with slight changes in design in other lines of industry. Their strongest points are that they are simple and

inexpensive, two things which appeal to both manufacturer and official alike, and they can and have prevented accidents.

CHAIRMAN COOK: Several years ago I believe it was Harry Donald of the American Mutual who called my attention to the hazards connected with beam warpers, and discussions with several people revealed the fact that none had heard of accidents on beam warpers. There had been some fatalities and since then we have uncovered, for example, an accident to an employee going to work or coming from work, I don't know which, who was passing one of these beams in motion and his overcoat caught in the beam and he was drawn in and seriously injured. If they had not been able to stop the machine he would have been killed. In Saugatuck Valley we had a case where a beam warper in operation caught up one of the oper-



ators and wound him up in the beam with six inches of warp on top of him. After they cut the thread and got him out there wasn't much left of him.

I am glad to know that the Ningret Division of the Fisk Company have solved that guard problem. I was fortunate in seeing this shuttle guard demonstrated at New Bedford and it is uncanny the way the shuttle will jump back into the shed again. It jumps out and almost turns head down and goes right in again.

I am interested in getting expressions from Mr. Bohlin and Mr. MacNulty on how that type looks to them from the silk and woolen and worsted end. Do you think it feasible?

MR. BOHLIN: As far as I can see off hand, it does seem feasible. I wouldn't say definitely, of course, until we have had a chance to experiment and try it out. But I am tempted to try an installation of that sort.

CHAIRMAN COOK: I would like very much to see it tried and would also like to learn what results you obtain.

What is your slant from the woolen loom, Mr. MacNulty?

MR. MACNULTY: I disagreed yesterday, and I still do. I can see, looking at his machine, that there is no comparison. When I said the weaver would not be

blamable for a shuttle flying out, it was correct. He also is correct, but we are speaking of two different methods. In this case the operators fill in the shuttle themselves, but on up-to-date automatic machines they are filled automatically by mechanism.

Just what it will do on a modern worsted loom I can't tell, because that automatic filler is there.

MR. WASHBURN: We do have some looms of the magazine type, and, of course, the guard has been put on each type of loom just the same.

MR. MACNULTY: I mean the putting in of the shuttle. The weaver has nothing to do with putting it in.

Flying Shuttles Are Almost a Thing of the Past

MR. WASHBURN: Yesterday I heard mentioned the question of target guard. We had that in mind at one time but we came to the conclusion that that side of the shuttle with the sharp metal point would do more damage to the target and to the shuttle itself than some other type of guard, and we felt that the target guard would be of very short duration and, therefore, discarded the target guard and went to work on the shuttle guard.

MR. MACNULTY: I would say in fairness to modern mills that flying shuttles are almost a thing of the past. They are now very, very rare. I don't think it is a very serious problem in the textile industry, and I still come back to the thought and will say that it is not so much mechanical as it is a human problem.

CHAIRMAN COOK: Now, gentlemen, are there any questions you would like to ask Mr. Washburn?

W. C. WROE (American Mutual Liability Insurance Co., Atlanta, Ga.): I would like to ask Mr. Washburn if he has ever tried the reversing of those beam warpers? We experimented with some after we had been told that it absolutely could not be done. There are a good many mills doing it today in the South and apparently it eliminates the point of hazard where the iron wraps around the beam.

MR. WASHBURN: It isn't as satisfactory as the original method for the reason that you don't get the compression from the compressor roll, as you do in the original way. For that reason we roll ours in the direct way. You don't need the guard when you wind your roll in the other direction. However, you have got a hazard when you wind it in the other direction which lies in the fact that an operator may, for some reason or other, slip or fall and get the yarn in between the beam and arm. When revolving toward the back he is going to have his arm carried around to where he gets that pressure with the yarn, and he gets an awful jam, especially with the tie yarn. Although that method of building a beam is all right for some concerns, we feel that we get more satisfactory results having them rolled directly. In fact, we know we have a better pressure and the yarn lies smoother and more compact.

CHAIRMAN COOK: Since we have no more speakers on the program, we can throw the meeting open to discussion and any one who wishes to bring up any subject and wishes a discussion can start something, and I am sure every one will be glad to enter into a discussion on some topic.

F. A. FREDRICKSON (Industrial Commissioner of Wisconsin, Madison, Wis.): We have had considerable difficulty with a great many of the machines in the mills in the textile industry in Wisconsin, primarily in our carding machines and on some of the looms, spinning jacks and so forth. That is due not so much to the point of operation as it is due to the gears, belts, pulleys, sprockets, chains, compressors, etc.

I was just wondering what you gentlemen are doing in the line of protection on carding machines, belts, pulleys, and so forth.

I recently went into one of our mills and succeeded in getting them to protect

the carding machine belt and pulley hazards and also the gear hazards on that machine. We had had a few accidents which were quite serious, and I got them busy on a protector for those belts, pulleys and gears. After they had succeeded in guarding up a number of their carding machines I took a photograph of them and sent it to the National Safety Council. I am sorry it is not here so you could see just what they are doing on that subject.

I think there is a big hazard on those machines. In one of our plants this was particularly so because the machines are so close together, due to inadequate space. It gave them very little room when getting in between the cards, and they were constantly subjected to danger because they came in such close contact with those belts and pulleys. In another mill the condition was somewhat better, but still the hazard was there. Those belts run from the ceiling down to the pulleys that drive the cards. They were easy to safeguard and they put in a belt and pulley guard that closes them up completely. They can readily move in and around the cards now and safeguard themselves from those former hazards.

I am seeking additional information and if any of you gentlemen have anything to say along that line, I should be glad to hear from you.

CHAIRMAN COOK: It is true that you can go into a mill, even in our more modern mills, and see a whole room full of cards and find no belts or gears guarded on those cards. I imagine if one were to go through the mills in New England he might go through 100 mills and not find more than one where gears and pulleys are guarded. There are now improved layouts and there is distinctive progress being made in improvements in textile machinery. On the other hand, if you examine the statistics on textile mill accidents it is pretty hard to develop a very large percentage of accidents due to the belt hazard and gear hazards on cards. In fact, the card bugaboo has been the old English style card hazard due to leaving the door open after stripping.

I would like to see the textile mills with their cards guarded and a lot of them ought to have their belts and pulleys guarded right now.

MR. WROE: The only solution to that is the individual motor driven card. I am not going to enter into any sales talk on that equipment, but down in the South several mills have such equipment and they have experimented with guards on belts and pulleys and they always run into a jam. We also tried reversing but did not have good success. We have had absolutely no success with guards around belts, gears and pulleys and, as I say, the only solution is the motor driven card, but that is a very expensive proposition.

MR. FREDRICKSON: I realize your position, gentlemen, but restriction on accident work in the state of Wisconsin is such that when an accident does occur on such a machine it is a direct violation of the order of the state and naturally the increased compensation applies. When our comeback is this: they don't have them guarded in the South or in the East, they say, "We can't help what they do down there."

CHAIRMAN COOK: I know the Wisconsin situation very well, and if we had the same incentive to guard belts and pulleys we would get a lot more guarded.

I think if the problem were attacked, we could have it done, too. It is probably due to the large number of machines in proportion to the number of employees. If we had a man on every card, we would have a lot more of the men hurt. It not only applies to your cards, but to the entire mill.

ADJOURNMENT

The Accident Experience of the Industry

E. Ross Farra, Manager, Grand Rapids Safety Council Grand Rapids Michigan

We have come to the Sixteenth Annual Congress of the National Safety Council, and it gives me great pleasure to again greet many of you whom I have greeted nearly every year for the last seven years. The present chairman first became connected with the Woodworking Section at the Congress in Milwaukee in 1920. Since that time many safety men have come into the work and a number have gone out of the work for reasons best known to themselves; but I am glad that I see before me today some faces that were present in that meeting in Milwaukee even years ago. As many of you know this is my second experience as chairman of this section.

It is well that we take account of stock once in a while to find out just where we are going and whether we are making any progress along our way. Therefore, the program committee saw fit to annex the topic on which I plan to speak at this time, viz.: The Accident Experience of the Industry, including a resume of outstanding safety measures discussed at past Congresses.

I have always been taught that in the last analysis results are the thing for which we should work. If we look at the statistics for the Woodworking Section for the last seven years, 1920 to 1926 inclusive, we will not show as great an advance as we would have liked. The frequency and severity accident rates for the various years and the plants reporting are as follows:

Year	Plants Reporting	Frequency	Severity
1920	19	43.00	4.46
1921	42	54.74	1.47
1922	69	63.84	2.71
1923	79	42.26	3.36
1924	72	49.56	3.08
1925	100	44.20	2.75
1926	136	62.05	4.51
Seven Years	517	53.81	3.16

If you look at it from that point of view, each year individually, it isn't very illuminating, but if you take the seven years you get a better idea.

I sat in a conference on Saturday morning where at least 30 men who are interested in statistical work were discussing whether we ought to figure our accidents on frequency or severity or both. I have been informed for years, that if you talk about frequency of accidents alone you don't get the picture, and I am also pretty clearly sold upon the idea that if you talk about severity alone you don't quite get the picture. However, if you just think of the severity here, we have made quite a decrease; if we take into consideration the severity and frequency both we haven't made so good a showing.

I think one reason particularly why the Woodworking industries have not made the decrease, as a whole, that the other industries have, has been due to the fact that the woodworking in many industries, especially in the remanufacturing industry, is only an incident.

For instance, Mr. Orth of the American Car & Foundry Company has very large plants; many of them have really big metal fabricating departments. They have very large woodworking departments, too, but those fellows are interested in both, not as though it were a purely metals proposition, where they are interested in just one thing.

Many of the larger companies which are having accidents in their woodworking departments are taking very little interest.

1. In a recent analysis of 1,725 plants which reported to the National Safety Council their accident frequency and severity for 1926, we find that the frequency rate of all plants has been reduced almost 20 per cent and that the severity rate has been reduced more than four per cent. We will notice from the above figures of the woodworking section that, with the exception of 1926, the severity of accidents has made quite a considerable decrease, although the frequency has not changed much. While we were very sorry that accidents have not been reduced more in the companies reporting in the Woodworking Section, yet there are many factors to be taken into account and we believe that real progress has been made which will demonstrate itself in the next few years. While only 19 plants reported their accident frequency and severity to the National Safety Council in 1920, this year 136 reported their last year's experience. This shows a healthy interest in safety because these folks would not have reported their experience unless they were interested.

2. Another favorable condition is the changed attitude of a very large group of manufacturers toward accident prevention. I can very clearly recall some companies that are now doing a real big safety job in their plants who a few years ago thought that safety was all bunk.

3. A number of industrial plants, both large and small, have recognized in the last year or two that while safety is a humanitarian principle it is at the same time a money-saver to any industry that goes into it in a wholehearted way, determined to stop accidents.

"Old Timers" Maintain Passive Resistance

I want to read here a letter that I received from an officer of the Woodworking Section who isn't present this morning. He is the representative of a large insurance company, operating out of New York City, a man who has very wide experience in accident causes, and this is what he says:

"The industry as a whole, especially the remanufacturing end, has been afflicted with a condition which has not been peculiar to other industries. I am speaking now of the smaller size concerns engaged in cabinet making, furniture manufacturing stair building, etc., which comprise the greater part of the remanufacturing industry and are scattered throughout the country. These concerns, at least the majority of them in this section with which I am familiar, have been worked largely with "old timers" in the business, mostly Germans who learned their trade on the other side, and while not entirely antagonistic to the safety program were absolutely disinterested. The majority of these men were of the type who did not openly oppose the measures taken for their welfare, but simply maintained a passive resistance to all such overtures.

"There is no other industry that I know of, outside of the chemical which has had to endure this condition. We have many cabinet plants in this section which we have been working on for years and have failed to make any indentation until, as in some cases, the 'old timers' died off and new blood introduced into the plant became receptive to our arguments. This is the only reason that the woodworking industry as a whole, is not so far advanced as some of the other industries, not because of poor leadership of the section, but because of the greater majority of the employers made it their business to employ full-fledged journeymen even if they had to import them rather than make an effort to teach apprentices. In some cases that have come to my attention even the few apprentices in the shop were friends or relatives of the journeymen who had brought them over from Germany or Austria to finish their trade. This condition, of course, has been aided to some extent by the reluctance of the American-born boy to learn a trade.

of Vancouver, British Columbia, and to the best of my recollection it is the first time in the eight years I have been connected with the section that we have had representation from that part of the country. When we get a man who is so interested in safety that because of the conditions he sees he goes and sells himself to a large organization like the British Columbia Loggers' Association, then goes into that organization and puts over safety in such a real way as I know our speaker has done, we surely want to get some of the good things that he wants to offer.

It gives me great pleasure to introduce to you now Major Henry Steere-Clark, safety director, British Columbia Loggers' Association, Vancouver, B. C.

Safety in the British Columbia Logging Industry

Major H. Steere-Clark, Safety Director, British Columbia Loggers' Association, Vancouver, B. C.

In discussing safety in the British Columbia logging industry, I will confine myself entirely to logging operations as carried out west of the Cascades in British Columbia apart from the mountain section, owing to the logging systems employed being somewhat different, there being two distinct associations.

I am aware that all here are assembled with one aim in view and that is the elimination of preventable types of accidents in industry. What a wide field of endeavor safety really presents to enthusiasts (and I look upon you all as enthusiasts) with unlimited scope for those who are really sincere in their endeavors to carry on humanitarian work as well as the elimination of one of the largest economical wastes in our industries, particularly so of the logging industry.

From records that are available and from observations made in your own logging operations, under modern conditions, it must be conceded that the necessity for thoroughly organized safety work is apparent and should be considered a very important factor in modern business, not by any means merely tolerated as a side issue, as often is the case.

The increasing rates of assessment levied by the Workmen's Compensation Board upon the logging industry in British Columbia (which at present is 4½ per cent of an operator's pay roll) made it imperative that something be done to offset this economic waste. The severity of accidents is reflected in their cost, and as the cost of accidents during the five years, ending 1925, in our industry alone had increased out of all proportion to the increased labor employed, and the increased compensation paid to injured workmen, some steps had to be taken to effect a remedy.

It must also be realized that with few exceptions the methods of modern logging, with the high lead, skidder, sky line, etc., were in use in 1921 as they are today; and yet, the average length of disability (in days lost) for "temporary total disabilities" increased each year from 37 days in 1921 to 42 days in 1925. But in 1926 this was reduced to 40 days, demonstrating that safety work was having its effect throughout the entire industry. The accident cost being \$50,000 less in 1926 than in 1925.

In May, 1925, the B. C. Loggers' Association, comprising forty-one operators, employing approximately 6,000 men in their 67 camps and accounting for 85 per cent of the production on the coast, realized that sound safety work should be introduced, and I was asked to organize a department of safety within the association and carry out a plan of safety education that would be practicable and acceptable to all operations. This presented a prob-

em, for it is readily understood that what may be favorably considered by one operator would probably not suit another.

A glance at the map of British Columbia with its many inlets and a coastline of approximately 3,000 miles, upon the greater part of which logging operations are scattered, will give you some idea of the large territory that had to be covered; and it was soon realized that camps could not be visited at frequent intervals without a numerous staff in the field entailing a large financial outlay. Therefore a good deal of the preliminary work was commenced through the mails, until a personal visit was made when the organization of a camp in regard to safety was thoroughly gone into.

All camps were furnished with a standard, well-built bulletin board installed in a prominent place and furnished with a quantity of suitable posters, obtained from the National Safety Council, supplemented with special posters each month, gotten out by the association safety department specializing our own particular logging hazards.

Quite a number of our operators took out memberships in the National Safety Council through the association, the service rendered by the Council being invaluable in assisting operators who were somewhat apathetic to take a active interest in safety and look upon it as important.

The only safety supervision (and that from a mechanical standpoint only) at the industry received to this date was the periodical inspection of camps by Government boiler and railroad inspectors. Their inspection called for a compliance with the existing safeguards as required by law. That the work of these inspectors is of a high standard and productive of good results is amply demonstrated when the records show that less than one per cent of our injuries had been caused through faulty equipment coming under their jurisdiction.

Yet the number and severity of our accidents during five years ending 1925 increased to a large degree, showing that efforts must be concentrated on an educational program, of which more will be said later.

Re-education a Difficult Task

It was at once realized that we had embarked upon a difficult job and, to quote other authorities, "one of the hardest tasks in the world is to re-educate habit workers and lead them to form entirely new habits at their work, namely use of 'safe thinking' and 'acting' and to exercise constant caution which is often forgotten on the many hazardous jobs found in the woods." It was found difficult too, to make men realize the large margin existing between fear and action, particularly among the "chance-taking" and "bravado types" of men which abound in our industry.

All camps are visited as often as possible, when safety committees are interviewed and a general safety meeting of all employees with the management is held. These safety meetings, supplemented by interesting motion pictures, and held in the evenings, are invariably responsible for a 100 per cent attendance, which is voluntary, and really forms an entertainment that logging crews are looking forward to.

In passing, it may be stated that lectures are sometimes difficult to render, owing to the large number of employees who have but a very poor knowledge of our language. It has been found that those who do understand, however, are it along to their fellow workers.

Each camp, no matter what its size, has its own safety committee, upon the efficiency of which, I am convinced, depends in a large degree the success of accident prevention work.

I think I am correct in saying that there is no more transient population than found in the Pacific logging industry, many men being veritable nomads. No less than 18,000 men were shipped from our own employment office to our camps, which employ normally 6,000 men, making a complete labor turnover three times a year; and yet, while these men are at camp, they are in the main good workers, using the experience gained in many camps, and to use a phrase, "spreading the tricks of the trade" including safety.

Therefore it was found necessary to form a committee in two parts, namely a "permanent one" composed of part management and part reliable old timers, say to the number of four, to which is added a "floating committee" of six, making a total committee of 10 or 12. To avoid favoritism, the floating committee is changed each month and fresh men invited so that safety thought and active interest will spread as quickly as possible and thus all men may have a chance to take an active part. This method prevents the committee from becoming stale and uninterested (their own ideas becoming exhausted if kept on too long); having a permanent nucleus, the committee is prevented from being broken up through men quitting their jobs, and at the same time fresh blood is introduced with new ideas serving to maintain interest.

Free Discussion at Committee Meeting Encouraged

Many good suggestions, not only from a safety standpoint, but from one of efficiency, have been lost to the industry owing to the prevailing idea among many men, (and I've no doubt there was some truth in the statement) that if they made any suggestions they would be considered as "wise guys" and marked men, in line for being fired off the job.

We encourage our camp foreman to be present at all committee meetings, which are held at least once a month. All formality is completely done away with. The discussions then practically become round table talks. Any suggestions brought forward are thoroughly discussed and recommendations made for their adoption or rejection. Each "accident" or "near accident" that may have occurred since the previous meeting is carefully gone over and the committee's opinions quoted on their report. These reports are made in duplicate, one copy sent to the association safety department, the other displayed on the camp bulletin board and kept for record. This enables the whole crew to see how their committee functions, how their interests are studied, and keeps my office in constant touch with safety work in camps. Many sound and constructive criticisms are made on these reports, which are disseminated by circular from our department. Such items as "carelessness," "should have known better," "it was his own fault," etc., are often quoted by the committees and are having their effect on the camp crews, who realize that they are being criticized and helped by their fellow men.

To further encourage the safety spirit, a number of operators put up cash prizes and prizes in kind, to be drawn for at the end of each month, during which the crew should be free from a compensable claim.

A modern Pacific logging operation using a railroad (and they are very much in the majority) calls for many varied types of labor with their own particular hazards. I will dwell briefly on them in the order of operating a claim of timber.

When the claim has been cruised and surveyed, the grading gang clears the right of way to grade the proposed road to the timber. This work calls for the felling and sawing into suitable lengths of heavy timber with the hazards of fallers and buckers referred to later. The blasting of stumps and rock cuts entails many dangers in handling and using powder, many men being injured through not taking safe cover, sufficient time not being given to a delay fuse,

crimping detonators on a fuse with their teeth instead of using crimping pliers and using any old gritty stick to tamp charges with. Many grading gangs work by contract, furnishing their own equipment, which we lead them to keep in shape.

Construction work in building bridges and wharves calls for skilled labor and many hazards are met with, those of falling and hand-tool injuries predominating.

The construction of a camp, which is more or less temporary, carries with it all the hazards met with in building operations, the hazards being increased owing to the rough nature of the ground. Floating camps on rafts have the extra hazard of men drowning, although hand rails and board walks are frequently used, more so since safety work had its inception.

Next in order are the "steel crews" who lay the track. Track-laying machines are sometimes employed but more often manual labor is used, steel and ties being brought forward on flat cars and then manhandled. It is here we find the hazard of crushed feet and strained backs through the improper handling of heavy weights.

The log sawyers, better known as "fallers and buckers," then start felling the timber and cutting it into suitable lengths. In our woods this work is generally done by contract, the men being paid by the 1,000 feet board measure cut, often taking unnecessary risks in their endeavors to make large wages.

Only the merchantable timber is felled, leaving snags and small timber standing, excepting those that may reach the crew near spar trees, should they fall or be pulled down. These snags constitute a serious hazard when yarding commences, but it is too costly to have everything standing cut down, therefore extreme care in their vicinity is the only remedy.

Natural Hazards of Tree Felling Serious

It is in this difficult class of work that most of our serious hazards are met. I refer to natural hazards that often cannot be foreseen. Many men have been killed and injured through falling limbs alone. The upper limbs in some green trees cannot be seen, and if rotten even the blow of an axe or sledge hammer or a slight gust of wind in the tree top may cause it to fall unexpectedly. The fallers, having selected the direction the tree is to be felled, make a notch in the butt, known as the undercut. This notch faces the direction the tree is to fall, the tree being sawn from the opposite side, just below the undercut.

The enormous weight of the tree, or a tree that may be "timber-bound" (unless leaning in the direction of fall) has a tendency to bind the saw, therefore steel wedges are inserted in the saw cut in rear of the saw, which are driven with a sledge hammer. The cutting proceeds until but a few inches are left, leaving part of the tree uncut for the full width of the butt. The wedges are now further driven, supplemented by more wedges if necessary until the tree falls. The uncut portion of wood is not completely broken through until the falling tree is nearing a horizontal position. This prevents a kick back and controls a tree in the direction of its fall.

The hazards met with are numerous; burrs from wedges or badly tempered hammer-heads, "side-winders" (in close timber) caused by the falling tree striking and putting other trees down, and limbs that may be thrown some distance by trees that whip back and forth when grazed by falling trees. Much of our standing timber is from 150 to 200 feet high, the velocity of a falling limb (often less than three inches in diameter) at that height strikes with sufficient force to inflict fatal injuries.

The buckers (who work alone, apart from the fallers) cut the fallen trees

into suitable lengths and they are exposed to similar dangers, particularly if working too close to fallers (a practice that is much discouraged) where they may be caught by the tree that is being felled. The call "timber," which is issued as a warning, is sometimes forgotten, very faintly called, or given too late to allow a man to get into the clear, with disastrous results for anyone within reach. Bucking a tree on the down-hill side accounts for many accidents, this being overcome by careful workers propping the logs ere they are cut through. Slipping, tripping over brush, and falling injuries are numerous, particularly in hilly country, when the timber is down, an extra hazard being added when carrying sharp tools.

How It Is Done

A spar tree is now rigged to which all the logs in a setting are hauled. This tree is carefully selected as to size and soundness and if a suitable one is not at hand where required, one has to be raised. The head-rigger, who is generally in charge of all rigging, climbs the tree with belt, rope and spurs, to free the trunk from limbs and cut off the top to the desired height which may be anywhere from 150 to 220 feet. This is a dangerous undertaking unless extreme care is exercised. A number of cases are on record of men accidentally cutting through their belt-ropes and falling. Wire-cored ropes are now used. Topping a tree is a safety measure, to prevent it breaking off when the spar is jarred in yarding (and falling on the crew working below it) and to prevent the wind from blowing it down before it is guyed, after the surrounding protective timber is cut. The spar is rigged with guy wires, as many as 20 being employed where powerful machines are used; then the various blocks are secured, some weighing 2,000 pounds, through which the moving cables pass, all lines being off the ground. Owing to the enormous sudden strains which this spar has to bear, the rigging of a spar calls for a high order of skill and sound equipment. A number of spars have been pulled down or have broken under the strain, either through some invisible defect in the tree, or because poorly guyed. Large margins of safety are employed in the diameter of guys and the wire cable straps used to carry the blocks. The large hauling block which is subject to heavy and quickly varying strains, sometimes 180 feet from the ground, is further secured by a short safety-strap attached by a shackle to a guy wire.

This causes the block to slide down the guy, in case the strap breaks, and prevents it from striking the machine or crews working below. The spar is barked where guys and blocks are secured, to prevent loose bark falling when yarding begins. The "High Lead" system of yarding commences (is most frequently used) and has many hazards, which cannot be remedied except by exercising constant caution and safe thinking.

The main hauling cable, with a diameter of $1\frac{3}{4}$ inches, and a breaking strain of 83 tons, leads from the drum of a powerfully-gearred machine, passing through the main block in the spar, to the full length of a setting over the felled timber. To the end of the main cable short pieces of line with hooks known as "chokers" are attached, as well as a line of less diameter known as the "haul-back." The "haul-back" passes through two or more blocks, secured to stumps or trees near the ground, and leads to the spar tree through another block to a separate drum.

The hook-tender with his crew of choker-men secure the chokers to logs. Upon a signal being given, which consists of a series of blasts of a steam whistle, controlled by a whistle man near the hookers, the logs are then hauled at great speed towards the spar tree, where they are dropped.

It can be readily understood that countless changing hazards are ever present.

The logs crash through and over anything in their path, bringing down snags and small trees that were left standing, and throwing anything that may be in their way to some distance. The various obstructions met with bring an extra sudden strain on the line, causing it to "whip" a considerable distance laterally, thereby inflicting serious injuries, often fatal, to those men not in the clear. The haul-back line carries the empty chokers and main cable back to the hookers. The empty chokers are fairly safe until they reach the ground and wrap around any obstacle, such as a root or sapling, which they either throw aside or glance away from, causing the chokers to fly about with great velocity over a wide area.

In "skyline" and "skidder" operations, the choker hazards are somewhat reduced, as the chokers are kept suspended near a traveling carriage, which runs upon a fixed skyline. The skyline is some distance above the ground and is stretched between the main spar and a back spar over the logs to be yarded. The injuries met with are wire strand punctures, blows from chokers or cables, being struck by snags or brush, foreign matter in the eyes and tripping and falling.

Loading the Logs

Logs are now loaded on skeleton or flat cars, which have two steel bunks, or beds, for the lower logs to lie upon. These logs are kept in place by steel "cheese blocks" (about one foot high) attached to adjustable chains.

Great care has to be exercised by the head loader in building his loads so that they are evenly balanced and not top-heavy. In spite of this care, the varying size and shape of logs, together with a temporary constructed track, cause many logs to fall off in transit, endangering both the train crews or anyone near the track.

The lifting of logs onto cars is carried out in many different ways, some employing separate loading engines, others have yarding machines with a loading unit, but the method is practically the same. The loaders secure the loading tongs or slings around a log, which is then picked up by the machine and swung over the car and lowered in position. Frequently tongs are pulled from a log when suspended, caused by trying to grasp too large a log for the size of the tongs, instead of using slings, or by soft spots in the wood, or by the bad placing of tongs. Logs falling from tongs, particularly when one end has been lifted higher than the other (as in duplex loading) are a great danger to all within reach. Sound judgment and constant vigilance in handling these heavy weights of various shapes are paramount.

The transportation of logs is practically a railroad operation with its accompanying hazards. Most of our locomotives are geared and move slowly compared to rod engines. All trains are thoroughly equipped with air brakes and are kept in good shape. This is very necessary owing to the very hilly nature of our Coastal logging operation, grades as high as 8 per cent are constantly met with.

Temporary tracks are used until the timber along them has been gotten out, the steel is then taken up and laid into uncut timber.

The prevailing hazards are caused by logs falling off loads when in motion (and I venture to say that all logging railroads in the North-West Coast regions have their quota of fallen logs along their tracks).

The loaded cars are taken to tidewater and dumped. The logs are then sorted and built into booms or rafts by the booming crews and towed to the mill or market. Not many accidents occur among boom men: ax cuts and pike pole injuries prevail, of course, falling into the water is frequent when riding logs, cases of drowning are on record, although rare.

I may mention that in interviewing 75 hand loggers on one lake operation alone, whose work is in a class by itself, and who constantly work on steep ground over deep water, only 21 could swim. All boom crews are lectured in regard to swimming and resuscitation.

Our larger operators have well equipped machine shops employing skilled mechanics where all locomotives and yarding engines are kept in constant repair. The usual hazards found in all machine shops are present, such as belt, spoke, lifting jack, overhead crane, emery wheel, shipping, electric and oxyacetylene and battered percussion tools. These are kept in shape and mechanical guards applied as far as possible. We have found some trouble through men not wearing their goggles when using a torch or emery wheel; this is gradually being overcome.

First Aid Practice Becoming General

Far more attention and interest have been given first aid since the inception of safety work. All camps are required by law to have a qualified first aid attendant, together with an equipped first aid room. This is very necessary, for it takes many hours to reach a doctor or hospital from some operations. Locomotives and yarding machines are also furnished with a certain amount of first aid equipment. Men are using first aid kits more often, causing a considerable reduction in former neglected injuries.

In some camps fallers and buckers, who sometimes are long distances in the woods, also have a first aid kit enclosed in a tin container which is stuck on a stick and placed near the grade they are working by.

The so-called "tough guys" are gradually getting won over to safety after posters and talks on serious infections are presented to them.

Infections from neglected minor injuries, as reported in 1925, amounted to 112 cases, the year 1926 having but 20. Truly a remarkable decrease.

Each camp also has a blacksmith shop where shackles, pins, clevises and tongs are made and kept in repair, in addition to the general blacksmith work necessary for camp equipment upkeep. The saying, "A skilled craftsman is known by the way he keeps his tools in shape" is never better demonstrated than when visiting the camp smith's shops. Some of our operators seem to be proud of a blacksmith who has lots of spare time on his hands during working hours. Recently when in company with an operator, I visited his camp. As we were getting from the launch, I noticed a man fishing on the wharf during working hours. The operator pointed him out to me as his blacksmith. At my expression of surprise, he said, "That's a skilled man at his job and I am willing to pay him good money while he's amusing himself, for I know that the rigging, etc., that he makes is standing up and in good shape, and that's what he's here for. I would fire a smith if he had to pound on an anvil all day and every day, it is a sure sign that his work isn't as good as it should be." On inspecting that shop which is but a temporary shack, similar to many others in the woods, it was a model of order and efficiency.

In conclusion I think you will agree by the foregoing that the constantly changing hazards met with in our industry, where few mechanical safeguards can be adopted, together with a constant changing of labor, present a problem which can only be overcome by intensive safety education, thoroughly backed by the operators in making men realize a sense of responsibility for their own personal safety as well as the safety of their fellow workers.

Our association feels that it is doing its best for the industry and its employees by making sincere endeavors to put a stop to a large economic waste.

It has seemed regrettable to me that the word "accident" is so commonly used as it now is when in reality we mean thereby an injury or bodily hurt. Being a good Democrat, however, I bow to the seeming wisdom of the majority and in the remarks to follow do adopt the commonly accepted meaning of the word. But still I feel a more fortunate selection of a speaker could have been made—one more familiar with the lumber industry, a practiced mill man who from training and experience better knows its peculiar hazards and is more qualified to speak of them and to offer more intelligent suggestions as to how to meet and overcome them; for what I may have learned is rather that character of knowledge acquired by one who watches the game from the bleachers or side lines.

Fatal Accident Makes a Deep Impression

It is true that for a short period in my life I was a participant in the industry and it was during this time that I first saw an accident resulting in the loss of a life. Two cousins of mine, just out of college, had built a mill in Southwestern Georgia which we thought admirably adapted to its purposes, but with no single thought of the safety of those to be employed in its operation. Neither one of us, I think, was indifferent to human suffering and I believe either one of us would have gone to any extent to alleviate pain or prevent an injury to any man, woman or child, but in the erection of this plant no intelligent effort—indeed, no effort at all—had been given to this end, because we had adopted as true the then prevalent idea that sawmilling was a dangerous business and to those who engaged in it accidents and injuries were a necessary consequence and a part of the price to be paid. And, as a result of our ignorance, but not indifference, I witnessed my first sacrifice of a human life on the altar of industry, one which could have been prevented had we possessed the foresight to cover a conveyor chain over which men had to pass.

I do not believe that any normal person is careless or heedless of the sufferings or misfortunes of his fellows. One of the finest traits in the character of the average American citizen is his quick and sympathetic generosity—the readiness with which he springs forward to relieve suffering when it is brought to his attention. As evidence of this witness, the far flung and magnificent activities of the American Red Cross and the response of the nation to appeals of the Florida and Mississippi Valley storm and flood victims. I profess some love and much confidence in my fellow countrymen and venture to say that when it is brought to the knowledge of the nation that the so-called industrial accident is unnecessary—a useless cause of suffering and waste of life and limb—the nation will respond as a unit and join hand and heart with this Council in its endeavors, but the nation, as the individual, must be first made to see and understand, and then it will assume its responsibility, and here lies the greatest opportunity of the National Safety Council.

Twenty years ago the state of mind of the country was the same as ours when we built our little Georgia sawmill, but due to the efforts of this body and the far-seeing men who were its founders a change has come and a still greater one will follow. Sensible men no longer accept as a fact that in industrial and manufacturing enterprises accidents and injuries must occur.

The manufacture of lumber—sawmilling—is reckoned as one of the most dangerous of industries, particularly when the logging side is considered, as it needs must be, as the mill cannot run without timber. The hazards start in the woods and do not end until the finished product has been loaded on vessel or car. Few industries combine more diversified dangers. Component parts are the felling, loading and hauling of the timber before it reaches the mill, and in

all parts of the operation will be found the manifold hazards of steam, electricity and the machine shop, as well as those peculiar to the industry itself. It would be impossible in the time allotted to point out even the most dangerous of these hazards, beginning with the unloading of the logs at the mill. I can remember when I thought that this was one of the most hazardous operations possible—certainly that I ever saw—but I now recall with what amazement I heard an eminent gentleman in addressing this body less than five years ago suggesting, if not advocating, unloading logs by first partially chopping the car stakes on the side next the pond and then shoving the logs off with what he called a "poke." I am unfamiliar with the operations of the far West, but an injury in unloading logs can be made impossible (excepting always those caused by rank human carelessness), in the Southern Pine mills by using trip stake pockets and shoving the logs into the pond from behind with a crane or specially designed machine which has recently been built for this purpose. The records of our own mills for the past five years will verify the truth of this assertion.

About two years ago I was invited to address the Southern Pine Association at its annual meeting in New Orleans on the Fundamentals of Accident Prevention. In that address I said in effect that no efforts toward accident prevention could be entirely successful without a recognition on the part of the employer of labor, be it in the sawmill or elsewhere, of his duty and moral obligation from a human and not a pecuniary standpoint, to protect to the fullest extent the health, life and limb of his employees. This necessarily to be accompanied by a willingness to meet the obligation, having in mind always the real object to be attained is the conservation of human life and happiness and the mitigation of human suffering. I would, if possible, emphasize that statement here and add the further assertion that safety, or the prevention of accident, must be recognized and treated as a major part of the fixed policy of the industry seeking to secure it. In one sufficiently large to justify it, employing any considerable number of men, it is essential that there be a department of safety with a recognized head—a fixed department of the business itself and of equal dignity with each and every other department of the organization. It can't function otherwise. If the safety engineer is made to feel that his efforts are subservient to this, that or the other department, his heart withers as do the tendrils of a vine upon which hot water is poured, and his future efforts are as barren of results as is that vine of bloom or blossom.

Your Presence Indicates Interest

Your presence at this council is sufficient testimony that the owners of the operations represented by you recognize and have accepted this moral responsibility and the fact that the safety of their employees is a major problem of industry, worthy of and demanding the attention of its chief executives.

I believe that each of you who has had experience will agree that every step toward accident prevention must be based upon a foundation of education. Man lives and everything he does in his every day life is according to habit, and a habit once fixed becomes a part of a man's life. It follows, then, that the thing most to be desired in accident prevention is the education of man to think "Safety" and sanely, and it further follows that he will live it in his daily work. Continuous and persistent effort, and not spasmodic campaigns or drives, can secure this state of mind.

The fundamentals in accident prevention are the same in the sawmill as in all other branches of industry. Into its operation there exist the same elements of machine power, material and man power. All three first enter into the erection of the plant itself, which should be constructed with the maximum of light.

foreman is responsible for the safety of his own men. The individual man should not be lost sight of. Leadership in the men, I think, should be developed. Let the men themselves feel that they have a place in the safety organization and a responsibility for the safety of themselves and their fellows. Appeal to their common sense to counterbalance the influence of the scoffers who are found in all organizations. Get the confidence of the rank and file and you can build up a morale, it means as much in industry as in the Army. A man's pride will carry him as far as will his nerve.

Let me give you our experience. We have operations typical of those in the Southern pine belt. The usual conditions of floating labor and labor turnover, the large percentage of negro labor and illiteracy exist, and the usual number of obstructionists common to all similar operations are to be found. For some years our people have been convinced safety was to be desired and was possible to be attained, and it fell to me, as one of my manifold duties to try to put it across. We made some progress it is true, but the results were most unsatisfactory to myself because I knew we could do better, and I have no reason to believe were they more so to the property owners. I had long been convinced no satisfactory results could hope to be secured until someone was put in charge of the safety organization, charged with the duty, and that duty alone, of teaching and preaching safety from early morn to dewy eve. Just when our owners reached the same conclusion I don't know, but about a year and a half ago they employed our present safety engineer. Now I know that I knew more about logging, saw milling and labor and social conditions in our operations than he did, and he had to spend at least six months in acquiring a knowledge and information I already had, though I must in all honesty admit he knew lots of things I did not and don't know yet.

Figures That Show Safety Improvement

It would hardly be fair to refer to the accomplishments of our engineer during the first six months of his employment, and as reluctant as I am to cite figures and statistics in a talk of this kind, my central idea could not be impressed without giving you a statement of what has been done during the first eight months of this year as compared with the same months for 1926, and in order that full credit may be given I make these comparisons throughout the entire operations.

	Lost Time Accidents			Total Accidents		
	1926	1927	Percent Decrease	1926	1927	Percent Decrease
Lumberton Mill	242	83	65.7	367	224	39.5
Kiln Mill	57	39	31.5	192	79	58.9
Total Mills	299	122	59.2	559	303	45.8
Logging Department	181	136	24.8	215	200	7.0
Turpentine Department	31	16	48.3	39	19	51.3
Total Camps	212	152	28.3	254	219	13.7
Grand Total	511	274	46.3	1044	542	47.9

This record includes a number of injuries which, in reality, did not occur. I have stated we in Mississippi have no compensation law and the limit of

recovery is the sky as stretched by the cupidity of an unscrupulous laborer as aided and abetted by certain individuals who have no scruples at all, and only a license to practice law.

The result is a multitude of claims that are rank fakes—but as we have them to defend, we also include them in the record. This result has been accomplished with the most trivial expenditure for the installation of mechanical guards. It was done by direct appeals calculated to reach and arouse the men on the job. My fixed belief is similar results can be secured in any organization, provided a man is at the head of the Safety Department as capable, conscientious and untiring in his efforts as is and has been our Engineer, Mr. Buchanan.

There may be those present who from lack of opportunity have not learned the value of safety as a fixed policy. These comparisons are commended for their consideration.

Lumber Industry Contributes Much to Human Welfare

The lumber industry has contributed much to human happiness and weal. Unfortunately it has likewise contributed to human woe. Its toll in life, limb and suffering has been great.

To one who has gone through a virgin pine forest with its tall and straight brown columns, its canopy of green and blue, its carpet of green, gold and violet underfoot, the vistas of dogwood and azalea between the columns of pine, he can imagine it was in such a setting the poet stood when he said "the groves were God's first temples," temples of beauty and grandeur such as only the hand of the Creator could fashion, but temples, alas, which for years have been desecrated and profaned by human sacrifices as ruthless and unnecessary as those of the pagan idolaters and fire worshipers.

The lumber industry is necessary to human welfare. No substitute can be found for natural wood in many of its uses, and its production must go on, but, thank God, American industrial enterprise has realized the production and manufacture of timber and lumber need no longer be accompanied by the mutilation of the bodies and the sacrifice of the lives of our fellow humans. This Council has done much to awaken the conscience of the owners of Industry to their own responsibility, and is doing even as much to help them to meet their obligation. May God prosper them and this body in their undertakings.

MR. WALLACE: There are a great many members of this body who have no practical knowledge of the sawmilling or lumbering operations in the south. Our people have had a moving picture film taken of their operations, from start to finish, from the virgin forest to the loading of the finished product. It has been taken as actual operations occurred, there is not a stunt in it, there is not a thing in it, that was attempted to show anything that didn't exist. The cameraman simply went into the woods and through the mill and took things just as they happened day by day, and just as they were occurring in the course of the work.

The photographer who took that picture has kindly consented to bring it up here with him, and it will be shown here tomorrow morning at nine o'clock, and tonight at eight o'clock.

CHAIRMAN FARRA: Mr. Wallace's paper brought out one question that I want you to think over—we will discuss it a little later.

One of the pleasing things in our safety work is that each year it seems that we are able to get into the work bigger men in the safety movement, and we have with us today a man whose face I have never seen at a previous Congress, a man

who is interested in the financial end of the game, and who therefore talks safety with authority.

I have said a number of times that I don't want a job in any organization unless I can work under the man who spends the money because you will get nowhere as a safety engineer in any organization if you have to report to some fellow who has to go to some other fellow and he to some other fellow to sell it from a financial viewpoint.

I am going to ask at this time Mr. J. M. Bissell, of the Marathon Lumber Company, to take the floor and discuss these papers.

General Discussion of Safety

J. M. Bissell, General Manager,
Marathon Wood Lumber Company, Laurel, Miss.

The chairman said he liked to work under the fellow who spends the money. Before you spend the money you have to raise it. Before we go into the discussion of the two papers I want to talk to you from this angle: first that safety work, if intelligently carried on, pays dividends; not some mythical dividend, but actual cash, which ultimately reduces the cost of operation, as in the case of the lumber industry, per thousand feet. Everything is figured, no matter what it is, on the basis of per thousand feet, or in the case of any other industry on the unit of the article produced—unit cost of the article produced. Second: the investment required to produce safety dividends is remarkably small, so that in the average plant employing from 500 to 600 or even 750, it is not necessarily essential to employ a full-time safety engineer or to make any elaborate changes in the method of manufacturing or the type of equipment used. Interest in the safety movement, heads up in the president and those who furnish the money for the operation of the business, whether that be the lumber business or any other business. In other words, the principals or owners themselves must first be sold on safety. Third: that it is a relatively simple matter to interest the supervisory staff in safety, and also to interest not only the better type of your employee, but right on down, as in our case, to the most ignorant negro that we have on the job; and if any of you men have employed much negro labor you will know what I mean when I say, "ignorant." Fourth: that the organized safety and cooperation along safety lines among the employees will increase the safety dividends mentioned above; promote a better understanding of the opportunity for safety work, and finally enable those engaged in industry to render better service not only to their customers, but to the mills in which they operate.

Now with your permission—you don't look like a bunch of hard-boiled men, but to put across my point—I want to try and visualize that I am talking to a bunch of hard-boiled men who want to know: "Where do I come in? Where are the profits?" And that is what I am going to talk to you fellows about right now. I want to say, though, the business men in general in this day and time are more human, they are not the hard-boiled—if you will pardon the expression—don't-give-a-damn type, but they are interested not only in making money, but in promoting the welfare and the happiness of their employees, and there is no better way that it can be done than by studying and using safety.

We have the question of profit in business, and it is every man's right, if he is at the head of the business, to consider what is and what is not profit. We have a right to expect profit in our business, and we have a right to expect a profit out of every branch of that business; and I am telling you men that you can get profit out of safety work, profit in dollars and cents.

Consider for a moment three important factors in the successful operation of

any manufacturing industry. First, there must be an adequate supply of raw material, and with that raw material the necessary finance to convert it into the finished product. Second, there must be assembled suitable machines, buildings to house those machines in, and all your other work incident to an operating business, and to converting the raw material into the finished product, ready to put on the market, to be sold. And, third, there must be assembled men and women who will operate machines and form the personnel of the organization. God provided the first, the raw material; God provided the last, the man; man, in his ingenuity, provided the machinery. Hence, when we consider the raw material which God produced—the man, which God produced—can we do anything greater than conserve that man power? I don't think we can, and I believe you will agree with me.

I happen to have charge of a plant producing from 46 to 47 million feet of lumber per year. To a great many of you men that doesn't mean anything. It is not as large as a great many operations in the south, not as large as many operations in the west, but on the other hand it is considered a fairly good-sized operation. We employ on an average a little less than 500 men. Naturally I am interested in the daily production of the sawmill because what the sawmill produces the rest of the plant must take care of. I am not only interested in the quantity of that production, but in the quality.

The other day, when figures were placed on my desk—and they are put there every morning, where I get them the first thing when I come into the office to see what we have done the previous day—I noticed that our production had materially fallen off. I made inquiry as to why production on the previous day had been so low. I found that the man who operates the jump saw had an accident. A jump saw is a saw that is operated with the foot treadle or a hand lever which comes up through a live roller bed, and as the long lumber passes down it is cut into proper lengths. That roller bed, if it stops, stops the man who saws the logs, and there is where your production begins and winds up. If you have a good man there, if everything is kept clear so that he can continually keep his log in the saw, then you are going to get good production; and I found that this man who operates this saw in the live roller bed had the previous day mashed his finger, and we had to put on a substitute.

We try to keep men reasonably familiar with different jobs in the mill, but no substitute is usually as good as your mainspring man, and we lost production that day.

Compensation Small End of Loss

We paid the man a very small amount in settling with him, really not because there was any liability on our part in that particular case, but we frequently do that for old employees. The money we paid that man wasn't a drop in the bucket to the profit we lost because of the low production resulting from that injury. So for that reason safety pays and pays cash dividends. That was a safety profit, as you might term it, which we did not get.

Another instance: A trimmer operator was injured at home. The next morning his substitute happened to be sick. We had to use a rather inexperienced man. Now, a trimmer is usually composed of from 11 to 13 saws, and is operated by a man on a board, a good deal like you operate a piano, or the young lady is operating that stenotype. The man must know his "onions" because those saws work frequently at the rate of 60 to 70 per minute, and he has to work the keys pretty fast. We lost production that day. Therefore, I say that it is almost as important that we conserve the man-power of our employees through safety measures at home and among our employees' families as it is to conserve this man-power through safety efforts on the job.

It is unfortunately true that I can name several other instances where we have lost production because of some minor injury and that loss amounted to many dollars.

Here is another thing I want you to think of: a serious accident, even, I might say, a semi-serious accident, will frequently so demoralize the fellow-workers in that crew as to lower their efficiency very materially during the rest of that shift; and if the accident is serious or a fatal one your crew is completely demoralized not only for that day, but probably for two or three days to come.

I will give you an example. The first day of this year it was our misfortune to have an old and valued employee severely injured. It at first appeared that the accident might prove fatal, and it was surprising to note the effect that accident had upon our crew for several days. Fortunately the man recovered and is now back on the job, but while he was off we had to break in another. That man was the head sawyer and those of you who know anything about sawmill and logging operations know that your sawyer is a key man. The loss of that man entailed a loss to us that I don't like to think of. I will say that it ran up into several thousands of dollars, not once of which went to the man, but it was lost in efficiency and breaking in a new man.

My father, who has been in the sawmill business for something over 60 years, told me years ago that if you would take two mills, identically the same, with two expert sawyers in each mill, and switch those sawyers from one to the other mill, you would suffer a loss of approximately \$2,000. He figured it out one time. And I, as I grow up in the lumber industry, am beginning to realize that he was right. Therefore, it pays to use all means at hand or what means you can secure in the prevention of accidents.

Dollars and Cents Cost of Preventing An Accident

I am going to pass on now to the dollars and cents cost of preventing an accident. In these days of competition and low margin of profits, there naturally arises in the mind of the man who is responsible for a plant, the question of what it will cost to take part in this safety program, to use it. I have tried to show there is no actual cost, but there must, of course, be an initial investment.

Those of you making furniture, invest in your machines; we invest in our machines, to convert trees into finished lumber. You invest in them to make out of that lumber the furniture. Therefore, in starting on this safety program, don't figure it as cost, but as an investment—the amount that you invest in the safety program.

This initial investment is small and I say that from experience, as well as from what has been told to me by those who have tried it. If I were to take charge of a plant tomorrow, that has never initiated the safety movement, my first investment would be a membership in the National Safety Council. My next investment would be to call my superintendents and my foremen together and drill into them, with the biggest and swiftest drill that I could procure, the ideas of safety. Then I would send them out among the men; and I would call in the men on company time and talk safety to them. We do that—not only when we started the safety program and were just infants in the game—but right now we frequently call our men into the front office, to smoke a while and have a safety discussion. I will tell you fellows that three times the lumber production that we might have had during that time would not have paid us for the benefits in dollars and cents that we have received from those discussions. Those profits are there, you can see them, you can almost put them down on paper and figure them right down to a penny.

I have tried it and I know; and I say that you can afford to give the time to discussion of safety measures with your men; sell it to your superintendents, your foremen, and your men; because in the final analysis, safety is what your employees in the plant make it.

Next I would give a few rewards or prizes for slogans or for safety ideas. I find that pays. I also find that some of the least educated employees give you ideas that are worth many thousands of dollars. At a plant not far from us the slogan they used for years was gotten up by a negro employee. Our slogan was devised by a stenographer in the office. The name of our concern is Mathathon Lumber Company—she combined the letters M, for Marathon, and M for Man; L for Lumber and L for Lives; C for Company and C for Considered, and below those two lines

MARATHON
EN'S

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in great big letters, and then underscored the word: FIRST. And I don't know of anything that has done more good than that slogan. We have it displayed all over the plant and the men know it and know what it means, and are interested in it. I venture to say that if we took that slogan down and didn't put up another one, inside of three hours I would have a dozen men running up to my office, wanting to know what is the matter; and I wouldn't blame them.

We get the National Safety Council calendars. We also give a prize for the best slogan that our people could adopt for them.

I think one of the biggest contributing factors in our reducing costs this year in every single department has been through our safety work. A safe man is a more efficient man and a better and a more satisfied workman. And I want to urge you not to neglect the safety in the home, because when a man's wife and children are talking to daddy about safety and about what he did that day, and if he was careful in the mill, that man is going to think a lot more about safety than even the president's talk could make him think about it. Because he knows not only that he is the provider for that family, but he knows that they love him, that if anything happened to him they would suffer financially and every other way. Therefore, when you get the women and the children interested in safety you will have made a long step forward in industrial safety.

Conserve your personnel or your man-power by constantly and everlastingly hammering into your superintendents, your foremen, your department heads and into your men that safety is as essential as the operation of the plant. Don't let safety be subservient to any department, to any operation.

Now I say you don't need a safety man, but you do need someone who is absolutely responsible for that department. My superintendent looks after it—my plant superintendent—there is no duty that he has to perform that takes precedence over safety work. The other duties can wait, safety cannot.

CHAIRMAN FARRA: That is the most outstanding address that has been presented before the members of the Woodworking Section in the eight sessions that I have attended. When we can get business men to come here and give a talk like that, I am confident that safety is going ahead. I feel a lot better than I did when I wrote my paper after reading the statistics of the section for the last seven years.

I see we have with Mr. Wiberg, chairman of the section for last year. He was a very valuable chairman of our section. I am going to ask him to say a few words as to his observations during the year.

H. G. WIBERG (Lumber Mutual Casualty Insurance Company, New York City): I just landed off the train, and I don't know that I am in a position to say anything. This last paper makes me think a good deal of the word "service." I don't know whether you other gentlemen have noticed it, but I think the idea of service is becoming more and more the forward step of progress in all kinds of industry. Competition is very keen in every line and I think most of the heads of large concerns are realizing that service is the medium through which they are going to amplify and extend their operations.

Take for instance the automobile industry. You can buy almost any kind of a car now and get a good car, with a good motor—a vehicle that is put together well, and one that with, let us say, reasonable abuse, will last for a very long time.

I have been driving a car myself for a couple of years, I have had some experience with the service stations, and I am becoming more and more convinced that in a few years the companies that will get the business are the ones that are furnishing real service; the ones that when you have something wrong with your car and you bring it in will really take care of it. After they finish the job they will test it, and before they turn it over to you, they will know it is in absolutely first-class condition again.

Now it strikes me that some of that same idea will have to be extended to industry, in that the people at the top of the organization will have to give some thought to furnishing welfare service to their employees and that, I think means taking care of them from the point of view of keeping them on the job all the time and keeping their bodies whole. That is going to be because of their own interest and also because they feel that they are responsible for the men working for them.

The last gentleman pointed out that the tendency of the present age is to get away from the old indifferent and hard-boiled attitude toward the (as they used to be known) "millhand." It is interesting to note that with the possible exception of one or two industries that term has practically become obsolete. That term in itself conveyed the idea that the workman was considered about on the same plane as a piece of machinery or a piece of the eight-by-ten holding up the floors of the building. The workman is becoming much better known, and is being much better thought of.

We Are Marching Forward Not Backward

I cannot help thinking in that connection of a picture I saw last Friday night, called "Metropolis." I don't know whether any of you have seen it. That picture seems to me to be a complete reversion to old times. It is supposed to be an indication of what is going to happen in the future, but I couldn't see it for a minute.

It showed first a city, supposedly, of a hundred, two, three and four hundred stories high, with elevated railways going from one building to the other, and airplanes flying around like bees, dodging in and out of the buildings. Then it went on to show that there were two classes, the very poor workman, or the slaves, and the very rich people, or the upper crust; and the slaves all lived down in the bowels of the earth, four or five miles below the surface, and the rich people lived on the roofs and had gardens and pleasures and fun of all kinds. It shows these thousands of workers marching in lock step to the elevators and being hoisted to the plants and then in the evening, going down into the bowels of the earth.

Another thing that struck me was somewhat of an anomaly—the fact that in this supposedly advanced age the machines were of the old type, steam-driven, with crank rods and crank disks and connecting rods and all of the stuff which we are getting away from.

My picture of what is going to happen in the future is that machines will pick up the power from the air and there won't be any moving parts at all. But this picture which indicated a condition a hundred years from now, showed machines just as complicated as those we have had in the past, and which in their operation certainly would involve a tremendous amount of energy uselessly spent.

That picture seemed to me to be absolutely contrary to the way in which the world is now going. Instead of the workman becoming more and more a piece of inanimate existence or equipment, he is being given more and more attention. We are thinking of him more and more and we are trying to better his condition. We are trying to get him to take care of himself; trying to get him to live longer;

trying to make him of more use to the world and to his own family; and the employers of this day and age, to my notion, and with the contact that I have had with them are coming to the front in great shape to back that movement.

This safety movement, I think, has had a great deal to do with bringing that around. I think it is going to have much more to do with it. I think it is going to develop into this higher idea, which is that the employers are going to try to give service to their workmen, and that service is going to consist of bettering their condition and seeing personally that when they take a man into their place they are going to provide him with a safe place to work. They are going to educate him in safety and they are going to make him a far better man to himself as well as to everybody else.

CHAIRMAN FARRA: Thank you Mr. Wiberg.

We have one question: How can we get more safety posters pertaining to woodworking hazards?

You can get them by letting your needs be known so that the National Safety Council may provide them.

MR. WIBERG: I think that we could get more of them if all of us were to notice conditions as we go through our plants, and where we see something that could be made use of, make note of it and let the National Safety Council know.

Mr. Homer D. Herron, is the chairman of our Poster Committee—Mr. Herron of the International Harvester Company, Chicago, Ill.—Mr. Herron will have those posters provided.

What you should do would be to send a photograph of the condition and a short story explaining what you are trying to bring out in the picture.

General Discussion of Problems

CHAIRMAN FARRA: Aren't there some questions you would like to ask?

H. A. TOWLE (Western Electric Company, Chicago): I would like to bring out a point in connection with the first gentleman's paper; I wonder if any particular badge has been presented to the committee members, a folding badge such as we wear here or a pocket piece, or something of the kind, to designate each one.

MAJOR STEERE-CLARK (Vancouver, B. C.): We don't as yet, but it was voted upon two or three months ago to have badges or suitable headgear, caps or something, brought out in our industry. We are new at the game and we are here to learn.

MR. BISSELL: I would like to ask a question, Mr. Chairman. I want to know how many men in this room are connected with the logging and sawmill industry?

(A show of hands disclosed fifteen.)

Perhaps some of you may have heard a rumor which has been prevalent for the last eight years, of the sawmill or lumber manufacturing industry wanting to dominate the woodworking industry. The lumber manufacturing problems of safety are not comparable with the woodworking industry, but until the lumberman shows sufficient interest, and I say lumberman, and mean the principals—we need the safety engineers. We need those in charge of the actual safety program at the individual plants at these meetings, but until the principals take enough interest in safety work and in attending safety meetings, we don't want a separate organization. You may have heard that we do; we want it—I want it—yes, I think there are other lumber men who want it, but not until we have organized in sufficient numbers and have a program of sufficient importance to warrant asking the National Safety Council to give us a separate section. That is coming, gentlemen, and when it does I want you to know and believe that we are not trying to organize that section to the detriment of the Woodworking Section, but to promote safety and those precepts which the National Safety Council stands for. It is going to be my endeavor to interest lumber manufacturers in the South, and as I happen to be financially

interested in plants in the North and in the West, I am going to try and interest those men in safety.

They are busy men, they have many conferences, many organizations to attend. I met Mr. Wallace and Mr. Hines this morning. Mr. Hines is president of Mr. Wallace's company. I asked him to come over here and he said: "John I would like to come, but I have just returned from Europe, and I find a lot to do. I have got to attend another meeting, but I want you to know that I would gladly attend if I could."

I said, "Mr. Hines, I am going to tell the Woodworking Section this."

He said, "I want you to know, John, that I am interested in safety and that in no department of our operation does anything take precedence over safety."

When we can get more principals thinking along that line, I think you will agree that we need a separate lumber manufacturers' section.

I want to say this: that Mr. Farra has suggested, or has agreed (and I know it comes from the bottom of his heart) to change the name of the Woodworking Section to Woodworking and Lumber Manufacturing Section, and I want to openly thank him before you fellows, and to thank you for giving us that recognition. I don't want to feel that we are trying to come in here and dominate the Woodworking Section, because when the time comes that we are strong enough I know Mr. Cameron, Mr. Farra and you other fellows, Mr. Grier, and those in charge of the Woodworking Section, are going to help us organize a section of our own.

Re-Naming the Woodworking Section

G. A. ORTH (Claim and Safety Departments, American Car & Foundry Company, New York City): Supplementing what Mr. Bissell has just said with reference to the change of name, that was going to be brought up at the Luncheon meetings. I am in favor of having this change made, and while we are on the subject, I move that the name of this section in the future be known as the Woodworking and Lumber Manufacturing Section.

(The motion was seconded by several.)

CHAIRMAN FARRA: Mr. Bissell rather misquoted my authority, I simply agreed last night, that I would suggest to the Woodworking Section that we do this.

The motion is before the house, is there any discussion upon it?

I think that this is a move in the right direction. I told Mr. Bissell last night that there wasn't an officer of the Woodworking Section, tied up with the remanufacturing part of it, who was not in favor of the logging and sawmill interest having a section of their own when they got enough men to run a section. But gentlemen, it has been the experience through eight years of those of us who have been tied up with this section, that the logging and sawmill interests have not been sufficiently sold as yet, to send their men to the Congress year after year, as the remanufacturing interests have done. We have to get new fellows; outside of Mr. Wallace and Mr. Thompson, most of them have not been here before.

Is there any discussion on this motion?

(The motion was put and carried.)

MR. BISSELL: I thank you gentlemen on behalf of the lumber men, and to all you lumbermen and loggers here I am putting this right under your collars: get out and get busy and get members for the National Safety Council, every one of you.

F. A. MULLET (The Long Bell Lumber Company, Quitman, Mich.): As I remember that compilation of figures on accident experience that came out some time ago, there was some separation of the logging and sawmill industry, but the planing mill end was thrown with the other woodworking establishments, which doesn't give us a clear picture of our experience. I was amazed to note the experience in the woodworking planing mill, and the classification as a whole, because it does not fit our's.

I merely want to suggest, if it is in order, that if we could get any of the statistics that are made up to show the planing mills which are in sawmill operations separate from the ordinary cabinet working, furniture working, and so forth, the figures would mean more to us.

CHAIRMAN FARRA: I am glad of that suggestion. I will pass it on to Mr. Grier. Mr. Grier will try to have that change made.

ADJOURNMENT

Tuesday Luncheon, September 27, 1927

The Luncheon Session of the Woodworking Section was called to order at one-thirty o'clock, by the chairman, E. Ross Farra.

CHAIRMAN FARRA: I give me great pleasure to present to some of you folks who have not been to as many conferences as others, a man who has been connected with this section since its inception, and connected with the National Safety Council work long before there was a Woodworking Section, Mr. G. A. Orth, of the Claim and Safety Departments, American Car & Foundry Company, New York City, the chairman.

CHAIRMAN ORTH: Mr. Farra, ladies and gentlemen, it is indeed a pleasure to have this opportunity of acting as chairman for this luncheon meeting.

This morning you heard reports of various committees, but you might have noticed that there was no report from the Program Committee. As chairman of that committee I purposely refrained from putting in the report because I wanted to see how the addresses panned out, and now that you have agreed that they were good I want to take credit, gentlemen, for getting these men to address you.

Our time is limited. We were supposed to have an hour but we have just 25 minutes in which to conduct this meeting.

The first subject we have is a discussion of the Woodworking Section. That is a broad contract, you might say, to undertake. If there is anyone here who would like to say something with particular reference to his own industry on woodworking we will be only too happy to hear what he has to say.

I think it well to call on some of these officials who have been in this Woodworking Section for a number of years, and I know I would like to hear from Mr. John Grier as to what his company is doing for safety in the Woodworking Department of his plant at Wilmington, Delaware.

JOHN GRIER: (Employment and Safety Manager, American Car & Foundry Company, New York City.): Mr. Orth is only too familiar with our work at Wilmington. If we don't blow our horn no one will know about the Woodworking Department of the Wilmington plant—it is one-fifth of the entire plant, and it employs about one-fifth of the men. We average about 150 men in that department who have worked fairly steady for the past five years.

The last lost-time accident we had occurred August 4, this year. The one previous to that was on February 28, 1923.

This last accident was rather discouraging. We were trying to get a no compensability accident month. I had written to several of the boys of the company asking them to help me on the thing and to try to pull their plants through. Four days later I had an accident on the band saw at the point of contact, with the saw entirely guarded.

We started in January, 1927, on a safety contest in the American Car & Foundry Company, covering all plants. Mr. Dickman offered a trophy for the plant which had the best safety record during 1927. The year is not ended, but up to the present time the efforts along the lines of this safety contest have given us a decrease of 53 per cent in the frequency of lost-time accidents over the first eight months of 1926.

N. C. GOODSPEED (General Electric Co., Erie, Pa.): Gentlemen, speaking of things that we might do to prevent accidents reminds me of a point that happened to us not quite a year ago.

We had a planer in our shop and we hadn't had a guard on it that we could use. We got a new guard and thought it would work in that particular job, put it on and told the fellows we wanted them to use it. At the same time I told

them if they found a job they couldn't use the guard on they were to throw it off.

We had one man in that department who has a reputation for doing what he is told. He had a job he ought to have thrown that guard off, but he didn't and as a result, trying to work underneath the guard, the work slipped, his hand was pulled in and he lost three fingers.

I am telling this story to bring out the fact that if you are putting in a change of work or a new device or a new guard on an old device, see to it that your instructions are explicit, and if you have an old guard to which everyone is accustomed it is safer than trying to make a new guard do the trick of the old one if it isn't properly understood by the men, or if the men are not properly educated to take care of that condition.

CHAIRMAN OWEN: We have with us a man who represents a big industry, the Fisher Body Company, subsidiary, as you know to the General Motors, Inc. Mr. Olsen. He is doing some fine work in Detroit, and they certainly have the safety spirit up there.

Severity Is Important in Wood Mill Operations

O. J. OLSEN (Fisher Body Company, Detroit, Mich.): I was very much interested today to find out the difference between woodworking and lumber manufacturing.

I am going to talk about woodworking.

We fell our own timber, clear all the way through, right to the finished product of an automobile body. On the woodworking, that is, outside of the lumber manufacturing, we have done a lot by mechanical guarding. When you talk about reduction of accidents, reduction of frequency, it is part of the story.

Severity is what interests me, and severity is what counts in a wood mill operation because when you get hooked up on a piece of equipment in a mill you know that something is happening.

What we consider one of our most hazardous machines is a shaper, squarehead and the detail. We have been experimenting for the last eight months with an automatic shaper guard and we believe we have it perfected.

Now in Detroit you know that we are hitting the ball all the time and you cannot put a guard on there unless it is practical, especially for people who have been in mills for years, after they once establish a habit it is pretty difficult for them to change.

We have this shaper guard in four of our mills, in mills where we are working day work, mills where we are working piece work, and the men themselves who are operating these machines are very much interested in it and pleased with it. It hasn't handicapped production.

We haven't been doing so very much safety work until the last year and a half, and we have been pushing it intensely. One of our slogans is, "We are not to get production at the expense of safety." That has the support of the management and we are trying to put that message across right down to the man at the machine.

These shaper guards we thought were an impossibility, we thought it couldn't be done, but we have them, and if any of you gentlemen happen to be in Detroit, we have set up a little room in our experimental department to show this guard in operation.

J. M. BISSELL (Laurel, Miss.): In spite of that safety slogan that you have, is it not true that your production is increasing in the ratio of the diminishing of these accidents?

MR. OLSEN: I haven't any statistics to prove that. So far as I know now, that is more or less of an intangible affair, but we believe—I believe personally and those who are connected with the work believe—the management is sold on the idea that if you have a proper safety spirit it increases the efficiency of your plant. I have no doubt about that. I have been in the safety game for a good many years—

I may look like a young fellow, but I am past forty, and I have met all kinds of experience in all kinds of plants, in power stations, building of magnetos, building of automobile tires. I know that if you run a plant safely, if the housekeeping is right, if conditions are right, your production is going to be increased.

As I say, it is more or less intangible so far as statistics or putting it down in dollars and cents is concerned, but we are working on that. Our safety program doesn't have to ask anything from anybody; it is not an expense, it is an asset; it is not a liability.

You may say it is mercenary, dollars and cents, so far as compensation is concerned, but there is a lot of intangible grief, grief to the man, grief to society at large, that we try to take care of it.

Production Is Increased by the Elimination of Accidents

CHAIRMAN ORTH: If I may make a further reference to our company, I would like to answer Mr. Bissell's question there: whether or not production is increased by the elimination of accidents. That is quite true. I want to give you just one illustration. At our plant, in P (he has since passed on), we had a man who was in charge of making various slings and hooks and who took care of the chains. This man had devised no less than 75 various types of hooks, and these hooks have prevented accidents and incidentally have increased production from 10 to as high as 20 per cent.

We have no slogan in the Car and Foundry, but we have a vice-president in charge of operation who is quite active in safety; and in some of the papers of which I have been the author I have stated that we do not simply command or dictate the policies so far as safety is concerned to our particular plant managers, we suggest and permit them to carry out the policies as they emanate from the New York office.

Our Mr. Dickerman, in a letter many years ago said this in closing, and this letter was addressed to the district managers: "I wish that you would give the same thought to accident prevention that you are now giving to production." That takes in a lot; and from that time forth our district managers and superintendents have taken that to heart. As a result, I think the Car and Foundry have made some wonderful records.

We look back and find that we caused the death of no less than 15 or 20 men every year, some eight or ten years ago; and we have brought it down at the present time to where we only have one or two deaths a year, with nearly twice the number of men employed. I think we are doing something for the sake of the movement.

H. F. WIBERG (New York City): I hope I may be pardoned for coming down to a couple of detailed occurrences which some of you may think unnecessary to refer to. I think, however, that these accident causes are ones on which we cannot place too much emphasis.

We had a man lose a hand on a saw recently. I am not connected with a manufacturing plant, but with an insurance company. The man had been employed two hours. He was put on a rip saw without a protection and without proper follow-up to see that he knew his job. That is one thing that I think cannot be stressed too much, that when you get a new man, find out whether he knows how to do the work that he is going to do—give him not only a test, but actually follow him up for sometime, to make sure of it.

The other circumstance is with regard to the old proposition of shutting a machine down before you make adjustments.

At the plant in Buffalo they had a near serious accident; a man was running a masher with a feed table about eight feet in length. A piece of wood caught in the feed roll. The operator got up on the table and tried to pull it out and got his arm caught. His arm went in to the shoulder. Another man nearby had the

presence of mind to shut the masher. If it had not been for this other fellow this man would have gone right through. It is the old story of keeping after the key fellows to see that they do shut machines down before they make adjustments.

I might also say on that, there was a question involved also of guarding the feed rolls. Most plant foremen will tell you that there is no sense in guarding that feed roll because it is eight or ten feet from where the operator stands. That is all very well if the operator always keeps his feet on the floor. You can never depend on what a man is going to do or where he is going to go.

I just want to leave those two propositions with you; it is the old story of keeping after those things.



CHAIRMAN ORTH: My good friend Mr. Farra suggests that I call on Mr. George P. Eddy, of the Klise Manufacturing Company.

GEORGE P. EDDY (Grand Rapids, Michigan): I think Mr. Farra has rather taken advantage of my lack of experience in some of this safety work. We have only been in it two years, it is a very small plant; some of these people could swallow us up in one corner and wouldn't know we were there.

About the only thing I can say is that about two years ago we came in contact with the National Safety Council, through Bob Haven, who was then our local Council manager, and in getting us into that he got the work enthusiastically started. Since that time we have decreased our lost-time accidents from 30 or 40 days a month, to two or three days a month. Our woodworking plant specializes in a type of product that does not call for a great amount of machinery of the type that carries the biggest hazards.

The work that we are doing has been directly the result of our contact with the Safety Council and the management feels it is the best investment they have made.

So far as any detailed stories, about what they have accomplished is concerned, I can only say that it has been through the efforts of the Safety Council, in getting

enthusiasm into our organization, and then our own work along the lines of education, that has done the work. The guards themselves seem to be a necessary part, but the education of the workmen is the biggest problem that we have got right now, and I think is the answer to the safety work as far as the smaller woodworking plants are concerned.

There is a sad lack of attention to that part of it—I am speaking particularly of the smaller furniture plants, the secondary operations in the woodworking industry.

We think we have a manager at Grand Rapids who is going to put a lot of pep into the plant and we know that we need it badly.

CHAIRMAN ORTH: Thank you, Mr. Eddy.

Our next subject is the election of officers. In the absence of the chairman of the Nominating Committee I will read to you the nominations, and I wish when the names are called that these gentlemen would rise so that all in the room may know who they are.

Report of the Nominating Committee

The committee suggests that the following members be considered for the various chairs to which their names have been assigned:

Chairman, John B. Grier, American Car and Foundry Company, Wilmington, Del.
Vice-Chairman (Sawmills), J. M. Bissell, Marathon Lumber Company, Laurel, Miss.

Vice-Chairman (Manufacturing), E. K. Prichett, Prichett-Powers Company, Grand Rapids, Mich.

Vice-Chairman (Logging), H. Steere-Clark, British Columbia Loggers Association, Vancouver, B. C., Canada.

Secretary, M. C. Goodspeed, General Electric Company, Erie, Pa.

Program Committee Chairman, W. L. Wallace, Edward Hines Lumber Company, Lumberton, Miss.

Membership Committee Chairman, E. Ross Farra, Grand Rapids Safety Council, Grand Rapids, Mich.

Publicity Committee Chairman and News Letter Editor, O. J. Olson, Fisher Body Corporation, Detroit, Mich.

Poster Committee Chairman, H. D. Herron, International Harvester Company, Chicago, Ill.

Engineering Committee Chairman, G. A. Orth, American Car and Foundry Company, New York City.

Executive Committee, The Officers and:

G. E. Sanford, General Electric Company, Schenectady, N. Y.

A. O. Jackson, Aetna Life Insurance Company, New York City.

H. G. Wiberg, Lumber Mutual Casualty Company of New York, New York City.

The committee believes that the offices left open can be better filled by appointment from the floor at the time of meeting.

A. O. JACKSON, Chairman

Gentlemen, this is not a slate that has been thrust upon you. In our democracy we have a right to nominate any man we may see fit to nominate. If there are any nominations, gentlemen, we will be glad to have them, and we will cast our votes for the gentlemen.

Are there any nominations?

If there are none, I will entertain a motion that the nominations be closed.

(Motion was made and seconded that the nominations be closed and upon a vote the motion carried.)

(A motion was then made and seconded that the secretary be instructed to cast the ballot for the nominees as read by the chairman, and upon a vote the motion carried and was so ordered.)

SECRETARY GRIER: The secretary has cast the ballot.

CHAIRMAN ORTH: Is there any further business, gentlemen, before we adjourn this session?

MR. BISSELL: In case some of you gentlemen misunderstood my talk this morning, I don't want any of you to think that I, for one fractional part of a second, place the dollar and cents value of safety ahead of the humanitarian side. I just want to get myself straight before you along that line. That of course is the paramount thing in all safety work.

ADJOURNMENT

Wednesday, September 28, 1927

JOHN B. GRIER, Chairman
Employment and Safety Manager, American Car and Foundry Company,
Wilmington, Del.

The third session was called to order at nine-thirty o'clock by the chairman-elect, John B. Grier, employment and safety manager, American Car and Foundry Company, Wilmington, Delaware.

CHAIRMAN GRIER: Gentlemen, we will start our session without the motion picture, as was the plan before; the picture went awry in some way last night. It will be shown later.

Woodworking Hazards

J. B. Grier, American Car and Foundry Co., Wilmington, Del.

Statistics covering all woodworking accidents can be divided into two distinct classes, which enable one quickly to determine the underlying causes for serious accidents in the woodworking industry, viz.: (a) Mechanical and (b) Non-mechanical. These two general classes are subdivided as follows:

Mechanical: (1) accidents at the point of contact, (2) accidents occurring on other parts of the machine—driving belts, pulleys, shaftings and etc.

Non-mechanical: (1) handling material, (2) bench work, and (3) miscellaneous.

By separating the accidents and putting them into their proper places we are quickly shown the cause of the greater number of accidents, and this will also give us the outstanding reason for the occurrence of these accidents. Our safety program can then be arranged according to the indications of this report.

The method of combating the above-mentioned accidents can be briefly outlined as follows:

Accidents occurring at the point of contact. These are accidents which are caused by the operator coming in contact with cutters, saws, knives, revolving heads or parts of machinery which necessarily must be left exposed in order that the machine may do its proper work. For the prevention of accidents occurring under this classification we must design guards which cover up all of the moving parts as much as possible, permitting the machine to do its full amount of work, and then follow this guarding up with the broad plan of education.

Accidents occurring at places other than the point of contact. These accidents can be entirely eliminated by the proper application of safeguards. When an accident occurs under this classification it should be thoroughly investigated by the committee and a guard designed immediately which will remedy this hazard. I say that these accidents can be entirely eliminated. This is true, if the proper guards are designed. By that I mean, guards which can be quickly removed and quickly replaced, the guards which permit the machine to have the proper attention as to oil, repairs, tightening, etc. After these guards have been designed it should be made a strict plant rule that all guards be in place when a machine is started, and this rule strictly enforced.

The non-mechanical accidents which are classified under handling material are probably the most frequent accidents. Men handling material around woodworking machinery must be carefully instructed to allow the machine operator ample room to work around his machine and feed the material to it. If he is cramped for space,

he will have a considerable number of abrasions, bruises, sprains, etc., which may at any time result in a serious or loss time accident, through the accident itself, or infection developing later.

Bench accidents, those accidents occurring among cabinet makers, bench hands, carvers, etc., do not suggest major accidents. However, I have had two cases occurring on the bench which were of a very serious nature. I will go into the detail of these accidents later, when we take up the woodworking hazards.

In passing it is well to mention that the placing of tools in tool boxes is a large factor in this type of accident. It is necessary to have an educational program to reduce accidents of this class.

Under miscellaneous accidents we place those which cannot be truly classified in the four headings explained above. Splinter wounds, which will be the most numerous under this classification, should be given quite a bit of attention. After workmen handle wood for a considerable period of time their hands become toughened and they feel that a slight splinter wound will cause them no damage. This neglect of a slight injury has oftentimes developed into a serious injury causing dismemberment of part of the body. It is necessary at all times to require workmen to get first aid treatment for splinter wounds no matter how slight they may be.

Hazards of woodworking machines are numerous, and unheard of causes of accidents will develop. In this paper I am limited to cover only the most common causes of accidents. These accidents are the ones which we must combat. Sometimes an accident will occur in an unusual manner; but after we work on this common cause of accidents, as our statistics show them, the unusual accidents will diminish in proportion.

The Joiner a Much Abused Machine

Probably the most abused machine in the woodworking industry is the joiner. Workmen who are not machine hands will use this machine to smooth up material, and their attention being on other work, they do not notice the set up of the machine but lay the stock on the table and push it across the head without determining whether it is too deep, whether the knives are properly adjusted, etc. You might say that permitting this is a poor policy; but, I dare say, it is done in every woodworking mill in the United States today. The result is, if the machine is not properly set up, a kick-back or a near accident. The outstanding hazard on this particular machine is the jointing of small blocks from 6 to 12 inches in length and probably of the same width. This material should never be run across a jointer head unless a plane handle is used to make the operation safe. These short blocks are usually of a twisted grain; and, as soon as the knives come in contact with it the block is kicked from under the workmen's hands and his hands come in contact with the revolving head of the machine. If your safety man has been on the job and a round head installed, the accident will not be as serious as it would have been if the old style square head was used. We must be always on the job to see that the workmen on the machines are always well to the side and the part of the head not being used is covered with a suitable guard. There are several guards on the market for this machine which work very satisfactory. They swing aside as the stock is passing over the head and are brought back into position when the material has passed.

The band saw is also a much abused machine. It is used by workmen who are not employed for this sort of work and cuts are attempted for which the machine is not set up. I mean that circles and curving cuts are made for which work the saw blade is too wide; and, in attempting to follow the line on the board, the blade is given a severe twist which cracks the blade at the base of the teeth. The saw is certain to break and unless your safety man has put the proper safeguards around the saw we have a very serious accident.

Both wheels on a band saw can be entirely covered, and here I might say that I do not like the idea of using an angle iron guard on a band saw without covering it with expanded metal or wire mesh. It has been said that when these wheels are covered with metal or wire mesh, every time the saw breaks it means a new saw. Admitting that it does, band saws are much cheaper than doctor bills. If the saw is guarded in this manner, the broken band will pile up in the upper or lower guard and not on the table or around the workman's neck.

The planer is another machine used like the saws mentioned previously. The newer type of planers are as near "fool-proof" as it is possible to make the machine; and, if necessary guards are placed around the outside when the blower hood is installed, it is impossible, if a man is on the alert, to become entangled in any part of the machine. However, on the old machine, with the old style in-feed roll, there is a distinct hazard. This occurs when feeding more than one piece of stock in the machine. When a thick piece is entered and then a thin one, the thin one is bound to kick back with considerable force and either tear the hands of the workman or hit him in the stomach with considerable force. While operating this machine the workman should be instructed to always stand to the side while feeding material to the head.

Education Has Helped Operations at the Circular Saw

The circular saw is a machine used much as the three previously mentioned. However, education has brought about somewhat of a better condition in regard to the circular saw and not so many men will operate them as will operate the above machines. However, the circular saw is used by men who do not work on it regularly and it will be used when it is not in the proper adjustment. This improper adjustment of wood working machines is the cause of the majority of machine accidents in the woodworking industry. A circular saw should be guarded as above and equipped with a splitter which is fastened rigidly to the frame of the machine and set absolutely in line with the saw itself. There are guards which completely cover the circular saw and will prevent most accidents; however, the use of these guards is severely criticised because most of them do not permit the men to see the saw so that he can cut a line. In other words, "Straighten the board." It is our policy not to permit anyone except experienced woodworking machine hands to operate this machine and we have practically eliminated our accidents on circular saws.

The emery wheels located around the woodworking mill cause quite a few minor accidents and oftentimes they develop into major ones. After we have completely guarded an emery wheel the workmen will continue to dash over to it and shape off a cutter without using goggles. This is a practice which is hard to overcome, and can only be combated by strict adherence to the safety rules by the foremen and other workmen throughout the shop. We are not always about the mill so that we can catch the men doing these things and we must rely on workmen whose machines are located close to the emery wheels to assist us in seeing that the workmen wear their goggles at all times.

The other woodworking machines are nearly always operated by men who are familiar with their job and know the hazards of their machines after guarding them as completely as possible. It is a question of keeping workmen interested and, thus, have them always have their machine in first-class shape before commencing the operation. To take the individual hazards of these machines would be a long and uninteresting paper because, we of the woodworking industry, are thoroughly familiar with them.

I have had or have knowledge of woodworking accidents occurring in the following manner:

A workman was cutting carlins from stock material on a band saw. There were

holes drilled in the side of this material and in order to get a better grip on the stock he put his middle finger into the hole. He pushed the stock through the saw and when he separated the offal from the carlin he noticed some blood on the material; when he removed his hand from the carlin he found that he had cut the end off of his finger. This is a rather peculiar accident, but it actually occurred.

Another accident occurred on a band saw when a man had sawed out a carlin. He had finished the cut and in an attempt to get rid of the offal on the right side of the saw he gave it a violent push toward the back of the machine. In doing this, it struck the remaining piece of stock which he was holding with his left hand and the weight of the stock which had been struck by the offal threw his left hand against the band saw, below the guard, causing a severe injury to his left thumb.

We had a man injured who was working on a glue press. The glue press was a heavy iron frame and in making our inspection we had neglected to notice that the corner of the eye beams were cut square. This man was lifting the heavy piece of work and struck his head against the corner of the glue press inflicting a severe scalp wound. We remedied this by rounding the corner of the eye beams on the press.

Another accident occurred on a mortise machine. This machine was of the conventional type but did not have lugs welded to the table to guide a man's hand and he pushed his hand under the chisel. It came down and inflicted several puncture wounds before he could remove his hand from underneath the chisel. The lugs were placed on this machine and no further accidents have occurred.

Single and Double Head Shapers

The single and double head shapers come in for their share of accidents: but, as this machine is universally known as a dangerous one, only experienced men work on them. There are several guards on the market which will prevent accidents of a certain kind from occurring on this machine, but not all work can be done with these guards attached. A man was shaping carlins when he became interested in what another employee had said and neglected to check up on the grain of the wood he was working. He permitted the cutter to pass the end grain and the carlin split in half, one piece flew in each direction exposing the entire head to the workman's hands. Fortunately he was using the spring holder on this machine and he was not injured—had he not been using this holder, he probably would have had a serious injury.

A man was working on a traveling cross-cut saw. He had made a cut through a board about six inches wide and four feet long. He had cut this approximately in half and was looking around the mill as he reached for the piece of offal. He had not noticed that the saw remained forward and did not return to its rest position. His hand came in contact with the revolving saw, as the guard of this particular machine was of the stationary type covering the saw only when it was in rest position. This was remedied by designing a guard which bolted to the traveling carriage of the saw, carrying a hood which moved forward with it, thus, covering the saw at all times.

The motorizing of the individual machines in a woodworking plant is a big step in aid of the safety movement as well as an economical one in plant operation. One important factor which must not be overlooked when this installation is made is that an emergency stop switch should be located in a convenient spot to where the operator must stand while feeding material into his machine. This oftentimes prevents a serious injury as well as saves machinery from damage when material becomes wedged into it. Workmen will use this switch to stop their machines practically all the time, thus, becoming familiar with its location and can shut down their machines with no loss of time in case of emergency. This type of installation also eliminates the hazard of preventing woodworking machines to run idle while a small job is

being done on a machine nearby. Several accidents have occurred on machines in this manner.

One item which has been considerably overlooked in woodworking safety is that of illumination. Workmen cannot properly set up their machines and do close work if they do not have good illumination in the proper place. We have installed on all of our woodworking machines, particularly band saws and close working machines, individual lights shielded from glaring into the operator's eyes with a small metal shield. These lamps are covered with a wire mesh to prevent their breakage.

A woodworking shop, in order to produce the greatest amount of work in the safest manner, must be warm at all times and employers must not expect production and must expect accidents if they do not have their mill in a comfortable atmosphere at the beginning of the day's work. Considerable time is lost in the morning by not getting the mill in the proper condition.

Bench Hands Have Many Kinds of Accidents

Serious accidents occur to bench hands in different ways. Careless piling of tools in tool boxes is a large contributor to these accidents. A chisel point sticking up always gets a man's hand when he reaches in his tool box hurriedly for another tool, or when he carries a chisel around with other tools he is bound to strike himself on the leg, ruining a good pair of trousers, or inflicting a wound in his other hand when he attempts to get another tool. This can be prevented by taking heavy paper, folding it several times around the end of the chisel, making a sort of sheath which can be dipped in glue and made into somewhat of a permanent cover. It is no trouble to slip the chisel in these sheaths and this hazard is eliminated.

An accident occurred while a bench hand was working with a chisel fitting a tenon into a frame. The chisel slipped striking him on the back of the left hand just at the wrist joint. There was a slight incision, but it was soon discovered that he could not use his ring and little fingers. It became necessary to remove him to the hospital to have an operation performed joining the tendons and he lost six weeks from work. This could have been prevented had he laid the material down on the bench and made the cut toward the bench instead of his left hand. It becomes necessary to educate and keep after the men continually to see that they do not neglect this small item in their daily job.

Numerous accidents have occurred because of slipping. The floor around wood-working machinery and around woodworking benches soon become littered with shavings and sawdust and before long the floor becomes highly polished and very slippery. We have found nothing better than rubber mats to eliminate this hazard and place rubber mats in front of every machine where it is necessary for the men to exert any pressure. All machines such as joiners, shapers, band saw, circular rip saws and similar machines are equipped with this rubber mat as well as the floor in front of the woodworking benches so that the men have a sure footing while making tight fits, etc. We find that this rubber mat prevents slipping even after it has become covered with sawdust, and makes a sure footing for the employee.

A broad plan of education is necessary at all times. This can be carried on in several different ways. Our method is to bring it to the individual attention of each employee some time during the day. As we make our rounds through the shop we notice a man doing something in a dangerous manner and call his attention to it in a kindly way reminding him that he is the one to suffer and not the company, that we are doing this for his protection, also soliciting his assistance in preventing other workmen from doing their work in a hazardous manner.

There will be no discussion on the papers, gentlemen, until after all three have been presented.

The next paper will be given by Mr. E. K. Prichett, president, Prichett-Powers

Company, Grand Rapids, Michigan. Mr. Prichett has also been a director of the Grand Rapids Safety Council for the past seven years.

How Safety Is Practiced in the Manufacture of Furniture

E. K. Prichett, President, Prichett-Powers Company, Grand Rapids, Mich.

As long as men have worked together, industry has had to contend with accidents, but the serious consideration of their prevention has occupied our minds but a comparatively short time. Most industries felt that accidents were necessary trade hazards and because an operative was injured was no reason for additional care nor particularly a matter of sympathy. When a man took the job he knew that he was running certain risks and his chance of accident was in proportion to the length of time he continued in the work.

The woodworking industry, and especially that of furniture making, has always been looked upon as particularly hazardous. A walk through any furniture factory years ago would disclose many hands from which fingers were missing. In some instances the hand was so crippled as to prevent the operator from continuing in his trade and, occasionally, made him a public charge.

Men frequently pointed with pride to what remained of their fingers or hands and often took delight in telling how each particular member was lost. No thought was given to whether or not accidents were preventable. They were trade hazards, and that was all there was to it.

Twenty-five or 30 years ago the National Association of Manufacturers, whose members represented all lines of manufacturing in this country, began to take notice of the great number of men who were crippled through accidents. A committee was appointed to study the subject and a sub-committee was sent to Europe to learn industrial conditions there. They were to investigate particularly the accident situation and how they handled compensation for lost time due to injuries while engaged in the ordinary trades. Upon their return, this committee made an exhaustive report to the next convention. From this beginning industrial accidents have been given the attention they deserve. Progress was very slow at first, but gained impetus as this great National Safety Council took up the movement.

The settlement for accidents had become a profitable field of operation with certain types of lawyers. This was expensive to the manufacturer and, because the sympathy of the jury seemed to be with the injured man, frequently very excessive damages were awarded. This might not have been so had were it not for the fact that often from 60 to 80 per cent of the award went to the attorney while the injured man would receive but from 20 to 40 per cent. This was clearly an injustice. A study was made of these conditions and the present compensation laws were the result. This system places specific values on the various parts of the body and injuries thereto are paid without question at an established rate, which both the employee and the employer know in advance.

At first it was thought that unguarded danger points on machines were the cause of accidents and study of guards occupied the attention of both machine makers and users. This resulted in much safer machines and undoubtedly has prevented many accidents. Still an alarming number, many of them fatal, continued.

The U. S. Steel Corporation made an extensive study of their accidents. They were surprised and shocked to find that after spending hundreds of thousands of dollars to thoroughly guard all machines and dangerous places about the plants, comparatively little reduction in accidents was noticeable.

It occurred to Mr. Arthur H. Young (a past president of the National Safety Council) then in charge of safety in the *Blount Steel Company's* South Chicago plant, that there must be some other reason. He found that at least 20 to

80 per cent of accidents were due to the human element. Men were thoughtless or careless or had their minds on something entirely foreign to their work. In such a condition anything might happen and it frequently did.

With the then existing attitude toward accident prevention and the feeling that no one should interfere with one's liberty to do as he pleased, it was hard to get men to accept safety regulations. Then, again, if a man did accept the advice of the foreman or superintendent to work more safely, he was talked about as being a "sissy" or that he was trying to "stand in with the boss."

With all these and many other things, progress in education of the men was very slow. However, due to the intelligent persistence of the pioneer leaders in safety, a new and favorable attitude of the men (and management as well) was developed with the result that great progress has been made.

For some time the number of accidents decreased each year due to the continued attention being given them. Late reports to the woodworking section of the National Safety Council indicate an apparent increase.

On the face of it, this looks bad and challenges our best thought and efforts to reduce this accident rate. These same reports show a reduction in severity and it is probable that accident records are more accurately kept and we are now counting all accidents, whereas before we only heard of the more serious ones.

Grand Rapids Factories Vitrally Interested

Safety is practiced in the manufacture of furniture in various ways, according to the different views of the management or of the safety director of the plant. Some furniture factories have very thorough and efficient safety measures and some have almost none at all.

Nearly all of the factories in Grand Rapids and elsewhere are vitally interested in accident prevention. Most of them have some one—usually a foreman or a man in some position of more or less responsibility—who leads the safety work, which includes machine hazards, piling and moving stock, sanitary conditions, including toilets, drinking water and even heating and ventilation of the building. This man is charged with the safety of the employees from the time they enter the premises until they leave. All of them know him and are usually glad to tell him of any unsafe or unsanitary condition that comes to their notice.

Unsafe practices are as bad as unsafe conditions, and scuffling, wrestling, throwing objects at others while at work are reported and stopped. This is not done in a fault finding way but in a spirit of helpfulness for the general good.

Generally the safety man is the first aid man of the plant. There is a first aid kit in his office or if he has no office it is kept near his bench and all accidents, regardless of whether serious or trivial, are brought here. Minor cuts, abrasions, etc., may be cared for at the plant but those that are more severe are sent directly to the surgeon.

Many of these safety men in the Grand Rapids plants are graduates of the Red Cross first aid courses fostered by the Industrial Division of the Grand Rapids Safety Council. It may be interesting to you to know that two such classes of 25 each (they are limited to this number) have been held and 47 members received Red Cross certificates in first aid. We find that our women employees take a great interest in first aid also and three graduated in the class last spring.

In the larger and more highly organized factories, accident prevention is usually in the hands of a committee—generally of 3 or 5 members. The personnel of this committee changes regularly. The man who has served the term of his appointment retires and a new member is appointed. In this way there are always at least two men who are familiar with the work and an opportunity is given every man in the plant to at some time become a member of the committee.

The duty of this committee is to make a thorough and impartial inspection of the

plant periodically to find the danger points and suggest remedies. The committee also forms a point of contact between the men and the management. The workmen feel free to discuss dangerous conditions, which come to their attention, with the committee while they might hesitate to do so with the superintendent or manager. Another thing, where these inspections take place at regular intervals, men are on the lookout for points to suggest to the committee. Careless practices are often a greater menace to the employee than improperly guarded machinery and suggestions of this type are recommended.

While prevention of fire may not be considered by some as a function of the accident prevention committee, when you take into consideration the great number of lives lost in fires, the wages lost by employees following a bad fire, also the loss to the company, which may have an effect on employment, suggestions regarding fire prevention are always welcomed by the committee.

The Fire Hazard Has Become More Serious

Now that lacquer or nitro-cellulose finish is so generally used the fire hazard becomes more and more important. The slightest spark may set off an explosion that would injure several men and cause a fire that might consume the plant.

In nearly every finishing room the spray booth floor or the table on which the furniture is sprayed is cleaned with a scraper—usually an old putty knife. This being steel, when it comes in contact with a nail or other metal on the floor or table may produce a spark. This has frequently started serious fires. A brass scraper will not cause a spark and is safe to use.

Broken electric light extension cords are a menace that should be looked for by the safety committees.

A serious fire occurred in a Grand Rapids factory by an operator dropping an electric lamp attached to an extension cord while the floor was being cleaned with naphtha. The breaking of the lamp ignited the naphtha fumes and before the fire department arrived considerable damage was done in addition to the damage by water in extinguishing the flames.

The work of the safety committee is carried on during working hours and its members receive their regular pay. The committee receives reports of all accidents and investigates them, usually making a report to the management. If a change in equipment or operation seems advisable, such recommendation is included in the report. It has frequently been noted how eminently fair and considerate these committees are of both the interests of the employee and the company.

Doubtless every industry feels it has the best method of taking care of its injured men, but I really believe that injuries are treated a little better in the furniture industry in Grand Rapids than anywhere else.

When the Workmen's Compensation Act went into effect in Michigan the furniture manufacturers of Grand Rapids, after careful consideration of the matter, decided to carry their own insurance and organized the Furniture Mutual Insurance Company.

There were no precedents to guide the organizers in this new undertaking, but, with the exceptionally good business and executive judgment of the committee on organization, the company has successfully operated by giving a maximum of service at a minimum of expense and is one of the important factors in accident prevention in the furniture industries of Grand Rapids.

First of all the founders of the insurance company felt that it was most important to engage the very best surgeon possible. Instead of contracting for his time, the company pays the established fee for the service rendered thereby encouraging the best possible attention to the patient.

The surgeon for this kind of work must be a man who combines several very important characteristics. First of all, he must be a good surgeon. He must be

thorough in his work, sympathetic in his treatment of the patient, resourceful to do new things, patient, yet firm with the injured, and, indeed, must possess a rare combination of good qualities. Our surgeon combines more of these qualities than seems possible to find in any one man. His patients like him and nearly all do well under his care.

The office or operating room is located in the heart of the city, as convenient as possible to all factories. Transportation lines from every district come near it. The location of this office was considered from all angles.

The office is equipped with every appliance that will aid in relieving suffering and in the prompt and safe dressing of the wound. The reception room or waiting room is furnished plainly but has a cordial atmosphere that the men like. There is nothing stiff or formal about it.

Few realize the important position held by the industrial surgeon. He represents the company in the eyes of the men who come in contact with him and they often feel toward the company as they do toward the doctor, therefore, the right type of man can do much to engender good feeling.

Another point in accident prevention is the education of the new employee. When a new man is hired he is taken by the foreman to the machine he is to operate, is asked questions and the answers he gives soon demonstrate whether or not he has had experience with this machine. The foreman explains to him in detail the dangerous points, warns him to use care and usually impresses on him the fact that safety must be considered even beyond speed or production. In other words, in case of doubt always take the side of safety.

Employees Are Interested in the Safety of Their Fellows

A cooperative spirit in the interest of safety has developed throughout the industry. Usually if an operative sees another doing an unsafe thing, he will call his attention to it and in most cases the new employee will take the suggestion in the spirit in which it is intended. There was a time when one felt that it was the other fellow's business to look out for himself and he felt equally certain that it was nobody's concern how he worked on his machine. But with the general good feeling that has developed in most plants, both of these attitudes have been modified and anything that can be done to prevent the injury of a fellow-employee and to reduce accidents has gained the ascendancy.

For several years past the Grand Rapids Safety Council has conducted what we have chosen to call the Foreman's Safety School. This is attended by one or more of the foremen in nearly every factory in Grand Rapids. Meetings are held once a week beginning promptly at 7:30 and closing as promptly at 9:30 p. m.

A definite program is outlined and prominent speakers address the meetings on particular topics. After about a twenty-minute talk the meeting is turned into a round table meeting and questions are asked the speakers. Much good has resulted from these round table discussions and many excellent safety men have been developed as the result of the safety school.

A record of attendance is kept and those who have been present a certain number of meetings are presented with a diploma at graduation exercises following the course. I am pleased to say that a large number of the Grand Rapids foremen have a diploma from every course that the Safety Council has sponsored since it was organized.

This year the safety school will be on a rather different plan than formerly. It will meet once a month instead of weekly. The first part will be a general meeting then it will divide into sections—woodworking, metal working, building construction, gypsum industries and possibly a chemical section.

How safety is practiced in another furniture manufacturing center is outlined concisely by Mr. H. G. King, secretary-treasurer of the Jamestown Mutual Insurance Company of Jamestown, New York. He says:

"The New York Compensation Law differs materially from the law in the State of Michigan. The sums of money paid injured employees is materially greater; the method of arriving at each employer's rate whereby the employer is penalized for bad losses and credited where losses are few, is of material help in this state through the fact that the penalties are severe enough to command the attention of all employers. This fundamentally assists in accident prevention work and is, I think, one of the greatest factors in promoting accident prevention measures. This so-called experience rating plan not alone gives credit for good experience but allows credit for good factory conditions; these credits running as high in many cases as 25 per cent and 30 per cent of the normal premium.

"In addition to the above, we organized in 1920 the Jamestown Mutual Insurance Company, of which the writer is secretary-treasurer; this company insures all of the woodworking manufacturers in this vicinity as well as practically all other manufacturers. We employ inspectors to regularly check up safety conditions in the various plants, and call attention of the management to unsafe conditions and practices. We make a careful investigation of every accident which involves any possible permanent injury, fix the responsibility for the accident, and recommend to the management any necessary steps to avoid recurrence. This includes specific recommendations on various types of guards which we know to be adequate and serviceable, and we obtain these guards at a material discount from list prices.

Three Phases of the Key to Accident Prevention

"We of course furnish regular bulletin board service with safety posters, and conduct in many plants safety organizations which are composed of employees and our inspector. These organizations are charged with full responsibility for all safety measures; in fact we have a special plan which is operating to very good advantage, but which we believe would be impossible to outline through correspondence in such a way as to be of any benefit to you. We also furnish pay envelopes with safety slogans. Both these and the bulletin board posters, of course, must be supplemented by something far more tangible.

"Our thought in the matter is that the real key to accident prevention work is:

"First—The penalties imposed under the New York law for bad experience.

"Second—The close follow-up of every serious accident.

"Third—Adequate safety organizations with full authority to impose necessary safety measures."

I have asked a number of furniture manufacturers as to their attitude toward accident prevention and it is very gratifying that, without a single exception, they have expressed themselves in favor of it. To the question of whether or not it retards production, at least 98 per cent state that it does not and many of them say it increases rather than decreases production by giving the operator greater confidence in his safety from the knowledge that both the machine and the methods are safe. Nearly all of the factories replying to my questions use the National Safety Council's bulletins and posters.

To my question, "How do the men take to accident prevention?" in nearly every case the reply is, "The men are very much interested in accident prevention and are very highly in favor of it."

An interesting thought was suggested by Mr. Smiley, factory manager of the Globe-Wernicke Company, Cincinnati. He states, "I will not bother you with the description of the routine safety problems, but in the interest of both safety and productive efficiency, we have established a rule which makes it necessary for all of our employees to have their eyes examined at least once a year. The initial examination of our 1,200 employees showed that more than 30 per cent of them had defective vision and were not wearing glasses. Among those who were wearing glasses, we found that about 10 per cent of them were not fitted properly." They have a licensed optometrist to conduct the examinations in their own first aid room.

He further states: "Although it would be difficult to prove it by actual figures, we are confident that this plan of eye examination greatly reduces the risk of accident in our plant and the productive efficiency of our employees has been increased. In adopting this plan it has been our idea that many factory workers who have defective vision do not have the time or the inclination to have their eyes examined in the ordinary way but readily respond when given the privilege at the factory.

I think you will all agree that the matter of correct vision doubtless has a decided bearing on accident prevention, and also on the quality of work the operator will produce.

Mersman Bros. Brandts Company, Celina, Ohio, stress the point that they have been interested in accident prevention since they started in business 26 years ago and that largely from a humanitarian standpoint. They have a foreman's club in the plant composed of the foremen, assistant foremen and heads of departments. In this club they have an accident prevention committee to report and advise regularly on all safety appliances and accident prevention. This committee encourages suggestions from all employees. Mr. Mersman reports that this has been found very satisfactory.

The Continental Furniture Company, of High Point, N. C., say they have been interested in accident prevention since the factory was built about 25 years ago. They have been unusually successful in this respect for during all these years they have had but one serious accident. This was caused by the operator of a grooving saw wearing an old mitten which was caught by the saw and three of his fingers mangled. They are firm believers in the very safest equipment and safeguards. Like many other manufacturers, they feel that the safety movement is common ground on which both the employer and the employee come together and that it instills a little stronger spirit of loyalty throughout the organization.

A Safety Committee Operating for Ten Years

The Estes Manufacturing Company of Owosso, Michigan, has had a safety committee in their plant for at least 10 years. This committee consists of three men selected by the superintendent, one new member being added every six months and the oldest member in point of service being retired. This committee makes a survey of the plant every month and reports its findings in writing to the superintendent. Every recommendation is promptly acted upon and it has been the means of reducing accidents to a minimum. Out of 26 accidents reported during 1926 but one was compensable. Only \$21 was paid in compensation. Their greatest difficulty is to get the employees to report minor accidents, such as slivers, scratches, etc. The one accident on which compensation was paid was due to a sliver in the finger which was neglected.

The danger of infection from neglected slivers and scratches cannot be overstated. I recall an experience along this line where an employee scratched his finger on a Friday afternoon and feeling it was unnecessary to pay any attention to a slight scratch like this, he did not even report it to the foreman. He did not return to work on Saturday, but as this happened in the slack time nothing was thought of it. On Monday a telephone message from his home stated that he did not feel well and would not be able to work that day but expected to return within a day or so. On Wednesday we learned that he had a bad case of infection and a doctor was immediately sent, but by this time it was too late and on Friday—one week after the slight accident which was too trivial to pay attention to—his death occurred. The doctor advised us that had he been called earlier the man would not have died. The simplest first aid, such as iodine, put on the scratch at once would have saved his life.

A detailed account of the case was placed on every bulletin board in the factory and for many months afterward no scratch or sliver or accident, regardless of how trivial it might seem, was neglected.

It is too bad that it sometimes requires the sacrifice of human life to impress on us the necessity for care, but the death of this man impressed the necessity of medical care on a great many of the woodworking employees in Grand Rapids.

The Kittinger Furniture Company, Buffalo, N. Y., states that their management is highly in favor of accident prevention and gives it full interest and support at all times. They found it difficult to enlist the interest of the men until they adopted a new plan a little over a year ago which has since made their employees enthusiastic over accident prevention. The State of New York gives credit for good conditions and penalizes bad conditions. After thorough investigation the company decided to adopt the plan of self-insurance as outlined by the workmen's compensation law of New York State combining it in a way with their mutual benefit association so that their members would receive greatly increased benefits at no additional expense. The company agreed to stand half the expense of operating the mutual benefit association which pays benefits for all classes of non-occupational sickness and accidents. It is further agreed that on December 15 of each year, all the money saved by the self-insurance and the surplus in the mutual benefit association treasury would be divided equally between the employees and the company. This gave all a financial incentive to become interested in safety and soon the careful workmen were using their influence over the careless ones with gratifying results. For the past year the employees' share of the surplus was greater than the amount they paid for insurance.

A Combined Safety and Sick Benefit Committee

They have a combined safety and sick benefit committee, composed of the foreman and a representative, for each 20 workers in each department. This committee meets monthly to discuss safety, the accidents that have happened since the last meeting, and matters pertaining to the sick benefit association.

They also have general safety meetings with an outside speaker several times each year in order to keep safety before the entire plant. On a large black board, at the employees' entrance, are listed the names of each foreman, the number of days since the last lost-time accident and the number of lost-time accidents since July 1, 1926.

Up to August 17 last they had had but five lost-time accidents in the entire plant. One department had gone 648 days—over two years—without an accident.

Since July 1, 1926, when they adopted the new self-insurance plan there has been a reduction of 30 per cent in compensation insurance expense and 60 per cent reduction in accidents. This is a record that any factory may well be proud of.

I would like to quote many more of the experiences of our good friends who have so kindly and so willingly given them for our mutual benefit but time prevents that interesting pleasure.

I think enough has been developed to show that safety is practiced in a rather intelligent way and with a reasonable degree of uniformity in the furniture manufacturing branch of the great wood-working industry.

It gives me special pleasure to acknowledge the help given me by the many who have aided in the preparation of this paper, by so fully and generously telling of their methods and experiences in this great work.

MR. PRICHETT: I want to digress for a moment. Speaking of the courage to do the unusual thing reminds me of a case that was told by Miss Mill of our Furniture Mutual Insurance office the other day. It seems a man cut one of the tendons on a finger and he was sent to the surgeon and the wound healed, but after awhile the finger commenced to draw around and he couldn't use it very well. This fellow thought more of his compensation than he did of his finger, which is rather unusual, and he wanted the finger taken off at the second joint because if it was taken off at that joint he would get more than if it was taken off at the first

joint, and if he lost his finger he would get still more compensation. And so we sent him to Dr. Denham, and the doctor said he couldn't see any reason why the finger should come off. He thought he could fix it, so he cut in and found both ends of the tendons, drew them together and the last reports were that this fellow is going to be disappointed and not have his finger taken off.

We had another case in our own factory—a man on the rip saw was hit on the end of his thumb and we sent him to the surgeon's office. They X-rayed the finger and found that the bone was split and the thumb had been pushed back into it. Our doctor opened it up, took out a few slivers and bound the wound up again.

This doctor believes in getting men back to work as soon as possible, which is a very commendable thing, both from the man's standpoint and the standpoint of the factory. Three weeks after the fellow was hurt he was back working, and in six weeks he was working as well as ever, and the joint was in good order. Now, a year after that, this fellow doesn't know that there was an accident, except as a matter of recollection.

CHAIRMAN GRIER: We will now have the next paper by Mr. S. Horace Disston, vice-president, Henry Disston & Sons, Inc., Philadelphia, Pa.

The Development of the Circular Saw and Its Relation to Safety.

S. Horace Disston, Vice-President, Henry Disston & Sons, Inc., Philadelphia, Pa.

Modern industrial development, with its demand for greater and still greater production is entirely responsible for the fact that this is a safety problem in connection with the use of saws.

The saw is one of the earliest of tools. Saws have been in use from the beginning of history. But the man of the Stone Age, with his flint saw, working all day to cut through a two-inch tree-branch, had no safety problems. It is in modern times, when saw users are demanding cuts of 200,000, 300,000 and 400,000 feet or more of lumber in a single day that we have any safety problems in connection with the use of saws.

It is fascinating to trace the history of saws. The earliest saws were small flakes of flint, notched by chipping. These saws were rarely more than three inches long. They were used chiefly for making ornaments of bone and soft stone. Saws made of bronze supplanted those of stone. Specimens of these prehistoric bronze saws are rare. Not more than thirty have been found in all Europe.

In Sweden was found a stone mould for casting bronze saws. In this mould, four saws were cast at one time.

The Egyptians used bronze saws with jeweled teeth for cutting the hardest stone. These early Egyptian saws had teeth inclined toward the handle to cut on the "pull" stroke as do the saws of the Orient today. The Japanese sawyer of today cuts by pulling his saw, not by pushing as we do.

Although, as the facts I have just mentioned show, the saw is one of the oldest and simplest of tools, it did not attain any great importance until the last two or three centuries. Stone saws had no real value and those of bronze were little better. Then, too, bronze adapted itself so readily to edged tool construction that the saw was practically supplanted for a time. In many of the later savage races, the trunks of trees were split with wedges into as many thin pieces as possible and the lumber so formed was hewn on both sides to desired size.



Figure 1. Types of very ancient saws.

Iron was necessary for the construction of a useful saw, and the real beginning of saw development came with the invention of steel. The exact date of the first use of steel is not known. In 850 B. C., there were "bright iron" and "black iron." A Greek wrote in 50 B. C. that his enemies were "armed with weapons of excellent temper."

Since I have been asked to talk about circular saws I am going to pass over years and years of hand tool development and speak only of power saws—that is, of circular power saws.

The development of modern power saws dates from the introduction of the power saw mill. The first of these was of the reciprocating "up-and-down" type. Crude as were these old fashioned "up-and-down" mills, they were a great improvement over the previous method of sawing a log with

one man in a pit beneath it, and another standing above, using the old-time pit saw.

The earliest mills were driven by wind power, but a thirteenth century manuscript shows a water-wheel saw. Germany had water-power mills as early as 1322. Holland had saw-mills nearly a century before England. Development in England was retarded by the hand-sawyers, who felt that the introduction of power equipment would put them out of work and when, in 1663, a Hollander erected the first sawmill in England, it was abandoned because of a series of riots by hand-sawyers.



Figure 2. Some of the teeth in ancient saws.

More than a century later another mill was erected by a lumber merchant. Again the hand-sawyers resented the introduction of power saws and this second mill was destroyed by a mob. America's first sawmill was built at the Falls of Piscataqua, on the line between Maine and New Hampshire, in 1634.

Before the arrival of William Penn, in 1681, sawmills had been erected along the Delaware River by the Dutch and Swedes. In 1803 there was built, in New Orleans, a steam-driven sawmill. This mill met the fate of the early English mills—it was torn to pieces by a mob of hand-sawyers.

These sawmills were all of the vertical reciprocating—"the up-and-down" type. The saws were in a strong rectangular frame which was driven along guides by a crank on a revolving shaft. A sliding carriage, which was made to move forward a short distance for each stroke of the saw, carried the log.

At this time, the care of the saw and saw-sharpening was a secret process. The saw sharpener or, as we now call him, the saw filer worked in a locked room and anyone wishing to speak with him was required to ring a bell and wait for admittance until the filer could conceal all evidence of his methods of working.

The next important step in sawing came with the development of the circular saw. It is said that the first patent on circular saws is patent No. 1152, granted to Samuel Miller of England, in 1777. In any event, circular

saws for practical wood-cutting purposes were first used in England about 1790.

The first circular saw in this country is said to have been produced by a country blacksmith—Benjamin Cummings—at Bentonville, New York, about 1814. Two Maine Yankees patented a sawmill in 1820 which produced as much as 1,200 feet of lumber a day—a great output for those times. The saws used on these early mills were crude round sheets of metal with roughly punched out teeth, hammered flat on an anvil.

As saws were developed the requirements were for thinner blades and faster

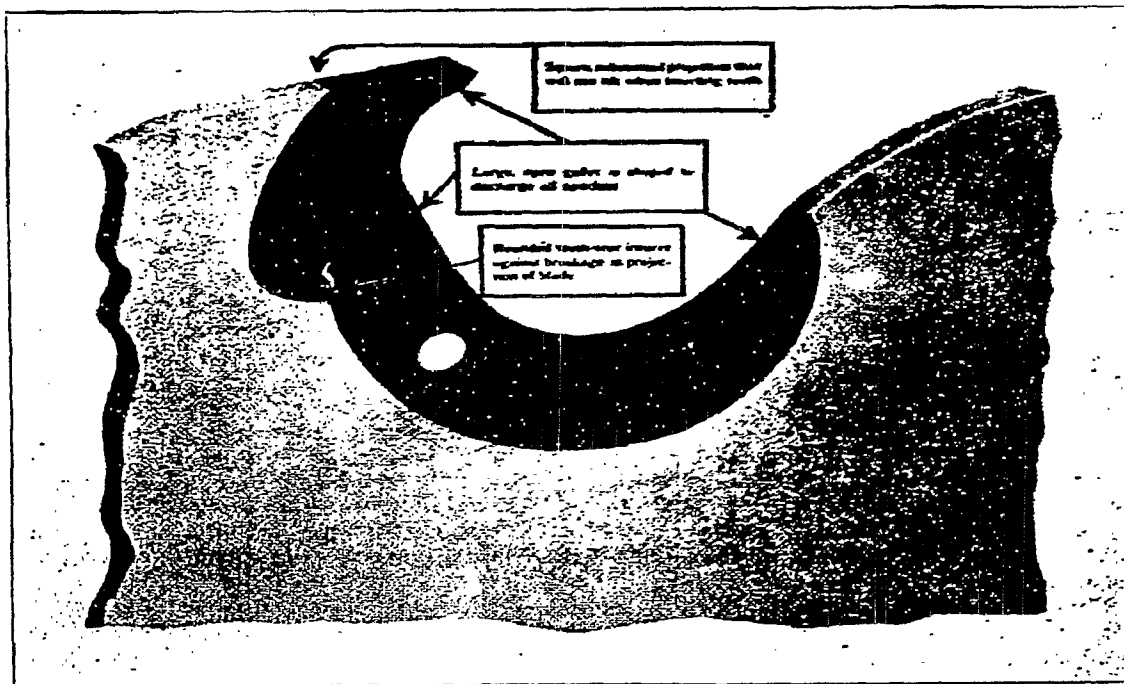


Figure 3. Method of inserting the tooth.

speeds. To meet these requirements, came the invention of the gullet tooth saw—a saw having round gullets, and providing larger sawdust chambers. Along with this came the development of improved designs of saw-teeth for special work. The old "V" tooth gave way to many new shapes for particular uses. Next came the inserted-tooth saw, also known as the chisel-tooth saw, which provided a way to replace the teeth when worn, without reducing the diameter of the saw.

The difficulty with the early, inserted teeth was that there was no really satisfactory way of holding the teeth in place. However, this difficulty was overcome and progress in this field has been rapid.

The illustration shows the most recent development in this type of saw. It is known as a "log" saw and is used to manufacture or rip lumber from logs.

Circular saws of the inserted tooth pattern also have been developed for the cutting off of logs. We have made saws of this type as large as 110 inches in diameter for use on the Pacific Coast. These are the largest circular saws ever made.

With the old-time, thick saws, running at low speeds, one did not require the factor of safety needed in modern saws. But consider the 110-inch saws, I just spoke of. They weigh 675 pounds each and are made to operate at a rim speed of 130 miles an hour. Here we have a definite problem in safety.

The appearance of saws has not changed greatly since saws were first known. Therefore, it is difficult for those not familiar with saw-making to realize how great has been the development in steel and in the methods of treating steel to produce saws which are withstanding the strain to which they are put in modern sawing.

There are eight important points that a saw maker considers when he supplies a circular saw. Most of these points have a direct relation to safety. Users can secure saws that will do better work and do it with greater safety if they, too, will consider these points when they specify a saw for their work.

The first point is—what type of saw is wanted? This refers, of course, to the work being done—ripping, cross-cutting, mitering, special smooth-cutting, etc. Many types of circular saws are made today to do special kinds of work.

Determine Just What the Saw Is to Do

Do not think because someone else, doing a different kind of cutting, is getting a better production than you are, you should use the type he uses. His saw might not be suited to your work. Be sure of your ground or allow the manufacturer to decide.

Second, what diameter of saw is wanted? There is an old rule governing the size of a circular saw which says "a saw should be just large enough to clear the center, or collar, and still cut through the stock." It is neither efficient nor safe to set a circular saw so that the teeth project too far above the stock being cut. Occasionally, mistakes are made in measuring the diameter of a saw. Diameter should be measured from toothpoint to toothpoint through the center.

Third, what size of mandrel hole is desired? This is, apparently, an unimportant specification. But, when given incorrectly, it causes trouble. What happens when a saw is furnished to specifications but still does not fit the mandrel? Sometimes, I am sorry to say, it comes back to the manufacturer with a claim that he should have known better anyway. Sometimes the saw is put on the machine and, by means of bushings or other makeshifts, is fitted to the mandrel. Then you have a safety problem. The saw wobbles, the rim of the saw is forced out of line by pressure at the center—and trouble is almost sure to develop, particularly where saws are operated at high speeds. Unless the saws fit snugly on the mandrel there will be vibration at high speeds which makes accurate cutting and safe cutting difficult.

Fourth, what style of teeth are wanted in the saw? As mentioned before, there are many styles of circular saw teeth because circular saws are used for hundreds of different purposes. No general comments of any value can be made here on this point. Be sure the type of tooth you select is the right type for your particular work. Do not attempt to make one saw do three saws' work. For example, a rip saw cannot safely nor efficiently be used for cross-cutting. It is not made to cross-cut and may break if used for this purpose.

Fifth, how many teeth are wanted in the saw? As a manufacturer, I am

glad to say that the day of "freak" specifications, as far as the number of teeth are concerned, is passing. The general rule governing the number of teeth in a saw is: the greater number of teeth in a saw, the smoother the cut because the more teeth engaged in the work at one time, the more evenly is the cutting strain distributed throughout the saw. On the other hand, the larger the tooth the faster the cut because with large teeth and correspondingly large gullets, the saw will not fill up with saw dust and "choke down."

A table that embodies the experience of saw makers and saw users has

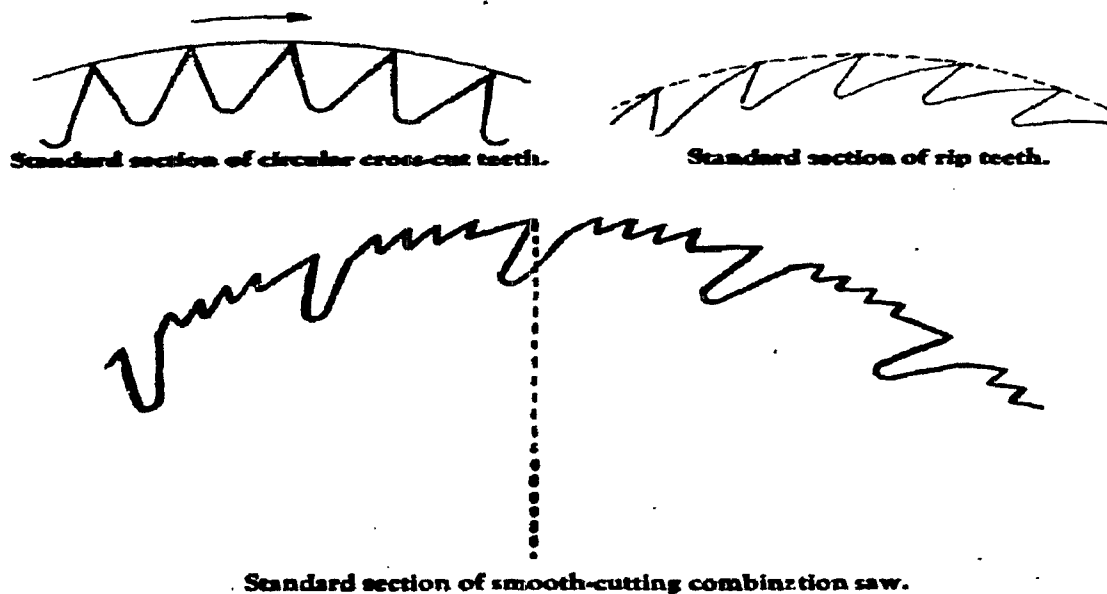


Figure 4. Details of saw construction.

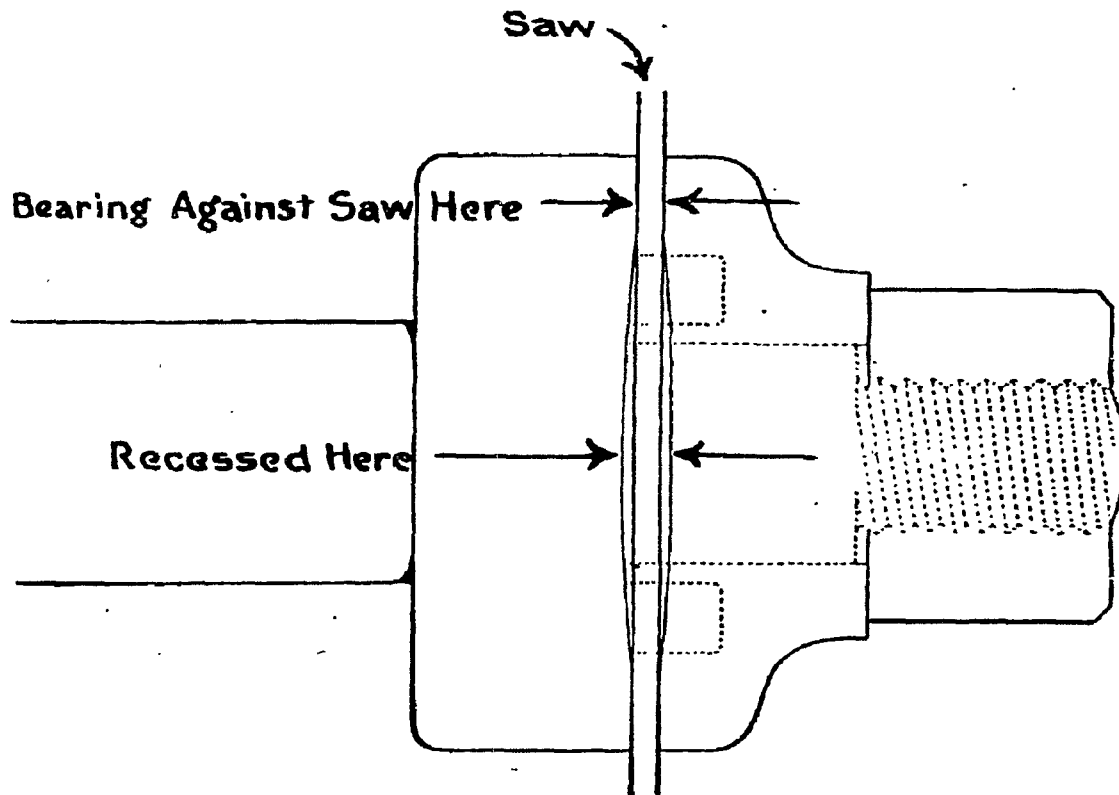
been developed showing the recommended number of teeth for circular saws of various diameters. It is a good, safe rule not to deviate from these recommendations without expert advice.

Sixth, at what speed will the saw be run in the work? It is well to remember that it is universal practice for saw makers to tension saws to run at a rim speed of 10,000 lineal feet a minute. There has been considerable argument about the most profitable operating speed for saws. Even today experienced operators disagree. Speaking generally, and viewing the practice in all parts of the country as shown by the specifications coming to us, we find the tendency over a number of years has been to increase and increase again the speed at which saws are operated. Not long ago, we began to notice a reaction. The tendency was to cut down speed.

Today, it is not unusual to read an article or to hear a talk by an experienced saw user advocating less speed, not only for greater safety but for greater profit in manufacturing. Definite recommendation has been made governing the speed of circular saws in the National Safety Code for Woodworking Plants, and these recommendations have been adopted in a number

of states. Unless otherwise ordered, saw makers put into saws the proper amount of tension for this speed and there is danger in operating circular saws in excess of this speed.

For example, a manufacturer who was using our saws on his machines complained to us that the saws cracked. Upon investigation it was found that the saws were being run at a much higher rate of speed than was specified. This caused the cracking.



Proper Arrangement of Collars

Figure 5. Details of proper collar arrangement.

Seventh, what kind of wood will be cut? This information will put the manufacturer in position to cooperate with saw users in checking up on the saw, the teeth, the speed, and the other specifications.

Eighth, what is the horsepower that will drive the saw? Particularly in big saws, saws are often specified with a size and style of tooth that cannot be used with a driving force of limited horsepower. There is danger in attempting to use a saw that cannot be properly driven by the engine. This, then, is the first step to insure the safe use of saws—to be sure that the type of saw used is suited to the work to be done.

There are several things that may be watched after the saw is received and

put in use that will decrease the liability of accidents and, at the same time, insure better production from the saw. Briefly, these are some of the points that come up frequently in the use of circular saws, particularly small circular saws. I know that the great majority of you who use circular saws use the small saws and therefore, I will talk particularly about small saws.

First—Circular saws that have been carefully set and filed are often damaged, even before they are used, by pushing them against the slot in the table when turning the mandrel in cutting position. Before turning on the power, saws should be revolved by hand to make sure they clear the slot in the table and are running freely.

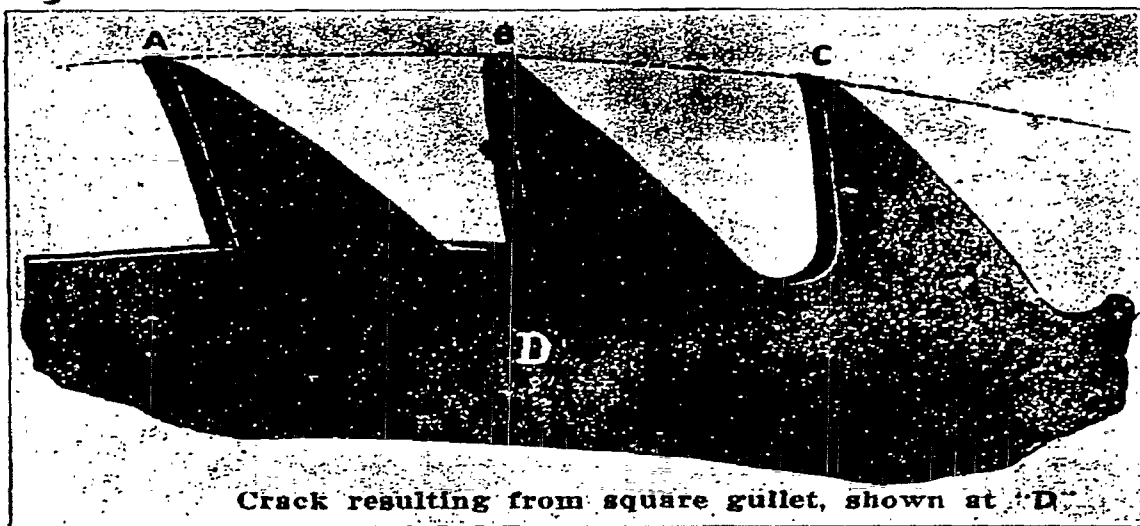


Figure 6. Typical crack in this type of saw.

Second—If the material to be cut has been used before, examine it carefully for nails or other metal.

Third—There is only one correct position for the operator of a circular saw. That is to stand to the side of the board to be cut. It is important for efficiency in the work and for safety that the operator does not stand directly back of the work.

Fourth—Use a "push stick" when feeding small pieces through a saw.

Fifth—Bring the saw to a full stop before the angle of the table, the depth of the saw, or other such adjustments, are made.

Sixth—If the saw "whistles" or "sings" when it is up to full speed, this indicates that something needs attention. Some of the first places to look for trouble are:

- a. Is the locking nut on the mandrel loose, permitting the saw to wobble?
- b. Are the mandrel journals smooth and running freely?
- c. Is the saw properly tensioned and are you running it at the speed for which it is tensioned?
- d. Are the teeth properly beveled? The teeth of saws for cross-cutting

should be beveled on both the face and the back—one tooth being beveled to the right, the next to the left, and so on, with the high corner on the outside. Teeth of saws for ripping are filed "straight through" or square across on the face with a slight bevel on the back. The bevel should never extend into the gullets. A saw for cutting hardwood is usually operated with less bevel than a saw for cutting softwood.

Seventh—When the saw "jams" in the work, do not attempt to force the work through. Withdraw the material and go again through the cut. If the saw till binds, stop it and find the cause. A saw suited to the work being done and in good condition will not bind. Examine the saw that binds to see that the teeth have sufficient set and that they are sharp; see that the saw is running in a true line; look for burned (or blue) spots on the side of the saw—such spots indicate that the tension has been destroyed and the saw is running out of line.

Many Causes of the Saw Heating

Eighth—Take particular care to see that the collars which support the saw are true and that only the narrow flat face at the edge of the collar comes in contact with the saw when clamped in position. When the inside of the collar is not machined out properly there is a bearing against the saw, inside of the collar line, which forces the rim of the saw out of line. The result is a buckling effect on the saw, causing heat both on the rim and near the collar line, and, in some cases, causing breakage.

Ninth—Do not run a saw that gets hot in the work. Heat in a saw indicates trouble.

The most frequent causes of heating at the rim are:

- a. Running saw when dull.
- b. Teeth with insufficient set or swage for clearance.
- c. Teeth with insufficient gullet space.
- d. Teeth with too little clearance on the back.
- e. Gum or resin sticking to the sides of the saw at teeth.
- f. Running saw when dished or not level on the face.
- g. Improper tension; i. e., too little tension so the saw is too stiff in the body.

The most frequent causes of heating at the center are:

- a. Improper tension; i. e., too much tension so that the saw is too loose in the body.
- b. Speed insufficient to take up the tension in the saw.
- c. Heating of journal next to the saw.
- d. Saw having too much "lead" in or out of work.

Tenth—It is dangerous practice to use saws after cracks have appeared. At least 60 per cent of the cracks in saws are caused by failure to retain the curved shape of the gullets between the teeth.

Being a saw maker, I have talked only of saws. I shall not attempt a discussion of the many factors such as guards, stops, etc., that also have to do with safety in the use of saws.

It has been our belief that in the operation of saws, as in the operation of other machinery, "the best safety device is a careful man." If the man operating the machine is a careful worker, the machine is apt to be a safe machine. In our company, for eleven years, we have been organized to teach the men who work with us to be careful. We have, of course, guards and safety

devices where we can place them. But a great part of our work has been done through education.

Our organization consists of a safety engineer, workmen's safety committees, a general safety committee and a medical department. Each workmen's safety committee spends one afternoon a month with the safety engineer making an inspection of its division of the plant. The safety engineer makes daily trips of inspection, investigates every accident and reports on ways to prevent a repetition. The general committee reviews all recommendations and suggestions and provides means for carrying out those adopted.

Our work has been successful and has paid us worthwhile returns in money and in happiness as you will see from the figures in the accompanying table, which show the reduction in the number of time-losing accidents in our plant each year from 1916 to date.

Number of Time-Losing Accidents Per 1,000,000 Hours Worked

1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926
38.2	18.0	12.6	10.3	8.75	7.7	9.7	9.7	10.3	9.78	5.93

CHAIRMAN GRIER: Gentlemen, I think we all enjoyed Mr. Disston's paper, it is something that much has been said about and probably much more will be said about.

I am told this is the largest meeting the Woodworking Section has ever had; and being my first to preside at, it is very gratifying to me. Let us keep up the good work.

This period of the meeting is given over to the discussion of the papers that were presented this morning. I would like to hear from any one who has any questions he would like to have answered by the speakers at this time.

R. JONES (Surtz Manufacturing Company, Chicago, Ill.): In your discussion of the solid feed roller on the planer to prevent kickbacks—do you know of any method of preventing that.

CHAIRMAN GRIER: Yes, there are guards on the market that will prevent that. There is a sectional guard that consists of a series of dogs that hook on to the frame of the machine ahead of the infeed roll, the material passes under it, this raises the dogs, if there is a kickback the dog drives the material against the table of the planer.

MR. JONES: That was the point I wanted to bring up. There may be some members who are not familiar with articles of that kind and may be under the impression that there is no very adequate way of taking care of it.

Also on the question of getting men to wear goggles when they come up to do any intermittent grinding on a wheel, from my experience it is hard to get them to put their goggles on, and there has been a very efficient machine goggle developed to take away the big end of that careless hazard that you have.

CHAIRMAN GRIER: That is a good point, Mr. Jones. That is what we want to bring out.

MR. JONES: If the members will come down to the exhibit hall I will be glad to explain in detail and show them the models of the actual stuff that will prevent that kind of accident.

CHAIRMAN GRIER: I have a couple of cards that were turned in: "Why as a rule are woodworkers so hard-boiled as to ability to operate machines without guards?"

That is a pretty hard question to answer. I would say that none of the fellows are so hard-boiled but what they can be shown if the proper procedure is gone through.

I might tell you how we handled one fellow who was so "hard-boiled" that he would not use a guard on a shaper. We had two wood mills, one an upper car mill, and one a lower architectural mill; the upper employing 50 men, the lower 150 men. We became very slack in the upper car mill and we had to either transfer our men to the lower architectural mill or lay them off. I wanted to get this one particular fellow and I told him that we had to let him go or transfer him to the lower sash mill. He said, "It is hard times and I cannot get a job, so I'll go to the sash mill."

He went down, and we put him on the shaper. The foreman of the architectural mill will not permit his shapers to be operated without the guard, and this man would not use the guard. The foreman said, "All right, we don't want you; you can go home or use the guard." He went home and stayed there for a couple of days and then came back and asked me if I had a job. I said, "I have a job in the sash mill. When you want to go back there and use the guard you can have it." He said, "No," and went away, but he came back the next morning and asked if the job was still open, and I told him it was, under the same conditions; so he came back and went to the architectural mill. Eventually we got busy in the upper car mill and now he will not operate a shaper without the guard.

That is probably the procedure you will have to go through with some of these so-called "hard-boiled" men, but you will find that they are not all hard-boiled after you get close contact with them.

Employees Approve of Good Safety Work

M. B. GATHMAN (Fisher Body Corporation, Detroit, Mich.): There are two things I think that cause it. In the first place the safety end has not always been an active consideration, it is only in the last few years that the manufacturers are taking a real active interest in this and in putting over these safety programs in the last few years, I think the rules have all been arbitrary. Somebody gets up an idea and it is worked in as an afterthought, and then it is forced upon the man in the plant to use it. Then, as a rule, he doesn't take kindly to it because it isn't adequate.

I find, in developing safety features, that where you get something that is really good, and where the men have been educated to safety, all of them get right behind it and use it and are for it.

R. C. BARR (Lumbermen's Mutual Casualty Co., Chicago, Ill.): I think one of the best arguments I have had in my work is to convince the old time wood worker that the object in the use of guards is that he is not the same man one day that he is another day, that he is liable to have his off days when he is not feeling so good, he is not so thoughtful, he may have had a few words with his wife in the morning, and that may have been on his mind and not his work. I have found it very beneficial in my work, to be able to convince these men that the guard is there to take care of them on days when they may be bilious or have other physically impairment.

While I am on my feet I would like to speak a word about wood slivers. I just finished an analysis of 865 accidents in lumber yards, 25.6 per cent of the accident causes were wood slivers, and from 25 in one operation to 60 per cent in others, these wood sliver accidents resulted in infection.

I went to see our chief surgeon about them and talked to him about wood slivers. He told me the surgeons liked to remove the slivers themselves because they can tell then whether there is any piece left in or not; but the prompt

first-aid treatment of wood splinters, I think, is recommended by every one; and in every case, with the exception of one in the 25.6 per cent of the 865 accidents the men waited four days before reporting wood splinter accidents to the proper authorities.

CHAIRMAN GRIER: In my paper I touched on the importance of keeping an eye on the minor accidents, and this bears out my statement that your minor accidents frequently will develop for you the place at which to direct your safety activity, because that is where your lost time accidents are likely to come on.

B. A. SHROEDER (Hartford Accident and Fidelity Company): I noticed in the slide the picture of a saw guard on which there was neither a splinter nor a kickback guard. We don't ordinarily recommend that type of guard for a rip saw. You generally find them hooked up in position the way they are to be used.

MR. DISSTON: At the moment I cannot recall whether that was a ripping or cross cutting operation.

CHAIRMAN GRIER: I think it is recognized throughout the woodworking industry that the splitter is really the guard on a saw.

MR. DISSTON: On the cracked saw, circular, if the saw is only slightly cracked center punching may help for a time.

HARRY S. NEWTON (Kohler Industries, New York City): In Mr. Prichett's paper he spoke of a self-insured savings, using it for mutual benefit. How do they arrive at a figure for savings for this mutual benefit that the firm has made on the self-insured plan?

Records of the Accidents Are Always Important

MR. PRICHETT: I couldn't tell you a thing about that, but I know that the Kittinger Furniture Company, who operate that plan, will undoubtedly be glad to give you that information.

MR. BARR: I think that one of the most important phases in getting started on accident prevention is to keep a record of the accident. I believe you mentioned that in the beginning of the talk. I have called on a number of risks from Florida to Alaska and I always make it a point to ask the employer if he keeps a record of his accidents. In nine cases out of ten they do not. If you call to their attention specific occurrences of injury to their employees they are surprised when the fact confronts them regarding the number of and the severity of accidents that have been sustained by them.

CHAIRMAN GRIER: The majority of his accidents are probably repetitions of the cause of the first accident.

O. J. OLSEN (Fisher Body Co., Detroit, Mich.): Mr. Chairman, you speak about laying a lot of stress on frequency of accidents in mills. Don't you give severity some consideration?

CHAIRMAN GRIER: Absolutely.

MR. OLSEN: Which do you consider the most important?

CHAIRMAN GRIER: From my own experience I consider reducing the frequency of accidents the most important of our safety activities. I do not mean to overlook entirely the severity of accidents, but if you will follow any statistics on accident prevention work you will find that in 90 per cent of the cases where frequency has been reduced, severity has been reduced in proportion.

MR. OLSEN: While I am on my feet, then, on this that you have either your mills pretty well guarded or you have the men pretty well educated. You say you have guards on your shavers, where are these guards, are they at point of operation?

CHAIRMAN GRIER: We have the transmission of all machinery guarded. That is a first law in our company. We must have our transmission guarded, and

guarded properly. That eliminates the accidents in transmission and other than point of contact. The spring guard which is a circle bolted to the back of the table with an arm carrying the guard, that fits down over the head and the work passes in under this block of wood, and is held down on the work by a spring, and the work is forced against the head, under this, and is held to the table by the spring.

MR. OLSEN: You use detailed shapers—what do you do with the square head top bearing overhead shapers.

CHAIRMAN GRIER: We use there the masher for most of that work, and where we can on the shaper we use this spring guard; where we cannot use it, the best guard is the careful worker.

MR. OLSEN: On this guard that you talk about, the detail shaper guard that serves another purpose, doesn't it, besides a guard?

CHAIRMAN GRIER: It serves the purpose of holding the material solidly on the table as well as keeping a man's hands out of the knives.

An Example of the Hard Boiled Employee

G. A. ORTH (American Car and Foundry Company, New York City): With reference to the "hard-boiled" man in the shop, I would like to cite an incident that occurred many years ago at our Madison Plant. We had in the mill a foreman who was "hard-boiled." When he was asked to put on guards that had been supplied by the company, over saws and gainer heads and various other forms of machines, he would come and tell me: "I have ten fingers on my hands and I don't propose to put any guards on these machines."

He was a valuable foreman and we couldn't dispense with his services. Then the question arose as to how to get around this individual. In order to touch his pride I told him this one day, "Henry, at our B. plant which is the largest of our company, they are not able to develop a guard for a gainer head. I understand that you are a practical man in the mill. I wonder whether or not you are able to devise something that we can get down to Berwick?"

That touched his pride, to think that Berwick had no mechanics to develop a guard and that he would be called into action, and Henry immediately went into his office, and in two days he did develop something, a guard for the gainer head, and we used that. At that time we were publishing a plant paper for all the plants and I had Henry photographed with this guard and of course that was broadcast from there, and from that time forward Henry became a safety first man.

CHAIRMAN GRIER: There are all kinds of methods, gentlemen, that you can employ to win over this so-called, "hard-boiled" operator, and that one was typical.

W. A. WILSON (Frank G. Eares Sash & Door Co., Los Angeles, Cal.): I would like to ask Mr. Olsen, who spoke at the luncheon yesterday, regarding the guard on a shaper. Our difficulty in using guards on shapers in circle-head work is rather extensive. I want to know if either you or Mr. Olsen have guards for shapers that will operate when you are doing circle-head work. I am thinking of the sash work now, where you have circle heads I have found it difficult to get a guard that will operate under those conditions.

E. BRATNY (Pullman Car & Manufacturing Company, Chicago): We have a guard in perfection now, to protect the circle-head work with safety. It will be on the market soon.

MR. WILSON: I am thinking of the circle-head work that is held in a vertical manner, and they feed it in on one side and feed it out from the other.

MR. BRATNY: Ours is for flat work.

MR. WILSON: That is the point.

MR. O. J. OLSEN (Fisher Body Co., Detroit, Mich.): Talking about proper

filling on a detailed shaper we covered it 50 per cent. We don't cover point of operation; we put a casting on top of the spindle, take the nut off and cover the part of the knife that is not in actual contact with the work. In other cases we have just a disk fastened on with a bracket that hangs over the top of the head, but that is only part of it, the point of operation is the important part, that is what we are trying to get at.

MR. JONES: I might say in answer to that, that my company is developing a shaper guard which will be down stairs probably tomorrow—maybe this afternoon—and I would like to have as many men as are interested in shaper guards look it over. In other words I want all the criticism I can get. We have an idea worked through and will have a model at our booth.

MR. OLSEN: May I ask another question? You made a statement that you think



that if we had our table saws—ripping—equipped with the spreader or splitter, that it would answer the purpose. Is there anybody here who can tell us something about kickback on table saws?

MR. JONES: I might answer that if I am not talking too much. There are two points where kickbacks should be placed on the saw guard to be really efficient. The worst kickback, that will cause real injury to an operator, comes from the rear of the saw. In other words the lumber must pass to the rear of the saw. The kickback dog, to give real service, and hold, should be attached to the guard rather than to the splitter so that it automatically remains in the same relationship on various thicknesses of material. In other words if you fasten a kickback dog to a splitter say six inches long to set at the proper angle on one-inch lumber, if you put four-inch lumber in there you are going to have a different angle entirely, and unless it is very sharp you don't get much holding power; if that dog is fastened to the hood of the guard, if the hood is raised automatically the dog should remain in the same relationship, no matter what the thickness of the

slot may be, to give real efficiency and prevent kickbacks. I have found from experience that on ripping short stock lumber it will have a tendency to creep back, as a rule, not with very much force. We have just developed also a very efficient kickback for the front of the guard as well as the rear.

CHAIRMAN GRIER: I think, Mr. Olsen, that a splitter of the proper kind, proper stiffness, located in the proper location to the saw, will prevent kickbacks in the majority of the cases. The great fault is that the splitter is too far away from the saw and not in proper adjustment most of the time. A different size saw is put on with the splitter attached to the table rigidly and we have a gap between the back teeth of the saw and the splitter.

R. G. BUCHANAN (Edward Hine Lumber Company, Lumberton, Miss.): Where a foreman in one plant is not in sympathy with the rules used in another plant, do you force them on him?

CHAIRMAN GRIER: That depends on how far you want to carry on. You have got first to use diplomacy and tact. If that fails, get rid of the man or tell him that he has got to do it.

Each Case Must Be Handled Individually

MR. BUCHANAN: But you do not force the same tactics in various plants?

CHAIRMAN GRIER: You may be able to get something better from the man who is not adopting your policy; if not, see that the policy is put into effect in his mill and see that he works with it. No man is so valuable that he can ignore safety and stay in the employment of any company—he can be replaced and replaced with profit.

MR. BUCHANAN: Here is what I am trying to get at: does anyone try to make one rule apply in all cases?

CHAIRMAN GRIER: We do not.

MR. OLSEN: We have a number of plants scattered all over the country and we do not use this word rule too strongly. We have made up a lot of suggestions for the safe operation in the mills, and we send these from the central office to all our mills.

You will have to decide yourselves when the psychological time comes for these removals.

You also have to take into consideration: are you a salesman? Are you selling it right?

In matters of discipline, changing is the last resort. You can hand the honey out with this hand here, but have the "big stick" down alongside of you.

As far as we are concerned in our mills we can apply the same suggestions in all of them.

Take, for instance, a cracked saw: the code says you shall or you should (use your discretion between should and shall) not use a cracked saw. One fellow says it is all right if you center punch it one side; the other says on both sides; and a third says drill it. We have plainly outlined in our suggestions when we would use a cracked saw; we don't like to use them, but there are occasions on certain kinds of work where we do use a cracked saw and we limit the length of the crack and how it shall be taken care of before we use the saw. We don't say "Don't!" We try to outline in detail the nature of the operation, and that comes through our mills.

MR. ORTH: I would suggest to Mr. Buchanan instead of the use of the word "obey" safety, use "observe" safety—I am like the man in the marriage ceremony—eliminate the word "obey" and he "will marry Mary."

CHAIRMAN GRIER: Gentlemen, we have a moving picture of the logging industry,

Woodworking and Lumber Manufacturing Section 1007

provided by the Edward Hines Lumber Company of Lumberton, Mississippi. We will put that on at this time.

(Screening of "Logging and Lumbering Operations in Mississippi," was shown by the Edward Hines Lumber Company, Lumberton, Mississippi)

ADJOURNMENT

INDEX

Volume II

- Accident Costs: "Accident analyses, records and costs (Record) 317-324.
"Cost of an Accident" (Smith) 290-294.
"Discussion on charging accident costs to departments" 309.
In "Selling safety to foremen" (Walker) 340.
In "Ways and means of impressing executives and operating and designing engineers" (Smith) 532-533.
- Accident Statistics: "Accident analyses, record and costs (Record) 317-324.
Coal Mines. In "Accident prevention in its broader phases" (McAuliffe) 232-233; 237; 240.
Coke plants. In "Coke plant accidents and their elimination" (Wardley) 144.
Discussion on compilation of maritime statistics, 13-14.
Discussion on mining statistics, 195-200.
In "Record of progress in the metal industries" (Chaney) 117-121.
"Marine Statistics and their relation to seamen's compensation" (Evans) 9-13.
Mining. In "Foremanship training conferences and their bearing on accident prevention" (Mosier) 216-217.
Mining. In "Keeping everlastingly at it" (Gandy) 210-211.
Mining. In "Statistics and their bearing on accident prevention" (Hensel) 193.
Paper Industry. 238-239.
Paper Industry. In "Accident analyses, records and costs" (Record) 319-321.
Paper Industry. In "Practical experience in accident prevention" (Lundrigan) 348.
Railroads. In "Report of Committee on Train Service Accidents" 744-752.
Railroads. In "Statistical work as it relates to safety on steam railroads" (Lorenz) 790-793.
Rubber Industry, 685.
Sawmills. In "Preventing accidents in sawmills" (Wallace) 964.
Sectional Statistics, 699.
"Statistics and their bearing on accident prevention" (Hensel) 191-193.
Steel Industry. In "Safety in American Industry" (Hook) 111.
Woodworking. In "Accident experience of the industry" (Farra) 949-951.
- Accident Records: "Accident analyses, records and costs" (Record) 317-324.
Discussion on mine records, 274-275; 278.
- Accident Reports: Discussion, 324.
- Acid Carboys (See Carboys).
- Adams, W. W. "Safety in the quarry industry" 282-288; 670-676.
- Air Hammers (See Hammers).
- Aldehyde Ammonia (See Ammonia).
- Alpha Naphthylamine (See Naphtholmine).
- Ammonia-Aldehyde: In "Compounding materials used in the Rubber Industry—their classification and health hazards" (Healy) 708.
- Aniline: In "Compounding materials used in the rubber industry—their classifications and health hazards" (Healy) 709-710.
- Aniline-Ethylidene: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 713.
- Aniline-Heptaldehyde: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 713-714.
- Aniline-Methylend: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 715.
- Aptitude—Relation to Accidents: "Affects of attitude and aptitude on accident prevention" (Davis) 589-595.
- Attitude—Relation to Accidents: "Affects of attitude and aptitude on accident prevention" (Davis) 589-595.
- Automobile Driving: "Discussion on age of chauffeur" 854.
"Discussion on cash deposit for drivers" 873.
"Discussion on dismissed for accidents" 853.
"Discussion on making drivers pay for accidents" 870.
"Discussion on return of dismissed drivers" 862.
"Discussion on speed" 850; 861.
In "How we promote safety among our drivers and service station salesmen" (Hearne) 447-453.
"Introducing the new driver to his job" (Hinckley) 851-853.
"Safe operation of motor driven and horse drawn vehicles in congested districts" (Hanrahan) 846-849.
"Safety and its application to electric trucks (MacMahon) 889-892.
"Telling the driver how accidents happen (Dow) 893-898.
- Automotive Section:
Joint meeting with power press section, 489-511.
"Discussion on employment of chauffeurs," 859.
- Back Sprain: "Discussion" 174, 176-177.
- Bannister, H. T.: "Electric Currents in Mines," 269-272.
"Haulage accidents and their prevention," 266-267.
- Barlow, A.: "First Aid and Accident Prevention," 904-906.
- Beaumont, E. S.: "Safe practice in manufacturing and distribution," 556-561.

- Benefit Associations: (See Employees' Benefit Associations).
- Benzo: (See Mercapti, Benzo, Thiozol)
- Beta Naphthylamine: (See Naphthylamine.)
- Bissell, J. M.: "General discussion on safety," 966-969.
- Blakeslee, H. N.: "Accident situation in the petroleum industry and the progress made thus far," 381-384.
- Blast Furnaces: "Accident prevention at blast furnaces" (Underwood) 132-138.
- Cast House, 164, 172.
- Discussion on color of piping of oxygen installation, 147.
- Bohlin, G. S.: "Safe practices in a silk mill," 908-918.
- Bonus Systems: "Application of a cash accident prevention bonus" (Loney) 495-508.
- Discussion—505: 510.
- Discussion on taxicab company bonuses, 560.
- Boyer, C. K.: "Standard guarding and the papermill safety code," 331-332.
- Brown, W. H.: "Rules for unloading poles, 537-544.
- Bulletin Boards: In "How we locate and correct unsafe practices" (Motley) 399.
- Burns: Discussion on burns from handling creosoted ties, 837-838.
- Discussion on use of picric acid, 441.
- Burns, G. E.: "Paper and pulp contest achievements," 366-368.
- Campbell, W.: "Qualifications of a safety engineer," 307-308.
- Carboys: Glass splash shield, 161-165.
- Carpet Mills: "Organization and functioning of a safety committee in a carpet mill" (Lord) 927-937.
- Carrow, T. H.: Report of Committee on Accident Causes and Remedies, 752-756.
- Cement Industry: "Fixing Accident Responsibility" (Weite). 643-649.
- "How can a mill with a perfect record keep it up?" (Wetknecht) 650-654.
- Joint luncheon with Quarry and Mining Sections, 281-288: 669-676.
- Joint session with Quarry Section, 641-667.
- Membership, 641.
- Nominating committee report, 643.
- Chaney, Dr. L. W.: "Record of progress in the metal industries," 117-121.
- Chauffeurs: (See Automobile Driving)
- Clair, J. R.: "Safe operation of teams and wagons," 881-888.
- Clark, H. S.: "Safety in the British Columbia logging industry," 952-959.
- Claypool, Z. B.: "Maintaining safe working conditions in the plant," 810-821.
- Clothing: "Hard Boiled" hats, 196.
- In "Common Hazards in Foundries" (Peake) 139.
- Clubs: Discussion on taxicab drivers clubs, 860.
- Coal-dust: Discussion, 252-257.
- "Effects of mine dust on health" (Meriwether) 248-251.
- Codes: "Brief resume of the national safety code for power presses" (Keefer) 461-462.
- Discussion on a marine code, 14: 13.
- Discussion on textile code, 320.
- "Standard guarding and the papermill safety code" (Boyer) 331-332.
- Coke Plants: "Coke plant accidents and their elimination" (Wardley) 143-147.
- Discussion on man holes, 149-150.
- Cole, G. E.: "Radio's contribution to safety of life at sea," 88-95.
- Commercial Automobiles: (See Automobile Driving.)
- Commercial Drivers: (See Automobile Driving.)
- Committees—Safety: Discussion, 689.
- Discussion on remuneration, 330.
- "How safety is practiced in the manufacture of furniture" (Prichett) 990-991.
- In "Fixing accident responsibility" (White) 645-646.
- In "How we locate and correct unsafe practices" (Motley) 396-403.
- In "Ships-personal injuries" (McIntyre) 39-42.
- "Organization and functioning of a safety committee in a carpet mill" (Lord) 927-937.
- "Our reasons for and methods of departmental and plant inspection committees (Osborn) 385-389.
- "Plant inspection and safety committees" (Rogers) 326-329.
- Competition: In "How we locate and correct unsafe practices (Motley) 401-403.
- "Safety in the quarry industry" (Adams) 282-283.
- See also Bonus Systems.
- Conferences—See Foremen: Meetings of Employees.
- Congdon, J. E.: "Engineers' opportunity for safety," 693-695.
- Construction: "Construction contractor's accidents on public utility properties" (Sanderson) 578-580.
- Contests: Discussion, 731-732.
- Discussion on paper contest, 335-336: 354-363: 669-672.
- In "How we locate and correct unsafe practices" (Motley) 401-403.
- "Paper and pulp contest achievements" (Burns) 366-368.
- "Presentations of certificates of merit" (Dowd) 357-359.
- Conveyors: See Screw Conveyors.
- Cooperation: "Cooperation between the surgical and accident prevention departments of the railroads" (Dowdall) 798-803.
- Cott, E. R.: "Safety playlet," 758-763.
- Courts, Safety: Discussion, 863.
- In "Plant inspection and safety committees" (Rogers) 329.
- Courtesy: Discussion, 865.
- Cranes: Trolley pole, 160-161.
- Crushed Stone: (See Quarries.)
- Davis, C. Y.: "Affects of altitude and aptitude on accident prevention," 589-595.

- Defective Vision: "In mental and physical causes of accidents" (Fisher) 547-554.
- Diamine: (See Para Phenylene Diamine.)
- Dimethyl: In "Compounding materials used in the rubber industry—their classification and health hazard" (Healy) 711.
- Dimethylamine: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 711.
- Diorites Tolye Guanidine: In "Compounding materials used in the rubber industry—their classification and health hazard" (Healy) 711-712.
- Di Ortes Toly Thiourea: In "Compounding materials used in the rubber industry—their classification and health hazard" (Healy) 712.
- Diphenyldiamine, Methylene: In "Compounding materials used in the rubber industry—their classification and health hazard" (Healy) 716.
- Diphenylguanidine: In "Compounding materials used in the rubber industry—their classification and health hazard" (Healy) 712-713.
- Discipline: Discussion, 150.
- Diseases—Occupational: "Compounding ingredients and their health hazards" (Shirley) 723-728.
- "Effects of mine dust on health" (Meriwether) 248-251.
- Disston, S. H.: "Development of the circular saw and its relation to safety," 992-1001.
- Dithiocarbonate: (See Piperidine.)
- Dithiocarbonate: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 711.
- Dixon, T. C.: "Auxiliary Ventilation," 259-261.
- Donovan, R. E.: "Tank fire tests," 407-414.
- Dow, M. A.: "Telling the driver how accidents happen," 893-898.
- Dowd, A. S.: "Presentation of certificates of merit," 357-359.
- Dowdall, Dr. G. C.: "Co-operation between the surgical and accident prevention departments of the railroads," 798-803.
- Downs, L. A.: Address, 783-787.
- Drop Forge Hazards: "Drop Forge Safety" (Herdegen) 465-471.
- Dusts: "Discussion on dangers," 655.
- "Discussion on affect of lime stone dust," 638.
- "Effect of mine dust on health," (Meriwether) 248-251.
- Sand blasting. In "Health after steel workers" (Harney) 156.
- Ears. (See Hearing.)
- Economics: "General discussion on safety" (Bissell) 966-969.
- "Values of accident prevention" (Graves) 618-625.
- Education of workmen: Discussion, 218-221.
- Discussion on nautical education, 80-81.
- "Foremanship training conferences and their bearing on accident prevention" (Mosier) 214-218.
- "Safety education in state nautical schools" (Williamson) 79-80.
- Edwards, R. F.: "Health conditions among seafaring men" (Edwards) 70-76.
- Eggleston, W. L.: "How to promote safety in our natural gasoline plants," 431-437.
- Electric Railway Section: Joint luncheon with Public Utilities Section, 609-616.
- Electric Railways: Address (Storrs) 612-615.
- Electricity: "Making light of the mystery" (Wulffing) 602-607.
- "Prevention of high voltage hazard on customers' premises" (Wagner) 581-586.
- Electricity—Mines: "Electric currents in mines" (Bannister) 269-272.
- Embossing Presses: Discussion on Sheridan presses, 295: 298.
- Employers' Benefit Associations: Discussion, 921.
- Employment: Discussion, 181-182.
- In "Qualifications and work of the safety director" (Scott) 526-527.
- Engineers—Safety: "Engineers' opportunity for safety" (Congdon) 693-695.
- In "Organization and functioning of a safety committee in a carpet mill" (Lord) 929-931.
- "Qualifications and work of the safety director (Scott) 524-528.
- "Qualifications of a safety engineer" (Campbell) 307-308.
- Elthylidene Aniline. (See Aniline.)
- Evans, I. L.: "Marine Statistics and their relation to seamen's compensation" 9-13.
- Everest, D. C.: "Why safety is worth while," 363-365.
- Exhaust Systems: (See Ventilation and exhaust systems.)
- Eye Protection: Discussion on protection for welders, 170-173.
- Electric welding and eye burns. In "Health of the steel workers" (Harney) 156.
- Farra, E. R.: "Accident experience of the industry," 949-951.
- Feet Injuries: "Discussion on foot protection, 149.
- Filling Stations: In "How we promote safety among our drivers and service station salesmen" (Hearne) 448.
- Fire Prevention: Discussion on fire equipment for service stations," 405.
- Discussion on oil industry, 415-417.
- Discussion on railroad fire protection, 822.
- "Fire prevention for public utility companies" (Smith) 562-567.
- In "Observations on safety precautions aboard tank steamships" (Tode) 55-57.
- "Tank fire tests" (Donovan), 407-414.
- First Aid: Discussion, 441-442; 907-908.
- "First aid and accident prevention" (Barlow) 904-906.
- "How we take care of injured employees" (Shaw) 440-441.

- In "Electric currents in mines" (Bannister) 271-272.
- Fisher, Dr. H. E.: "Mental and physical causes of accidents," 547-554.
- "Fixing accident responsibility" (White) 643-649.
- Fleet Owners: (See Taxicab and Fleet Owners Section.)
- Foisie, F. P.: "Safety and productivity in port cargo handling," 60-62.
- Foreign Workmen: Discussion, 310-311.
- Foremen: "Application of a cash accident prevention bonus" (Loney) 495-503.
- Discussion on conference, 223-224; 228-230.
- Discussion on selling safety, 341.
- Discussion on training conferences, 218-221.
- "Foremanship training conferences and their bearing on accident prevention" (Mosler) 214-218.
- In "Coke plant accidents and their elimination" (Wardley) 146-147.
- In "Maintaining safe working conditions in the plant" (Claypool) 810-821.
- In "Safe practices in a silk mill" (Bohlin) 914-915.
- "Safety—a part of the foremen's responsibility" (Williams) 506-509.
- "Safety as a foreman sees it" (Jaco) 129-132.
- "Selling safety to foremen" (Walker) 339-340.
- "Training foreman in accident prevention" (Myers) 490-494.
- Foundries: "Common hazard in foundries" (Peake) 138-143.
- Discussions, 125.
- Fritch, L. C.: "Safety movement on American railroads," 765-767.
- Furniture Factories: "How safety is practiced in the manufacture of furniture" (Pritchett) 985-992.
- Fyfe, A.: Railroad, 828-829.
- Gandy, H. L.: "Keeping everlastingly at it," 208-213.
- Gas Industry: "Safe practice in manufacturing and distribution" (Beaumont) 556-561.
- Use of hose in drenching coke from retort, 561.
- Gas Masks. (See Masks).
- Gasoline: "How to promote safety in our natural gasoline plants" (Eggleston) 431-437.
- German, W. J.: "Advantages and disadvantages of the miner's electric cap lamp," 262-265.
- Glazing Jacks: Guard, 299.
- Gloves: Discussion on inspection, 587.
- Goggles: Discussion on forcing eye protection, 148.
- Discussion on goggles for railroad employees, 825-827.
- Discussion on wearing goggles to avoid flying tacks, 297.
- For mines, 200-201.
- Governors: Discussion, 849.
- Grade Crossings: Discussion on whistles, 833-835.
- In "Report of committee on Train Service accidents," 751.
- Prevention of highway crossing accidents report, 740-741.
- Grade Crossings—Signs and Signals: Electric Flash light signals, 834.
- Graves, O. M.: "Values of accident prevention," 618-625.
- Grier, J. B.: "Woodworking hazard," 980-985.
- Guanidine: (See Di Orleto).
- Guards: "Late developments in safeguards" (Oartel) 160-164.
- Guest, E.: "When things go wrong," 114.
- Gyroscopic Equipment: (See Marine Safety).
- Hall, R. D.: "Review of the work of the Mining Section since its inception," 202-206.
- Hammers—Air: Discussion on dies flying out of hammer, 836.
- Hammers—Drop: Safety device, 160, 163.
- Hand, R. F.: "Practical benefits from the physical examination of seamen," 33-36.
- Handling Materials: "Rules for unloading poles" (Brown) 537-544.
- "Safety and productivity in port cargo handling" (Foisie) 60-62.
- Trough takes care of bars running back from roughers, 164; 172.
- Handling Materials: Discussion on handling from the car to drop hammer, 471.
- "Haulage accidents and their prevention" (Bannister) 266-267.
- "Safe handling of rock" (Jones) 630-635.
- Safety chain used on electric magnet, 160.
- Hanrahan, M. T.: "Safe operation of motor driven and horse drawn vehicles in congested districts," 846-849.
- Harney, Dr. L. G.: "Health of the steel workers," 155-159.
- Hartenstein, F.: "Response to Mrs. Claypool's Paper," 838-841.
- Hats: (See Clothing).
- Haulage: (See Handling Materials).
- Hazard rating sheet for foremen: In "Application of a cash accident prevention Bonus" (Loney) 499-503.
- Health Hazards in the Rubber Industry: "Compounding ingredients and their health hazards" (Shirley) 723-728.
- Report, 701-728.
- Health Supervision of Employees: "Effects of mine dust on health" (Meriwether) 248-251.
- "Health conditions among seafaring men" (Edwards) 70-76.
- "Health of the steel workers" (Harney) 155-159.
- Healy, L. J. D.: "Compounding materials used in the rubber industry—their classification and health hazards," 701-728.
- Hearing: In "Mental and physical causes of accidents" (Fisher) 550.
- Hearne, E. M.: "How we promote safety among our drivers and service station salesmen" 447, 453.
- Hearts—Defective: In "Mental and physical causes of accidents" (Fisher) 550-551.
- Heat Exhaustion: Discussion, 175.
- In "Health of the steel worker" (Harney) 157.

- Hensel, H. G.: "Statistics and their bearing on accident prevention," 191-193.
- Heptaldehyde Aniline: (See Aniline).
- Herdgen, R. T.: "Drop forge safety," 465-471.
- Hexamethylene Tetramine: In Compounding materials used in the rubber industry—their classification and health hazard" (Healy) 714-715.
- Hinckley, W.: "Introducing the new driver to his job," 851-853.
- Hook, C. R.: "Safety in American Industry," 109-116.
- Horse Drawn Vehicles: Discussion on tail lights, 888.
- "Safe operation of motor driven and horse drawn vehicles in congested districts" (Hanrahan) 846-849.
- "Safe operation of teams and wagon" (Clair) 881-883.
- Hot Mill: Guarded, 160-162.
- Human Element in Safety Work: "Affects of altitude and aptitude on accident prevention" (Davis) 589-595.
- "Soul of safety" (Williams) 879-880.
- "Study of the human element in its relationship to organized accident prevention" (Parlett) 625-629.
- "What we consider our chief means of instilling safety in the hearts and minds of our employees" (Nicholson) 390-394.
- Humphreys, Dr. R. E.: "Safety from the executive's point of view," 443-447.
- Hydrogen Sulphide: In "How we locate and correct unsafe practices" (Motley) 398.
- Injured Workmen: (See Workmen, Injured).
- Inspection: Discussion, 330.
- Discussion on new machines, 696-698.
- "Our reasons for and methods of departmental and plant inspection committees" (Osborn) 385-389.
- "Plant inspection and safety committees" (Rogers) 326-329.
- Insurance: Discussion on cost, 325.
- Insurance—Automobile: Discussion on taxicab insurance, 873.
- Insurance — Compulsory: Discussion, 878.
- Investigation of Accidents: Special committee often appointed, 654.
- Iron and Steel Industry: "Accident prevention at blast furnaces" (Underwood) 132-138.
- "Health of the steel workers" (Harnex) 155-159.
- "Late developments in safeguards" (Oartel) 160-164.
- "Record of progress in the metal industries" (Chaney) 117-121.
- (See also Coke Plants).
- Jaco, A.: "Safety as a foreman sees it," 129-132.
- Johnson, H.: "Safety spirit," 774-779.
- Joiners: In "Woodworking hazard" (Grier) 981-982.
- Jones, A.: "Safe handling of rock," 630-635.
- Keefer, W. D.: "Brief resume of the national safety code for power presses," 461-463.
- Kinks: "Late developments in safeguards" (Oartel) 160-164.
- Oil Industry, 424-425, 428.
- "Ten good safety measures" (Marvin) 265-266.
- Knives: Discussion, 691.
- "Safe practices with knives and shears" (Low) 682-684.
- Ladles: Collar for not metal ladles, 162-170.
- Lamps: "Advantages and disadvantages of the miner's electric cap lamp" (German) 262-265.
- Miners, 200.
- Lead Poisoning: In "Compounding ingredients and their health hazards" (Shirley) 725.
- Leggins: (See Clothing).
- Linemen: "Application for position as lineman," 568-571.
- Locomotives: Blow-off muffler, 164; 173.
- Logging: "Safety in the British Columbia logging industry" (Clark) 952-959.
- Loney, N. M.: "Application of a cash accident prevention bonus," 495-503.
- Longstreth, U. C. F.: "Women's place in safety," 801-809.
- Lord, Dr. F.: "Organization and functioning of a safety committee in a carpet mill," 927-937.
- Lorenz, M. O.: "Statistical work as it relates to safety on steam railroads," 790-797.
- Low, H. W.: "Safe practices with knives and shears," 682-684.
- Lumbering: (See Logging), Woodworking and Lumber Manufacturing Section.
- Lundrigan, J.: "Practical experience in accident prevention," 347-353.
- McAuliffe, E.: "Accident prevention in its broader phases," 231-241.
- McIntyre, M. D.: "Ships—personal injuries," 39-42.
- MacMahon, C. C.: "Safety and its application to electric trucks," 889-892.
- MacNulty, I.: "Safe practices in a woolen mill," 921-924.
- Maintaining Interest in Safety Work: "How we promote safety among our drivers and service station" (Hearne) 447-453.
- In "Address" (Downs) 786.
- "Selling safety to employees" (Thinkield) 337-338.
- "What we consider our chief means of instilling safety in the hearts and minds of our employees" (Nicholson) 390-394.
- Management: "Fixing accident responsibility" (White) 643-649.
- In "Safety in American industry" (Hook) 113-115.
- "Qualifications and work of the safety director" (Scott) 524-528.
- "Safety from the executive's point of view" (Humphrey) 443-447.
- "Selling safety to superintendents" (Slater) 343-346.
- "Ways and means of impressing executives and operating and designing engineers," (Smith) 529-534.
- Marine Hazards: "American Marine Standards committee—the relation of its work to accident prevention" (Simmons) 65-69.

- "Building safety into ships" (Parker) 19-25.
 Discussion on booms, 29-30.
 Discussion on deck pads, 86-87.
 Discussion on formulation of a code, 14, 18.
 Discussion on hazards of hatch, 27-28, 31-32.
 Discussion on possibilities of use of stainless steel, 25-26.
 "Health conditions among seafaring men" (Edwards) 70-78.
 "Life and property conservation in railroad marine operation" (Moore) 81-86.
 "Marine statistics and their relation to seamen's compensation" (Evans) 9-13.
 "Maritime safety movement and its relation to America's merchant marine problem" (Titus) 6-9.
 "Observations on safety precautions aboard tank steamships" (Tode) 44-59.
 "Radio's contribution to safety of life at sea" (Cole) 88-95.
 "Relations of gyroscopic equipment to maritime safety" (Whitaker) 96-100.
 "Safety and productivity in port cargo handling" (Folsie) 60-62.
 "Safety education in state nautical schools" (Williamson) 79-80.
 "Ships—personal injuries" (McIntyre) 39-42.
 Special committee on loading and stability, 67.
 Marine Section: Membership committee report, 4-5.
 Minutes, 3-103.
 Nominating committee report, 43.
 Officers, 3.
 Place for sectional Safe Practices Pamphlets, 15-17.
 Resolution on Chicago Congress, 102.
 Marvin, T.: "Ten good safety measures" 265-267.
 Masks: Cutting rivets, 162, 169.
 Discussion, 429.
 In "Safe practice in manufacturing and distribution" (Beaumont) 559.
 Medical Supervision: "Cooperation between the surgical and accident prevention departments of the railroad" (Dowdall) 798-803.
 Meetings of Employees: "Conducting safety meetings," (Ziegler) 152-155.
 In "Organization and functioning of a safety committee in a carpet mill," (Lord) 931-933.
 "Maintaining safe working conditions in ten plant" (Claypool) 810-821.
 (See also education of workmen).
 "Mental and physical causes of accidents" (Fisher) 547-554.
 Mercapti-Benzothiazal: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 716-717.
 Meriwether, Dr. F. W.: "Effects of mine dust on health," 248-251.
 Metal Industries: (See Iron and Steel Industry).
 Metals Section: Bulletin committee report, 103.
 Membership committee report, 107.
 Minutes, 105-183.
 Nominating committee report, 123.
 Officers, 105.
 Secretary's report, 106.
 Methylene Aniline, (See Aniline Methylene).
 Methylene Diphenyldiamine, (See Diphenyldiamine, Methylene).
 Mica: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 720-721.
 Mine cars: Discussion on trolley wire, 268.
 Mine Rescue, (See First Aid.)
 Miners' Lamps, (See Lamps.)
 Mines and Mining: Discussion on conferences, 276-277.
 "Foremanship training conferences and their bearing on accident prevention" (Mosier) 214-218.
 "Haulage accidents and their prevention" (Bannister) 266-267.
 "Statistics and their bearing on accident prevention" (Hensel) 191-193.
 "Ten good safety measures" (Marvin) 265-266.
 (See also electricity—Mines, ventilation and exhaust systems.)
 Mines and Mining—Coal: "Accident prevention in its broader phases" (McAuliffe) 231-241.
 "Effects of mine dust on health" (Meriwether) 248-251.
 "Keeping everlastingly at it" (Landy) 208-213.
 "Mining safety in the coal mine" (Webb) 273-274.
 Mining Section: Joint luncheon with Cement and Mining Sections, 281-288, 669-676.
 Membership committee report, 187-188.
 Minutes, 185-279.
 Nominating committee report, 246; 279.
 Officers, 185-186.
 Publicity committee report, 189.
 Mining Section: (Continued.)
 Report of Poster Committee, 186-187.
 Report of Program Committee, 190.
 Report of Statistical Committee, 189.
 Review of the work of the mining Section since its inception" (Hall) 202-206.
 Secretary's report, 190-191.
 Model: "Making light of the mystery" (Wulffing) 602-607.
 Moneymaker, D.: "Common accidents in the tanning industry and suggestions for eliminating them," 294-297.
 Moore, O. D.: "Life and property conservation in railroad marine operation," 81-86.
 Mosier, M.: "Foremanship training conferences and their bearing on accident prevention," 214-218.
 Motion Pictures, (See Motion Pictures in Safety Work.)
 Motley, R. E.: "How we locate and correct unsafe practices," 396-403.
 Moving Pictures in Safety Work: Discussion on making motion pictures, 454-455.
 Mumford, S. C.: Discussion of Mr. Smith's paper, 535.

- Myers, Dr. H.: "Training foremen in accident prevention," 490-494.
- Napthylamine-Alpha: In "Compounding materials used in the rubber industry—their classification and health hazards," (Healy), 708-709.
- Napthylamine-Beta: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 710-711.
- Natural gasoline, (See gasoline.)
- New Employees: "Introducing the new driver to his job," (Hinckley), 851-853.
- Nicholson, A. A.: "What we consider our chief means of instilling safety in the hearts and minds of our employees," 390-394.
- Oartel, J. A.: "Late developments in safe guards," 160-164.
- Oil Company Safety: "Accident situation in the petroleum industry and the progress made thus far," (Blakeslee), 381-384.
- Discussion (Hightower), 425-426.
- Discussion on repairing tanks, agitators, 394.
- Oil Company Safety: (Continued.)
- Discussion on safety kinks, 424-425.
- "How to promote safety in our natural gasoline plants," (Eggleston), 431-437.
- "How we locate and correct unsafe practices" (Motley) 396-403.
- "How we promote safety among our drivers and service station salesmen" (Hearne) 447-453.
- "How we take care of injured employees" (Shaw) 440-441.
- "Our reasons for and methods of departmental and plant inspection committees" (Osborn) 385-389.
- "Promotion of safety in a producing department" (Swim) 418-421.
- "Safety from the executives' point of view" (Humphrey) 443-447.
- "Tank fire tests" (Donovan) 407-414.
- "What we consider our chief means of instilling safety in the hearts and minds of our employees" (Nicholson) 390-394.
- "What we consider our most successful method of promoting safety in the sales division," (Tobin) 403-405.
- (See also Petroleum Section).
- Oil Handling, (See Tank Steamers.)
- Organization: Discussion, (Hightower) 425-426.
- "How safety is practiced in the manufacture of furniture," (Puchett) 985-992.
- "How we promote safety among our drivers and service station salesmen," (Hearne) 447-453.
- In "How we locate and correct unsafe practices," (Motley) 396-403.
- "Maintaining safe working conditions in the plant," (Claypool) 810-821.
- "Organizing for accident prevention in public utilities," (Webb) 597-599.
- "Practical experience in accident prevention," (Lundrigan) 347-353.
- "Promotion of safety in a producing department," (Swim) 418-421.
- "Purpose of the safety organization," (White) 769-771.
- "Safety in the British Columbia logging industry," (Clark) 952-959.
- "Study of the human element in its relationship to organized accident prevention," (Parlett) 625-629.
- "What we consider our most successful method of promoting safety in the sales division," (Tobin) 403-405.
- Ortho, (See Di Ortho.)
- Ortho Tolindine: (See Tolindine.)
- Osborn, B. V.: "Our reasons for and methods of departmental and plant inspection committees," 385-389.
- Packers and Tanners Industry: "Common accidents in the tanning industry and suggestions for eliminating them," (Moneymaker) 294-297.
- "Safety influence on production in the packing and tanning industries," (Schwarze) 299-301.
- (See also Tanning Industry.)
- Packers and Tanners Section: Minutes, 289-312.
- Nominating committee report, 302.
- Officers, 289.
- Paper and Pulp Industry: "Accident analyses, records and costs," (Record) 317-324.
- Discussion on codes, 333-335.
- Discussion on paper contest, 335-336; 354-363; 369.
- "Paper and pulp contest achievements," (Burns) 366-368.
- "Practical experience in accident prevention," (Lundrigan) 347-353.
- Presentation of certificates of merit, (Dowd) 357-359.
- "Selling safety to superintendents," (Slater) 343-346.
- "Standard guarding and the paper-mill safety code," (Boyer) 331-332.
- Paper and Pulp Section: Discussion on service, 374-376.
- Minutes, 313-376.
- Nominating Committee report, 341-342.
- Officers, 313-314.
- Registration list, 314-315.
- Reports of various committees, 315-316.
- Para Phenylene Diamine: In "Compounding materials used in the rubber industry—their classification and health hazards," (Healy) 717-718.
- Para Tolindine: In "Compounding materials used in the rubber industry: their classification and health hazards" (Healy), 718.
- Farker, H. E.: "Building safety into ships," 19-25.
- Parlett, E. M.: "Study of the human element in its relationship to organized accident prevention," 625-629.
- Peake, C. L.: "Common hazards in foundries," 138-143.
- Pentamethylene. (See Piperidine.)
- Petroleum Section: Chairman' Report, 378-379.
- Minutes, 377-456.
- Nominating committee's report, 406.
- Officers, 377-378.

- Telegram of appreciation to Mr. Nicholson, 380.
- Phenylene, (See Para Phenylene Diamine.)
- Physical Examination of Employees: Discussion on express service employees' examinations, 850.
- Discussion on physical examinations of seamen, 36-38.
- "Health conditions among sea farming men" (Edwards), 70-76.
- "Practical benefits from the physical examination of seamen" (Hand), 33-36.
- Piperidine Pentamethylene Dithiocarbamate: In "Compounding materials used in the rubber industry," their classification and health hazards" (Healy), 718-719.
- Planers, Discussion on guards, 1001.
- Plays: "Application for position as lineman," 568-577.
- "Safety playlet" (Cott), 758-763.
- Poems: "Home and Safe," 393-394.
- "When things go wrong" (Guest) 114.
- Poisons: "Compounding ingredients and their health hazards" (Shirley), 723-728.
- "Compounding materials used in the rubber industry—their classification and health hazard" (Healy), 701-728.
- Poles—Unloading: "Poles for unloading poles" Brown), 537-544.
- Power Press Section: Joint meeting with Automotive Section, 489-511.
- Minutes, 457-488.
- Nominating Committee report, 464.
- Officers, 457-458.
- Purpose (Thompson), 458-460.
- Prayer: Steam Railroad Section (Shedd), 734.
- Presses—Power: "Brief resume of the national safety code for power presses" (Keefer), 461-463.
- Discussion on best way to determine angle of granty shoot, 478.
- Discussion on Bliss 3 press guard, 474.
- Discussion on electrical tripping, 472.
- Discussion on feeds, 475.
- Discussion on guarding chute on die, 479.
- Discussion on guarding every part of trip treadle, 476.
- Discussion on inspection, 488.
- Discussion on magnetic electric pickups, 477.
- Discussion on section devices, 477.
- Discussion on thread roll operation, 476.
- "Drop forge safety" (Herdegen), 465-471.
- Prickett, E. K.: "How safety is practiced in the manufacture of furniture," 985-992.
- Production: "Safety and productivity in port cargo handling" (Foisie), 60-62.
- "Safety in the quarry industry" the packing and tanning industries" (Schwarze), 209-301.
- Psychology: "Mental and physical causes of accidents" (Fisher) 547-554.
- Public Utilities: "Construction contractor's accidents on public utility properties" (Sanderson), 578-580.
- "Fire prevention for public utility companies" (Smith), 562-567.
- "Organizing for accident prevention in public utilities" (Webb), 597-599.
- "Prevention of high voltage hazards on customers' premises" (Wagner), 581-586.
- "Rules for unloading poles" (Brown), 537-544.
- "Ways and means of impressing executives and operating and designing engineers" (Smith), 532-533.
- Public Utilities Section: (Continued.) record, 536-537.
- Classification of attendance, 567.
- Joint Luncheon with electric Railway luncheon, 609-616.
- Membership committee, 519-520.
- Minutes, 513-608.
- Public Utilities Section: (Continued.) Nominating Committee report, 536.
- Officers, 513-514.
- Proposed plant visits, 521-522.
- Report of Bulletin Committee, 516-517.
- Report of Publicity Committee, 517-518.
- Report of vice-chairman in charge of electrical interests, (Rutland) 514-515.
- Secretary's report, 515-516.
- Telegrams to absent members, 587-588.
- Pulp Industry, (See Paper and Pulp Industry.
- Punch Presses, (See Power Presses.)
- Quarries: "Safe handling of rock" (Jones), 630-635.
- "Safety in the quarry industry" (Adams), 282-288: 670-676.
- "Values of accident prevention" (Graves), 618-625.
- Quarry Section: Joint luncheon with Cement and Mining Sections, 281-288: 669-676.
- Joint session with Cement Section, 641-667.
- Minutes, 617-639.
- Nominating Committee report, 635.
- Officers, 617.
- Radio: "Radio's contribution to safety of life at sea" (Cole), 88-95.
- Railroads: Address (Downs), 783-787.
- "Co-operation between the surgical and accident prevention departments of the railroads" (Dowdall) 798-803.
- Discussion of brakes, 823-824.
- Discussion on handling creosoted ties, 837-838.
- "Life and property conservation in railroad (marine operation" (Moore), 81-86.
- Painting metal car roofs, 824.
- Report of Committee on Accident Causes and Remedies (Carrow), 752-756.
- Report of Committee on Train Service Accidents, 744-752.
- "Safety movement on American railroads" (Fritch), 765-767.
- "Safety Spirit" (Johnson), 774-779.
- "Statistical works as it relates to safety on steam railroads" (Lorenz) 790-793.
- (See also Steam Railroads.)

- Record, A. F.: "Accident analyses, records and costs," 317-324.
- Reliability: Discussion, 306-307.
- "Reliability—an important factor in accident prevention work" (Sandel), 303-306.
(See also workmen, injured.)
- Report Forms: In "Accident analyses records and costs" (Record), 317-324.
- Resolutions: Congress in Chicago, 430; 589.
- Death of Mrs. Kroger, 490.
- Public Utilities Section resolution of appreciation, 588.
- Steam Railroad Section, 827-828.
- Responsibility for Accidents: Discussion on drivers' responsibility," 864.
- "Fixing accident responsibility," (White), 643-649.
- In "How can a mill with a perfect record keep it up" (Weiknecht), 653-655.
- Resuscitation: Discussion on resuscitation at blast and coke plants, 148.
- Rewards: In "How we locate and correct unsafe practices" (Motley), 401.
(See also Bonus Systems.)
- Rock Dusting: Discussion, 242-245.
- In "Accident prevention in its broader phases" (McAuliffe), 233-235.
- Rogers, B. D.: "Plant inspection and safety committees," 326-329.
- Rolls—Guarded: 161; 164.
- Rowe, W. A.: "Advantages and disadvantages of blower cans for auxiliary ventilation," 258-259.
- Rubber Industry: "Compounding ingredients and their health hazard" (Shirley), 723-728.
- "Compounding materials used in the rubber industry—their classification and health hazards" (Healy), 701-728.
- "Important place safety holds in rubber industry," 685-688.
- "Safe practices with knives and shears" (Low) 682-688.
- Rubber Section: Bulletin Committee report, 678-679.
- Health Hazards Committee (Healy) 701-728.
- Membership Committee report, 679-680.
- Minutes, 677-732.
- Nominating Committee report, 693.
- Officers, 677-678.
- Report of Secretary (Salisbury) tee, 680-681.
- Report of Secretary, (Salisbury) 678.
- Report of the Program Committee, 681-682.
- Report of the Statistical Committee, 698-700.
- Rules: Discussion: 180-181.
- Discussion on railroad rules, 795-796.
- Refresh memory of employers, 161; 166.
- Rupture: In "Mental and physical causes of accidents" (Fisher) 551.
- Safeguarding: "Late developments in safeguards" (Oartel) 160-164.
- Safety Engineers: (See Engineers, Safety.)
- Safety Movement: "Safety in American Industry" (Hook) 109-116.
- "Safety Spirit," (Johnson) 774-779.
- Sandel, J. M.: "Reliability—An important factor in accident prevention work," 303-306.
- Sanderson, J. C.: "Construction contractors' accidents on public utility properties, 578-580.
- Sawmills: "Preventing accidents in sawmills" (Wallace) 959-965.
- Saws: "Development of the circular saw and its relation to safety," 992-1001.
- Schools—Safety work with*: Address (Telford) 661-664.
- Discussion, 664.
- Schwarze, F.: "Safety's influence on production in the packing and tanning industries" 299-301.
- Scott, C. B.: "Qualifications and work of the safety director," 524-528.
- Scott, R.: Opening address at Steam Railroad luncheon, 782-783.
- Screw Conveyor: Discussion, 657-658.
- "Selling safety to employees" (Thirkield) 337-338.
- "Selling safety to foremen" (Walker) 339-340.
- "Selling safety to Superintendents" (Slater) 343-346.
- Shapers: Discussion on guard, 975, 1004-1005.
- In "Woodworking hazards" (Grier) 983.
- Shaw, T. N.: "How we take care of injured employees," 440-441.
- Shears: Guarded, 161; 165.
- "Safe practices with knives and shears" (Low) 682-684.
- Sheridan Presses (See Embossing Presses.)
- Ships (See Marine Hazards.)
- Shirley, Jr. J. N.: "Compounding ingredients and their health hazards," 723-728.
- Shoes: Discussion on foundry shoes, 148-149.
- Signals: For passageways, 163; 171.
(See also grade crossings, Signs and Signals.)
- Silicosis: In "Compounding ingredients and their health hazards" (Shirley) 726.
- Silk Mills: "Safe practices in a silk mill" (Bohlin) 908-918.
- Simmons, E. A.: "American Marine Standards Committee—the relation of its work to accident prevention," 65-69.
- Slater, J. H.: "Selling safety to superintendents," 343-346.
- Small Plants: Discussion, 484.
- Smith, E. J.: "Fire prevention for public utility companies," 562-567.
- Smith, F. W.: "Ways and means of impressing executives and operating and designing engineers, 529-534.
- Smith, W. S.: "Cost of an accident," 290-294.
- "Soul of Safety" (Williams) 879-880.
- Splitting Machines: Guarded, 298.
- Standards: "American Marine Standards Committee—the relation of its work to accident prevention" (Simmons) 65-69.
- Steam Railroad Section: Accident Causes and Remedies Committee report (Carrow) 752-756.

- Luncheon, 782-789.
 Membership Committee, 739.
 Minutes, 733-844.
 Nominating Committee report, 780-781.
 Officers, 733-734.
 Opening address (White) 735-738.
 Prevention of highway crossing accidents report, 740-741.
 Program Committee report, 738-739.
 Report of Publicity Committee, 741-742.
 Report of Committee on Train Service Accidents, 744-752.
 Report of the Committee on Public Relations, 742-743.
 Resolutions Committee, 739; 827-828.
 Secretary's report, 757.
 Stevedoring (See Marine Hazards.)
 Stewart, G. C.: Address at luncheon, 610-612.
 Stone Manufacturers (See Quarries.)
 Storrs, L. S.: Address, 612-615.
 Suggestion Systems: Discussion, 438-439.
 Sulphuric Acid: Discussion on handling, 311.
 Superintendents: "Selling safety to superintendent" (Slater) 343-346.
 Surgeon: "Cooperation between the surgical and accident prevention departments of the railroads" (Dowdall) 798-803.
 Swim, C. L.: "Promotion of safety in a producing department," 418-421.
 Swing Grinders: Guarded, 162; 167; 168.
 Switches: Discussion on electrical switches in foundries, 149.
 Tachs: Flying into employees eyes, 296-298.
 Talc: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 721-722.
 Tank Steamers: "Observations on safety precautions aboard tank steamships" (Tode) 44-59.
 Tanks: Discussion on hazard of trees close to tanks, 438.
 Discussion on repairing tanks, agitators, etc., 394.
 Tank fire tests" (Donovan) 407-414.
 Tanners (See Packers and Tanners Section.)
 Tanning Industry: "Common accidents in the tanning industry and suggestions for eliminating them" (Moneymaker) 294-297.
 "Safety's influence on production in the packing and tanning industries" (Schwarze) 299-301.
 (See also Packers' and Tanners' Industry.)
 Taxicab and Fleet Owners Section:
 Minutes, 845-899.
 Nominating Committee report, 877.
 Officers, 845.
 Taxicab (See Automobile Driving.)
 Teeth: In "Health of the steel worker" (Harney) 158.
 Telford, M. L.: Address, 661-664.
 Tetramine: (See Hexamethylene Tetramine.)
 Textile Industry: Discussion on beans warpers, 941.
 Discussion on code, 920.
 Discussion on flying shuttles, 942.
 "New developments in safe guards for textile machinery" (Washburn) 937-941.
 "Organization and functioning of a safety committee in a carpet mill" (Lord) 927-937.
 "Safe practices in a silk mill" (Bohlin) 908-918.
 "Safe practices in a woolen mill" (McNulty) 921-924.
 Textile Section: Membership Committee report, 902-903.
 Minutes, 901-943.
 Nominating Committee report, 926.
 Officers, 901.
 Secretary's report, 902.
 Thiocarbonilid: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 719-720.
 Thiourea: (See Di Ortho.)
 Thizol: (See Mercapti-Benzothizol.)
 Thirkield, D. D.: "Selling safety to employees," 337-338.
 Thompson, G. S.: "Purpose of the power press section," 458-460.
 Titus, N. E.: "Maritime safety movement and its relation to America's merchant marine problem," 6-9.
 Tobin, H. J.: "What we consider our most successful method of promoting safety in the sales division," 403-405.
 Tode, A. M.: "Observations on safety precautions aboard tank steamships," 44-59.
 Tolindine: (See Para Tolindine.)
 Tolindine, Ortho: In "Compounding materials used in the rubber industry—their classification and health hazards" (Healy) 717.
 Toly: (See Di Ortho.)
 Tools: Discussion on building safety into old tools, 465.
 Trucks: "Safe operation of motor drivers and horse drawn vehicles in congested districts" (Hanrahan) 846-849.
 "Safety and its application to electric trucks (MacMahon) 889-892.
 Underwood, L. H.: "Accident prevention at blast furnaces," 132-138.
 Van Cleef, P.: "Important place safety holds in the rubber industry," 685-688.
 Varicose Veins: In "Mental and physical causes of accidents" (Fisher) 551.
 Ventilation and Exhaust Systems: "Advantages and disadvantages of blower fans for auxiliary ventilation" (Rowe) 258-259.
 "Auxiliary ventilation" (Dixon) 259-261.
 Discussion on mine ventilation, 261-262.
 Wagner, W.: "Prevention of high voltage hazard on customers' premises," 581-586.
 Walker, W. E.: "Selling safety to foremen," 339-340.
 Wallace, W. L.: "Preventing accidents in sawmills," 959-965.
 Wardley, G. P.: "Coke plant accidents and their elimination," 143-147.
 Warfel, G. H.: Discussion of Mr. White's paper, 772-774.

- Washburn, H. C.: "New developments in safeguards for textile machinery," 927-941.
- Webb, H. F.: "Mining safety in the coal mine," 723-724.
- "Organizing for accident prevention in public utilities," 597-599.
- Weisknecht, W. H.: "How can a mill with a perfect record keep it up?" 650-654.
- Whitaker, O. B.: "Relation of gyroscopic equipment to maritime safety," 96-100.
- White, J. D.: Opening address, 735-738.
- White, R. C.: "Purpose of the safety organization," 769-771.
- White, W. L. Jr.: "Fixing accident responsibility," 643-649.
- "Why safety is worth while" (Everest) 363-365.
- Williams, A. M.: "Safety—a part of the foreman's responsibility," 506-509.
- Williams, J. C.: "Soul of Safety," 879-818.
- Williamson, C.: "Safety education in state nautical schools," 79-80.
- Women's Activities: Discussion, 809.
- "Women's place in safety" (Longstreth) 804-809.
- Wood, H. D.: "Some of the real problems of taxicab and fleet control," 856-859.
- Woodworking: "How safety is practiced in the manufacture of furniture" (Prichett) 985-992.
- See Also Joiners: Saws, Shapers.
- Woodworking and Lumber Manufacturing Section: Change in name, 972.
- Membership Committee report, 948.
- Minutes, 945, 1007.
- Nominating Committee report, 978.
- Officers, 945-946.
- Report of News Letter Committee, 947-948.
- Secretary's report, 946-947.
- Woodworking Industries: "Woodworking hazards" (Grier) 980-985.
- Woolen Mills: "Safe practices in a woolen mill" (MacNulty) 921-924.
- Workmen—Injured: "How we take care of injured employees" (Shaw) 440-441.
- "Ships—Personal injuries" (McIntyre) 39-42.
- (See also Rehabilitation.)
- Workmen's Compensation: "Marine statistics and their relation to seamen's compensation" (Evans) 9-13.
- Wulffing, H. E.: "Making light of the mystery," 602-607.
- Ziegler, N. V. B.: "Conducting safety meetings," 152-155.

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CONTENTS

	PAGE
Public Safety Division:	
General Session, Tuesday.....	3
Wednesday Morning Session	19
Wednesday Afternoon Session.....	36
Thursday Morning Session	53
Thursday Afternoon Session	74
Friday Morning Session	97
Home Safety Session—Monday Afternoon.....	125
Chicago's Pageant of Safety	141
Index	143

**SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL**



Public Safety

Tuesday, September 27, 1927

General Session

Educating the Public for Safety—A Symposium

LUCIUS S. STORRS, Chairman
Managing Director, American Electric Railway Association,
New York City

The Public Safety Meeting at the Sixteenth Annual Safety Congress, Hotel Stevens, Chicago, Illinois, was called to order at two-fifteen o'clock by the chairman, Lucius S. Storrs, managing director, American Electric Railway Association, New York, N. Y.

CHAIRMAN STORRS: The program for this session has for general subject, "How can we educate the public for safety?"

The addresses will bring to your attention the activities of various public bodies, public industries and utilities in connection with their work.

As you travel around the country you feel more at ease if you see, as you do, on some of the great railroad systems the slogan, "Safety First." Coming out from New York yesterday I was impressed with the fact that there were banners of safety along the lines over which I was traveling.

It gives me great pleasure to introduce to you Mr. Charles E. Hill, general safety agent, New York Central Lines of New York and vice-president for Public Safety, National Safety Council.

The Viewpoint of the Railroads

Chas. E. Hill, General Safety Agent, New York Central Lines, and Vice President for Public Safety, National Safety Council, Representing the Railroads

There are over 600,000 miles of railroad in the world, one-half of which are within the confines of our own country, and they represent an investment equal to one-tenth of all of the values of the earth. The growth of the railroads in the United States has kept pace with the growth of our nation. They are owned by some 1,800,000 stockholders. They constitute one of the basic forms of business of our country.

Efficient transportation as provided by the American Railroads has had more to do than any other agency or combination of agencies in establishing good citizenship, and also that high standard of living which is not equalled by any other country in the world. Therefore, it is only natural that in keeping with progress along other lines, the railroads of this nation should have a keen interest in any suggestive remedies having for their purpose the saving of human life, for the railroads have long since recognized safety as essential to successful railroad operation.

Quite successful safety performances are being made by the railroads of the country today due to the systematized manner in which safety is being conducted.

The steam railroads of America were among the prime movers in the inauguration and promotion of organized safety in the United States, and as a result, railway employment today is less than one-third as hazardous as it was fifteen years ago.

Organized Safety Is a Vital Factor

Organized safety has indeed been, and still is, a vital factor in railroad operation. In 1913, which was prior to the time constructive safety work had an opportunity to make itself appreciably felt, there were upon the railroads of the United States—based upon reports made to the Interstate Commerce Commission—10,964 persons killed and 200,308 persons injured. In 1926 there were 7,090 persons killed and 130,293 persons injured, representing a reduction of 35 per cent in deaths and 35 per cent in injuries. It must be remembered that this reduction in casualties—which refers to all classifications—was made in the face of a material increase in the number of railroad employees, an increase in the volume of freight and passenger traffic, and what is of still greater moment, an increase of 125 per cent in the number of casualties at railroad highway crossings.

Confining ourselves to employees, we show a reduction from 2,353 deaths and 170,239 injuries in 1913 to 1,587 deaths and 111,241 injuries in 1926, or a reduction of 33 per cent in deaths and 35 per cent in injuries. In 1913 there were 350 passengers killed on the American railroads as compared with 155 deaths in 1926, or a reduction of 56 per cent. The reduction in the number of casualties to employees and passengers during the past thirteen years has been nothing less than phenomenal, and while the hazards incident to railroad employment have been materially reduced during this period, the safety of passenger travel has been greatly increased. Of the 155 passengers killed last year through the operation of the American railroads, only 79 of them were due to train accidents, the remainder being due to causes largely beyond the railroads' control. During the same period there were 23,000 persons killed due to automobile accidents occurring in the streets and highways of this country, of which number 7,600 were passengers in the car. This comparison serves to cause a further appreciation of the splendid safety achievements of the railroads of this country, and this feature is further emphasized when we know that the railroads of the United States last year carried 860 million, 343 thousand passengers, or the equivalent of 35½ billion passengers a distance of one mile.

Therefore, travel by railroad train in this country has reached a position not only of comfort, ease, and enjoyment, but also of security and safety. In fact, there is only one place today that may possibly be considered safer than when traveling as a passenger on a railroad train, and that is when you are asleep in your own home. However, an accident that occurred in Nebraska recently has

caused me to be somewhat skeptical as to the safety of your own bed. Two women were driving along the highway in that state, and from some unknown cause lost control of the steering wheel, and drove their machine up over the curbing, striking a three room bungalow, knocking the wall down, continuing on into the bedroom and across the bed in which two bachelor brothers were quietly sleeping, not stopping until their machine arrived at the kitchen sink. While the two men were not killed, their sleep was somewhat disturbed.

The hazards occasioned through the operation of the American railroads have, for many years, challenged the attention of men whose vision has been broad enough to visualize the necessity of placing into effect a definite program that has resulted in a downward trend in accident frequency.

Fifteen years ago, or about the time organized safety began functioning on the railroads of this country, our progress at first was measured almost wholly in the elimination of the physical conditions that were contributing to the nation's casualty toll. We were then primarily concerned with a situation that was obvious to the layman. While the work of accident prevention at that time was of interest, yet it had a touch of the inanimate, for we were dealing with the physical side of safety.

As time went on, we gradually passed from the physical aspects into the realm of the human equation. Man has kept pace with progress in that he has modernized machinery, he has renovated our industrial plants, he has put his house in order so that accidents from the proper use of these agencies have been rendered almost negligible.

Man Made Machines Are Ahead of Mental Training

The progress of things which are inanimate brought about through the ingenuity of the human mind, has been greater than the progress of man himself. While he has been busy delving into the intricacies of the things which are for the betterment of mankind, he has neglected to train the mind to meet the new order of things as they exist today. Thus we find the human element as the potent factor in our safety program, and this being true, we must of necessity train the mind so that man in the performance of his duties will pursue the course that is efficient and safe.

To carry on accident prevention work successfully, it matters not whether it is in the industry, the home, the street, or elsewhere, we must proceed along orderly and intelligent lines, following a preconceived, definite program. We must not only know how many people are killed and injured annually through accidents, but we must know where they occur, and how they occur, always having in mind that a careful analysis precedes an intelligent remedy.

As already stated, the railroads of the country have been quite successful in accident reduction, particularly as it is related to employees and passengers—accidents which, in a measure, are under their control; but while these accomplishments have been made, there has been a marked increase in accidents involving the public at highway crossings. This has been due to a large increase in the number of automobiles, which, together with the extensive mileage of improved highways, has immeasurably increased the volume of traffic on the highways and over such crossings.

It is worthy of note, however, that motor vehicle accidents in the streets and highways have increased three times as fast as they have at grade crossings, which evidences the fact that the application of safety measures has been effective in the prevention of crossing accidents.

The Safety Section of the A. R. A. recognizing the importance of this problem, organized a committee on the prevention of highway crossing accidents five

years ago. The efforts of this committee, plus the safety work of the various railroads, have borne fruit, for while the number of automobiles in 1926 as compared with 1923 (the year this campaign became effective) increased 46 per cent, and the number of casualties resulting from automobile accidents in the streets and highways increased 29 per cent, the number of casualties at highway crossings during the same period increased only 10 per cent. The work of this committee has been made more effective by reason of the splendid cooperation of the various organizations and agencies most directly concerned.

The crossing accident problem is a subject within itself, and will not be discussed at this time excepting to say that our immediate remedy is through a cooperative procedure as between the railroads and the public. Our chief success in the prevention of accidents to our employees lies in the spirit of cooperation between employer and employee, and if our contact with automobile drivers was as close as it is with our employees, and the response toward cooperation was proportionate, we would materially reduce crossing accidents immediately, and eventually bring them down to an infinitesimal number.

A Problem of Constructive Education

Our experience in industrial safety teaches us that after our engineering work has been done—after we have ascertained the causes and corrected the conditions—that our problem is one primarily of constructive education. Since education is the real fundamental upon which effective safety work can be based, we must learn how our employees and also how the public can be educated. The railroads have a keen sense of their responsibilities, not only to their employees, but to the public as well. The strides they have made in accident prevention prove the efficacy of their plan. If a similar procedure were followed as regards accidents that more directly involve the public, it would mean the weeding out of a large army of incompetent and reckless motorists that infest our streets and highways, thus assuring a greater degree of safety for the large majority of motorists who are careful. This would immediately bring about a marked decrease in the number of street and highway accidents, and would result in the saving of many thousand of lives each year.

The consummation of such a plan is essentially a problem for the community as a whole. We have our responsibilities as citizens. We owe our allegiance to our flag and our country. We adhere to this allegiance not through compulsion, but rather through a desire to serve the citizenry that go to make up this great nation of which we are so proud to be a part. If we are disloyal to our country, we, in a measure, disrupt the moral fabric of our citizenship. To be good citizens means to be good safety men and women, for good citizenship and safety go hand in hand.

The American railroads are now engaged in the greatest safety campaign in their history. Their goal is a 35 per cent reduction in accidents by the end of 1930. A large number of railroads have already reached this goal, but they are pressing on and on, not content that they alone have succeeded but desiring to aid those who are less fortunate.

The railroads would have no greater satisfaction than to have the realization that their efforts will also be instrumental in inculcating in their hearts and minds of the men and women of America a full appreciation of their individual responsibilities in the conservation of human life so that through this medium there will be a greater spirit of cooperation upon the part of all organizations and agencies, ultimately resulting in the establishment of not only a safe place in which to work but also a safe place in which to live.

Public Safety Sessions

CHAIRMAN STORRS: The utilities, so known, have touched intimately the daily lives of the largest portion of the public.

We will be favored with a brief talk by Mr. H. F. Webb, general safety director, West Penn System of Pittsburgh, Pennsylvania.

The Viewpoint of The Electric Railways and Utilities

H. F. Webb, General Safety Director, West Penn System, Pittsburgh

The progressive public utility is interested not only in safe-guarding its employees by all available methods, but also in the protection of the public, residing in, or traveling through territory occupied by the railway, light and power systems. Most of this protection is afforded by high standards of construction and operation, the safe equipment, or the recommendation only of safe equipment, by careful maintenance of properties and prompt service to customers. But having attended to all this, the Public Utility company realizes the need of a well sustained system of safety educational publicity.

The West Penn System, Pittsburgh, Pa., developed an interesting and productive Public Safety program beginning the year 1925, and the result of its application brought a reduction of fatal accidents to the public from 27 reported during the year 1924, to 7 fatal accidents the year 1925, or a 74 per cent reduction. The methods used which may have been partially possible for this reduction are as follows:

(a) *Safety Talks and Lectures* given wherever the opportunity was afforded to Kiwanis, Rotary, Lions, and other clubs.

(b) *First Aid Talks and Demonstrations* given in all cases where manufacturers and fire-departments requested this service.

(c) *Newspapers* cooperated to the extent of publishing all copy furnished.

(d) *Car (railways) Cards* helped to inform car-riding patrons precautions that might be taken to insure greater safety.

(e) *Dash (railways) Posters* displayed on front and rear ends of cars were helpful in bringing safety to the attention of pedestrians and automobile drivers.

(f) *Public Schools Plan* designed for teaching children the fundamental principles of safety.

The importance of public school safety work should not be over-looked, for it is among children that the need is greatest, and once a young mind is impressed with the great need for carefulness, gratifying returns may be expected. There is little question that children are the best advertising mediums to be found and where printed matter would be wasted effort, insofar as adults are concerned, a child will carry the whole story home to the willing adult ear.

During the spring semester 1927, the speaker personally visited 93 schools, gave 203 talks, ranging from a ten minute to a forty-five minute school period, and carried the safety message to 52,170 school children from the primary to the highest grades. The safety talks were given in a language understandable to the grade of pupils addressed. A stiff, stilted, grown-up manner of address would be entirely lost on school children, and the successful speaker must be as changeable as to age, action, talk, etc., as a chameleon. The "Always Be Careful" clubs were formed in each school and the members were given buttons and printed folders containing a safety pledge and rules. The motion picture film "Ask Daddy" was shown at each opportunity as the scenario ties in with the formation of the club.

It is of course necessary to enlist the cooperation and sanction of school authorities before such work may be started.

The West Penn System has found this last named treatment of the public safety situation by far the most productive of results, and heartily endorses this plan of attack to other utilities, industries, etc., interested in public accident reduction.

CHAIRMAN STORRS: Another phase of the public transportation problem and one which I think we all recognize as being a most vital one, is that of the service rendered by taxicabs.

We have the pleasure of having with us this afternoon Mr. W. W. Cloud, president of the National Association of Taxicab Owners, and president of the Yellow Cab Company of Baltimore, Maryland.

The Viewpoint of Cab Companies

Wm. W. Cloud, President, National Association of Taxicab Owners, and President and General Manager, Yellow Cab Company, Baltimore, Md.

The particular subject assigned me covers two separate and distinct passenger transportation industries. Different as to their equipment composition, operating methods and business conduct. Both however have grown to tremendous proportions in recent years, representing vast capital investment, employment importance with mileage performance and passenger carrying records which have earned for them a deserved position in the great scheme of passenger carrying industries of our country.

Charged with the responsibility of transporting a goodly percentage of our population year by year, those of us actively engaged in this work realize that the small percentage of accidents and fatalities against miles operated, is not a condition of chance but has been accomplished through proper business conduct and the adoption of safety methods applied to operations, together with the education of and cooperation with the public.

Referring to the standardized cab industry, for which by reason of an active identification with it of 19 years, I can speak from experience and with some degree of authority, I know that its operators consider safety a business fundamental, without which success would be impossible. To this end, they each year, either appropriate a definite lump sum or set same up from mileage run to be used for educating their employees and the public as to the value and importance of safety. To succeed in the role of educator, one must be educated, particularly when one's pupil happens to be the public.

Therefore, the cab industry some years ago started to put its house in order, and the good work has continued. Hiring and firing methods of the old days were abandoned. Careful selection of employees, with physical examinations and psychological tests for drivers was introduced. These drivers were proclaimed to the public as safe, honest and courteous and by like token were the improved conditions emphasized in the public mind. Many thousands of dollars in newspaper publicity were spent throughout the country to carry this educational propaganda. Safe drivers schools and safety contests were promoted within the organizations. Of these the public were told about through convincing newspaper advertisements, booklets, pamphlets and other media. Out of the campaigns safety contagion has been spread.

Through the convention activities of the National Association of Taxicab Owners, with which many of the standardized cab companies of the United States are affiliated as members, a number of cab operators have become actively associated with their local Safety Councils and by reason of their knowledge and experience in safety work, have been of practical help in the development of these Councils and the carrying on of their activities.

The officials of our association have consistently urged these affiliations,

realizing that with the adoption of public safety as an important part of the work, representative organizations, such as the National Safety Council and local Safety Councils, have a definite function for them, reach the public in an educational way and should be supported.

Time does not permit a brief on what the bus industry is doing to educate the public as to safety, nor am I qualified to give same; however the great importance of this industry and knowing the caliber of men who are identified with it, we can rest assured that they are doing their full part and can be counted upon to cooperate and help further the usefulness of this great movement.

In conclusion, this short brief would be sadly lacking were it not to emphasize the fact that these of us who by virtue of our occupation are from time to time brought close to the great tragedy of accident, fully realize our responsibilities to the public and are conscientiously striving to bring our operations to a higher degree of safe conduct. Out of which not only comes the material compensation of greater efficiency and more orderly procedure but the higher humane reward of helping safeguard life and limb.

CHAIRMAN STORRS: Private transportation, which almost killed off public transportation until it came to life again, is one of the vital factors in our public life because about 25 per cent of us use private instead of public transportation. The motor clubs of the country are doing a wonderful job in connection with safety work and we are fortunate in having with us Mr. Charles M. Hayes, president of the Chicago Motor Club of this city, who will present the matter to you. Mr. Hayes.

The Viewpoint of The Motor Clubs

Charles M. Hayes, President, Chicago Motor Club, Chicago, Ill.

Long before there was any serious accident problem, the Chicago Motor Club was engaging in active safety work, for we could see that the growth of the automobile industry would bring with it a stupendous accident problem. In those early days the danger of grade crossings was stressed. Motorists had not learned the high degree of danger that exists at these crossings, and at that time the railroads had done little to protect the motoring public. Today the grade crossing danger has by no means passed, but motorists are more aware of this danger. The railroads are doing great work in protecting and in eliminating dangerous crossings and are deserving of credit for their endeavors in trying to reduce grade crossing accidents.

The next stage of development was the sign erection stage. Like the grade crossing stage of safety development, this sign posting stage is still here. Our progress in accident prevention has brought additional needs, but we have by no means outgrown our dependence upon warning signs—in fact, the need is more pressing today than ever before. As soon as the club in the early days, with its small membership of a few thousand, could afford to pay for warning signs, we saw to it, that they were erected at dangerous crossings. (In fact, I used to go out on sign boarding expeditions myself.) This work is being carried on today on a scope that the limited finances of the early years could never have permitted.

Our accident prevention department maintains a large map of Chicago on its office wall, and whenever a fatal accident occurs the location and nature of the accident are indicated on the map by the use of colored pins; and the large numbers of pins clustered in certain spots bring up vivid pictures of the tragedies that have happened there. An unusual number of accidents in one spot

indicates some unusual hazard, and just what this is we try to determine. If it is in a school district, we find out whether or not there is a schoolboys' patrol, and, if not, why not.

This department concerns itself with the saving of life, and uses many methods in promoting the cause of safety. The erection of warning signs is one method. Warning and direction signs are erected everywhere. A sign at a dangerous spot might some time save a life. The actual work in connection with this phase of accident prevention is carried out by the highway department. In 1926 the Chicago Motor Club erected a total of 2,894 signs, classified as follows: 148 Caution; 771 School; 126 Danger; 48 Railroad; 7 Left turn.

Another method is general publicity, and this method is carried on by means of motor news, articles sent to the press, radio talks, and literature showing how accidents are caused.

Today we are in the third stage of safety development—the stage of safety education. We believe that safety education must begin in the schools, and that this is a most important part of the child's curriculum. The club is now engaged in the work of helping school authorities to educate children in the fundamentals of safety. This work is accomplished by means of several agencies. The School Boys Patrol is one of these agencies, and the Chicago Motor Club has fostered this work everywhere in the territory of the club. The engineer in charge of our accident prevention department supervises this work in the schools.

The Safety Habit, Once Developed, Will Remain

Habits of caution can be built in childhood's plastic age that would be difficult if not impossible to instil in later years. In the early years the child can build up what the psychologists term patterns of reaction. These habits, once formed, are difficult to eradicate. The child who is taught safety from the first year of his school life will scarcely develop into a careless motorist or pedestrian. The safety manner, once developed, will remain for life.

What is being done to develop the safety manner? The automobile clubs have entered into the problem seriously.

Most of the public and parochial schools in northern Illinois and northern Indiana, in the territory of the Chicago Motor Club, now make use of the poster system of teaching children safety. The club supplies the posters and the data used by the teachers in talking to the children about the posters. Each month the club prepares a new poster to be hung in the various classrooms. A safety film owned by the club and a victrola record are used in teaching lessons of safety.

This continuous plan of safety instruction has been in force a little more than a year, and the results have been remarkable. The fatalities among children for the first five months of 1925 were computed. There were no posters used during this period. The fatalities for the first five months of 1926 were then computed and it was found that the fatalities during this period, when the safety posters had been used, were 11 fewer than for the same period of the previous year. And this despite a tremendous increase in the registration of automobiles and a similar increase in school attendance. The plan has been so successful that it is now being used by a number of other clubs affiliated with the American Automobile Association. It is a practical safety plan because it is not a plan for a day or a week, but one that is constantly engaged in putting over the idea of safety throughout the year.

Closely allied with the poster plan is the work that the club is doing with the school boy patrols. These patrols render invaluable safety service. Where

the boys of the patrol are well organized and thoroughly drilled in their duties, a noticeable improvement in the conduct of children on the street will be noticed, and with this improvement will come a reduction in accidents. In order to encourage the boys, the Chicago Motor Club once a month issues a bulletin to all members of the patrol in the territory of the club. An interesting event in connection with the work of the Chicago Motor Club in schools took place last June when the Chicago Public School patrol teams met to compete for the Chicago Motor Club trophy.

On some of our early inspection tours we found that, contrary to instructions, boys were standing in the middle of the street to direct traffic. This practice caused the school authorities a great deal of worry. We tried to impress on the boys that traffic should be directed from the sidewalk; that the principal duty of the patrol boy is to keep the children from running pell-mell across the streets; that the boys are charged with the safety of the children and should not concern themselves so much about the flow of the traffic. We have in most cases found the boys amenable to suggestion, and this practice of standing in the street has been practically stopped.

Accidents can be reduced by day in and day out attention to accident prevention. Spasmodic attention to safety, hysterical and emotional campaigns, are useless. With motor and pedestrian traffic on the rapid increase, closer cooperation between the two bodies should be fostered. This can be brought about by a campaign of education directed toward motorists and pedestrians, alike, and toward adults as well as children, and by a sense of the obligations of courtesy on the part of all. The need for uniform courtesy and consideration is urgent. Children should be taught that the street is a dangerous place to play as they are taught that fire will burn.

We already have enough laws. Additions to those now in effect may do more harm than good by bestowing upon the pedestrian a false sense of security.

Science has made tremendous progress during the past 25 years in cutting down fatalities from children's diseases. Specifics have been discovered for diseases that formerly had a high fatality rate. What the scientist has done in his laboratory, in his calm, unemotional way, we who are interested in accident prevention must do. We must use laboratory methods. The day of the emotional, sob-sister campaign has passed.

CHAIRMAN STORRS: You have heard the public utility and private transportation agents. In this problem the education of the future generation as well as the present generation is what we look to for final success.

We have the great privilege of having with us Mrs. Walter H. Buhlig, president of the Illinois Council of Parent-Teacher Associations.

The Viewpoint of the Community Organizations

Mrs. Walter H. Buhlig, President, Illinois Council of Parent-Teacher Association, Chicago, Ill.

The last speaker said he was acting from the standpoint of conservation. So, too, are the parent-teacher organizations throughout the country. It is an evident fact that we shall not have the children to educate and to train if we do not conserve the lives of the children, and as we emphasize different activities with children we are beginning to emphasize more and more the ramifications that come under the head of safety.

Our national organization and the National Safety Council have cooperated to

the extent that the National Council has prepared three questionnaires to be distributed to the parent-teacher associations in every community. Questionnaires are frequent and not very popular and it is going to take a double push from our organization and from your organization undoubtedly to bring these questionnaires back in large numbers.

I want you to know the National Congress of Parent-Teachers is offering co-operation of this sort. We have over 1,000,000 members. We have a branch in every state of the union except Nevada. We have 26 parent-teacher associations in the island of Hawaii. If you want to get in touch with the state organization and don't know to whom to apply, write to our national office, the National Congress of Parent-Teachers at Washington, D. C., and you will be told just who is the president, or some one with whom you can get in touch.

The parent-teacher associations are made up of men and women. We are not just a woman's organization. We realize that dad has much more to do with the family than just provide the financial end of it and we are very anxiously urging the dads of the communities to come into the association in full membership, not just to pay the small dues, but to participate. And because this is a democratic organization, organized in every school where we can have it, without respect to race, to color or to finances, we feel that we have the avenue through which all of those things which concern the welfare of the children may be promoted. Since you are, each and every one of you, interested in this particular phase that has to do with children and with child welfare in the community life, I want to ask you to get in touch with the parent-teacher association and help make it stronger and make it an avenue for safety education.

CHAIRMAN STORRS: We are fortunate in having with us a representative of the movement in the schools of the land in Mr. Thomas F. Power, assistant superintendent of schools, Worcester, Massachusetts.

The Viewpoint of The Schools

Thomas F. Power, Assistant Superintendent of Schools, Worcester, Mass.

Before attempting to answer the question, what the public schools can do to help educate the public for safety, I feel that in all justice to my conscience I should recognize the indebtedness of the school people to the work of the National Safety Council.

Without the initiative of this safety work by the National Safety Council, working indirectly through local councils in their management, it is undoubtedly true that safety education would not be in the school systems of a great many cities of our country.

If there are school people present they can recall that in the history of the educational movement in America the initial sponsoring of many projects was carried on by outside agencies. The enthusiasm of those agencies is responsible for the initiation and the justification of the work which school people later have gathered to support. The history of America is full of instances justifying the work of these so-called outside agencies.

In answering the question as to what can the public schools do to help educate the public in safety, I am going to make a rather challenging answer.

The most direct and useful opportunity for educating the public for safety is through the public school children. You cannot have an army of school children singing safety songs, writing about and discussing dangers and safe practices, acting out pantomimes, playlets, computing problems in arithmetic that deal with the atmosphere of safety, without having some of the educational results carry over into the lives of adults of the community. An interesting, small piece of evidence

of this is found in the attempt of a child to prevent his father from cutting corners on a main thoroughfare of our city. "You must go to the next corner," said the child. "We are taught to cross at street crossings."

The introduction of safety patrols of school children commands the respect of adults. This orderly crossing of highways by school children marching, two abreast, under the direction of their patrolmen and captains, is an impressive sight. To my positive observation in our city where almost all of our seventy public and parochial schools are thus organized, the safety patrol makes a very psychological impression upon automobile drivers. During the spring of 1926 one court conviction of an autoist for failing to slow down while approaching the school patrol, and three cases of suspension of automobile licenses for thirty days each by the Massachusetts Registrar of Motor Vehicles, for refusal to recognize the rights of school children as pedestrians, made such an effect upon autoists of the city that during the subsequent school year of 1926-27 not one case was discovered of any autoist in our city of 200,000 population who failed to recognize the rights of school children to cross the streets in orderly formation.

A Long Record Without a Child Injured

During this time from March, 1926, to June, 1927, not one child was injured fatally or non-fatally at dismissal time in our city. Such dismissal formation includes approximately 35,000 school children twice a day. To create such general respect for the rights of school children as pedestrians on our highways requires the support of all newspapers. The above results could not be achieved without a generous amount of space in the news and editorial columns by all local newspapers.

The introduction of Safety Education into the public and parochial schools of our city has been, in my judgment, the prime factor in reducing fatal accidents to children on the highway by approximately 50 per cent. Statistics from January 1, 1927, to August 1, 1927, show a reduction of approximately 50 per cent of fatalities to children on the highways in our city. We believe that, in the main, this high result is due to the teaching of safety by approximately 1,000 teachers to about 35,000 public and parochial school children. These statistical results are due in part to direct instruction given by the teachers and to the indirect results in the homes created by this general atmosphere of safety resulting from the introduction of the subject into the public schools. This period of reduction corresponds exactly to the time when formal education in safety was put into the school system. By formal education, I mean not only the orderly dismissal of school children under the organization known as the "Safety Patrols," but the teaching of proper attitudes of mind, correct safety habits, through the three R's and the other subjects of the grammar school curriculum. All this work can be done without crowding out anything, as has been proved by the formal Worcester Course of Study in Safety Education. The material to be used follows modern school procedure. Because so much of it is taken from the lives of children, it is well motivated. Teachers are eager to use it, because it is highly social. All in all, it places a new emphasis or interpretation upon existing material.

Safety was introduced into the Worcester schools through an experimental or laboratory school during the spring of 1926. After the teachers had spent several months organizing, selecting and compiling material, parents, members of the executive committee of the Worcester Safety Council, city officials, citizens, generally, were invited to view such demonstrations. The work was altogether praiseworthy. In my judgment, this, too, contributed towards educating the public for safety.

Another practical means of arousing the public to keener consciousness of danger and to safe habits is to present to the public a demonstration of the work done in

the schools. This was done in Worcester during the Spring of 1927. The several thousand citizens who saw the display in the Chamber of Commerce Building were very favorably impressed with the attempts to develop safety practices in the children. Psychologically, it is evident that a display of posters, graphs in arithmetic, hand work, compositions, penmanship exercises and evidences of work done in all other subjects from Kindergarten through Grade 8 would make the public, generally, stop, reflect and conclude favorably. This is all apparent and there is no need to go into ramifications of the effect upon human minds.

It may be rather challenging to say that education of the public can best be accomplished through the children. This is not the only reason why education for safety should be in the schools. One who has studied the causes of accidents and analyzed the material used to offset those causes must admit that this material is proper educational matter. Ignorance of conditions, or facts, improper attitudes of mind, improper physical habits, dangerous personal tendencies, lack of control, irresponsibility and such have been the causes of thousands of accidents. In offsetting these causes, the material used is educational. On the face of things, supplying information, forming correct habits of body, correcting improper habits, forming correct attitudes of mind, correcting faulty attitudes of mind, developing control—all have been, for ages, proper educational material.

It would appear from this brief summary of causes and procedure just listed that one could go on pedagogically and psychologically to justify the teaching of safety in the schools. It is not my desire to attempt to justify the teaching of safety in the schools from an economic point of view. That is undoubtedly being done in other sections of this convention. But, it is my opinion that the slaughter of humanity and wastage of physical property, which has become so absorbingly a part of our economic organization, must be offset in part by teachers. Modern conditions of life have made this demand upon our schools. This is one respect, wherein the complexity of modern society, has demanded a changed conception of public school education.

CHAIRMAN STORRS: You have had presented to you the various phases of the safety movement from the standpoint of personal and humanitarian interests of the utilities and private automobile agencies, the home and its appeal for the conservation of infant life. You have yet to hear of the great possibilities of the National Safety Council offered through the movement in the local safety councils.

I have the great pleasure of introducing Mr. A. Hardgrave, past president of the Kansas City Safety Council, Kansas City, Missouri.

The Viewpoint of The Community Safety Council

Arthur Hardgrave, Past-President, Kansas City Safety Council; President, City Ice Company, Kansas City, Mo.

It was a little less than a quarter of a century ago that American industry became interested in the prevention of accidents. The purpose then was, and the purpose today still is, based on economic principles. Industry coined the slogan "Safety First," and, notwithstanding that in the drift of years slogans have come and slogans have gone, the humane appeal incorporated in "Safety First," has caused it to be translated into many tongues and has carried its work into practically every civilized country on the face of the globe.

At the beginning many agencies worked independently in their respective fields. A little later these agencies were grouped together under what ultimately became local councils. With the further recognition of the importance of safety work, a national head, or fount, under the title of the National Safety

Council was formed. By this method and through this channel, it has been possible to coordinate the efforts of all agencies and to bring about almost complete cooperation.

Coordination of ideas and cooperation of effort backed by men—human individuals deeply concerned in safety—are the fundamental factors contributing to the great success of safety work in this country.

We are making great strides in safety work in this country, both industrial and public and especially in the industrial line.

The big field before us is public safety. While we have just begun the great work, to succeed in this branch of safety we must reach down into the uncontrolled public mind.

There is a message—a universal message—that must be carried in a convincing manner to the 115,000,000 people in our country. This can best be accomplished through the medium of the local or community Safety Council. With the National Safety Council acting as a clearing house of ideas and methods, these Community Councils are able to carry a uniform message and progress with a unity of thought and of purpose. By no other method would this be possible.

Coordination of Effort Through the Council

It has been demonstrated beyond question of doubt that the local Safety Councils can best function in this manner. There are many agencies doing effective and most commendable work and this work should be carried on and further developed. However, to obtain the maximum results, the work of these various agencies should, where possible, be coordinated; and this coordination is most effective through the local Safety Council where the work is of a local nature.

The local Safety Council is a cooperative organization providing the facilities to which the work of all agencies interested in safety can be tied together and duplication of effort eliminated.

There is another fact which should be seriously considered in discussing the value of Community Safety Council work and that is the attitude of the public toward National organizations. However extensive may be the National Safety Council program of educational work, nevertheless it is sometimes discounted, owing to the fact that their organization, representing, as it does, a specific general purpose, cannot expect to be accepted by the local public as representing a disinterested attitude.

When the Community Safety Council presents a recommendation to the community it is accepted as being a recommendation which represents the combined interests of the many units which go to make up that particular community. How can it be otherwise when the Board membership of the community council includes the representation of practically every phase of community life and its respective organizations? They should be sold on the idea that any movement which they desire to have sponsored would be much more effective if they would lend their support to the Safety Council and ask their cooperation in sponsoring the movement rather than trying to conduct an individual educational campaign. For example, how could the Motor Club be expected to put on an effective campaign for pedestrian control? How could the railroads put on a campaign for the protection of grade crossings and for the enforcement of the rule that motor cars should stop at the hazardous grade crossings? How can the electric railways put on a campaign for the preservation of the rights of the citizens when standing in the safety zone? How can the schools put on a program including safety in their curriculum?

without being criticized by some of the citizens for introducing a fad into the schools? All of these campaigns would be deserving of the support of the Safety Councils and could be effectively consummated because the public of the community recognizes that the Safety Councils not only represent the interests of the individual organization or corporation, but that it also represents the interests of the other 85 or 90 per cent of the community.

Educating the public for safety cannot be accomplished by the Safety Council assisting the motor club, the railways or the other organizations, but it will only be accepted by the public when it is sponsored by the Safety Council, and following such sponsoring, the cooperation of each of these organizations can materially add to the effectiveness of the campaign.

Experience has demonstrated that three distinctive lines must be pursued in community Safety Council work; namely,

1. Engineering,
2. Enforcement,
3. Education.

In developing the program of the Community Safety Council, we must, therefore, give consideration to each of these three fundamental factors and drawing together the various activities in the community, feel sure that the program is properly coordinated and properly proportioned. The installation of automatic signals or the creation of through streets without adequate enforcement spells failure. On the other hand, strict enforcement without proper education does not obtain the proper and necessary support of the public. Assuming it is possible to obtain the coordination of agencies interested in the engineering and enforcement factors, then it would seem the major problem of local Safety Councils would be along the lines of education, and experience has shown that this is, indeed, a difficult part of the Safety Council work, for here we must deal with the uncontrolled, unorganized public mind.

As a general rule the average citizen braggingly states he is not interested in the work of safety. He speaks from the conscious and not the subconscious viewpoint. It cannot be questioned that the work of safety, both industrial and public, is rooted deeply into the subconscious mind of the public, so deep in fact, that it cannot be eradicated or washed out by mere idle statements. This is due to the very nature of the work—the human appeal—the inherent characteristic of humanity to save and protect.

The Adult Is More Difficult to Educate

The education work of safety becomes more difficult when dealing with the mature person, because of the difficulty to reach the fixed conscious mind. It is upon the adult subconscious mind that we must depend to obtain the results desired in public safety.

In the case of the child or youth, we deal with the receptive conscious mind which, contrary to the mature mind, recognizes its knowledge is limited and is grasping for enlightenment.

The work of educating both the conscious and subconscious mind of the public can best be accomplished by and through local Safety Councils for reasons which are obvious. The work of public safety must be national in scope and made effective locally. A uniform national message must be handled through local agencies.

It is only the local agency or the Community Safety Council that thoroughly understands the problems of its respective locality. The National Safety Coun-

cil. as a national body, can plan and outline and advise, but it is only the Community Safety Council that can mould these thoughts into action.

CHAIRMAN STORRS: I find that your very efficient Program Committee has down as the conclusion of this portion of your program on the agenda today, the suggestion that your chairman sum up the salient points of the various addresses so that the audience may be left with some definite, coherent impression.

Your chairman hesitates to impose upon you any further, as you must have a very definite, coherent impression (to use the quotation) of the matter that has been so ably presented in all its aspects. The magnitude of the task, the efficiency of the labor and the results that are being obtained mean much. They are good results, but not good enough. Only those can come by a continued cooperative effort.

You are to be favored with the presentation of a playlet by Mr. A. W. Whitney, whom you all know as the Chairman of the Education Division of the National Safety Council and head of the National Bureau of Casualty and Surety Underwriters.

Mr. Whitney is an enthusiast and has a real, fundamental philosophy of education.

For the presentation of the play you are greatly indebted to the Chicago Board of Education, the staff of the school system, the Nathaniel Pope School in particular and its teachers, also to the Academy of Dramatic Education.

For an explanation of the little play these booklets are available. To quote from it, "The present play undertakes to interpret the transition in a child's life from the dominance of fear to the dominance of knowledge."

(A morality play, "How Knowledge Driveth Away Fear," by Albert W. Whitney, was presented by the pupils of Grade 6A, Pope School, Chicago, Illinois, Frank A. Fucik, principal, Helen Oleksy, teacher, directed by Irene Skinner and Donald Marye, Academy of Dramatic Education.)

ADJOURNMENT

Wednesday Morning, September 28, 1927

COLONEL JAMES SINKE, Chairman
Director of Public Safety, Grand Rapids, Mich.

The second session was called to order at nine forty-five o'clock by the chairman, Colonel James Sinke, Director of Public Safety, Grand Rapids, Michigan.

CHAIRMAN SINKE: We have for our first topic this morning a subject that has been creating a great deal of interest throughout the country. There has been much said pro and con relative to the advisability of pedestrian regulations. I know it has been discussed to a great extent in my city for the past three or four years, but we have never done anything about it and have been watching the success of other cities to have a precedent to fall back upon. Some of the cities in the South and some in the West, I understand, have had a great deal of success with it. Some of the older communities have found it harder, I believe, to put those regulations into effect.

We hear a great deal of fine comment about Los Angeles' pedestrian regulations out our way, and I think we are exceptionally fortunate in having Mr. Lefferts with us this morning to talk on the subject. Mr. Lefferts has not only been with the Automobile Club of Southern California for several years, but prior to that time he had been a Safety Council manager. He has been in quite close contact with the development of the traffic movement for a considerable time, and it is my pleasure to introduce him to you.

Regulation of Pedestrians

E. B. Lefferts, Manager, Public Safety Department, Automobile Club of Southern California, Los Angeles

The subject assigned to me for discussion is one of the great problems confronting everyone interested in municipal traffic regulation. For many years this holding of pedestrians for the "Go" signal, as has been practiced so univervally with vehicular movement at heavily traveled intersections, has seemed to be practically impossible of attainment. To all who have observed the confusion as well as danger resulting from mixing these two classes of traffic no argument is necessary to convince them of the desirability of definite and effective segregation.

This ideal of so controlling pedestrians that danger is minimized, and the maximum vehicular capacity of an intersection is obtained through uninterrupted flow of travel during the "Go" interval, has been realized in Los Angeles. I shall endeavor to outline the high lights as to how and why this has been possible. Aside from the apparent benefit of such control, engineers who have given serious study to this realize that this is a matter of life and death, because statistics show that 70 per cent of all traffic fatalities result from collisions between motor vehicles and pedestrians.

Our experience in Los Angeles is to me proof positive that pedestrian control is like practically all other safety measures, a matter of education. This has been proven by the long and torturous path this plan had to travel before it finally was enacted as a law. During a period of three years it was introduced three different times in our City Council and each time it was vetoed by the Mayor.

Naturally, each time it came before the Council it attracted a great deal of attention in the newspapers and was quite generally discussed on the street. Finally sentiment had been developed in favor of this regulation to such extent that it was

possible the third time to pass it over the veto of the Mayor. The third time, in addition to pedestrian regulation, the entire ordinance was revised and simplified. This gave a splendid opportunity to furnish articles regarding the provisions of the ordinance to all of the daily papers, and they gave the necessary space because the interest and discussion aroused gave added news value to these regulations.

The radio broadcasting stations also helped, and as a result of their cooperation we were able to have every station in the city broadcasting the same information regarding provisions of this new ordinance at eight o'clock each night during the week before the ordinance became effective. Each speaker was furnished with the same copy, consequently during this period if a person tuned out of one station and into another they would receive the same message. In other words, the radio audience had no escape from the informative talks on this regulation in our city.

During this same period the Automobile Club of Southern California, the police department, oil companies and similar agencies having direct contact with the public, printed and distributed over a quarter of a million copies or summaries of the ordinance. Therefore when the ordinance became effective there was no need to do other than remind our citizens of its provisions because there was no valid excuse for ignorance.

Lanes Provided at Each Street Intersection

This complete control of pedestrians and automobiles followed a series of experiments in dividing the right of way between the motor vehicle and pedestrian. For a long time we have had on our statute books, like most other cities, a regulation compelling automobiles to stop behind standing street cars, which provides protection to pedestrians desiring to board and alight.

Next, primarily with the thought of protecting the school children of our city white lines were drawn across streets where large numbers of children regularly crossed, and motorists were required to stop before crossing these lines. This experiment was not successful, as it compelled many motorists to come to a full stop during hours when there was no need for this precaution. As you all realize, any law to be observed must be reasonable. This was not a reasonable regulation, with the result that compliance was not obtained in the majority of instances unless a police officer was present.

We finally decided upon our present regulation which calls for the prolongation of the sidewalk lines across the street. These lines are divided in the center by another white line, making in effect an elongated letter "H" between the curbs with the cross bar of the letter in the center of the street. A motorist is compelled to stop and remain standing while a pedestrian is in that half of the lane on the side of the street upon which the motorist is travelling, until the pedestrian has passed beyond the path of the vehicle.

Our next proposal was to separate pedestrian and vehicular traffic through the construction of pedestrian tunnels. A bond issue for \$350,000 was submitted to the voters and passed with the largest majority of any issue submitted at that election, showing conclusively the interest taken by the public in this question of protection child pedestrians.

Upon passage of the bond issue we were confronted with an interesting problem of properly locating these tunnels. Naturally every parent wanted a tunnel across the thoroughfare where his child would cross in going to and from school. Our original estimate showed that 35 tunnels could be built with this money, which naturally meant that some parents would be disappointed. It was therefore necessary to study in detail the proposed locations to determine which were the most dangerous crossings. I therefore undertook for the Automobile Club of Southern California a detailed traffic survey of all crossings in the vicinity of schools, which included traffic counts of vehicular and pedestrian movement at 150 of the most dangerous

locations. Through the amassing of this data we were able to suggest to the constituted authorities tunnel locations which would give the maximum protection to the largest number of children.

After starting construction it was found that these tunnels could be built at a lower price than was originally estimated and when this year's building program has been completed we will have over 40 tunnels in operation which have been financed entirely by our original bond issue of \$350,000. In addition to providing protection for pedestrians, these tunnels greatly facilitate vehicular traffic movement by eliminating interruptions in its flow, as well as relieving police officers for duty elsewhere.

In Los Angeles County alone there are 645,549 automobiles, or one to every two and a fraction persons, which of course means that the largest majority of our people either own or ride in automobiles, with the result that we have a population which is "motor minded." Possibly this is another reason why the regulation of pedestrian travel has been so eminently successful in the city of Los Angeles, as it is not particularly difficult to sell to a motorist the idea that pedestrian regulation is a necessary adjunct to the expeditious and safe movement of traffic. It is a fact that the regulation of our pedestrians has expedited vehicular movement in our congested areas and the vehicular capacity of intersections has been materially increased since pedestrian movement has been synchronized with vehicular movement.

The question of enforcement has always loomed large in everyone's mind whenever this regulation has been contemplated and I know you will be interested in hearing how this phase of the problem was worked out in Los Angeles. To the best of my knowledge, but two arrests were made. These occurred soon after the regulation became effective and it was generally accepted that the violators were simply publicity seekers.

The Policeman Makes the Pedestrian Obey

The procedure in general is that when a person steps off the curb when the signal is against him, the police officer gives several sharp blasts of his whistle and beckons the absent minded individual back to the curb. When this person turns and goes back to the sidewalk he is facing a large gallery of amused people and he shamefacedly takes his place with the waiting group. Of course some persons are headstrong and refuse to be deterred by the officer's whistled warning. In such cases the officer simply escorts them back to the side of the street from whence they started. Arrests are not made except when persons become abusive and refuse to obey orders. We have found in both of these situations that the ridicule of their fellow citizens is far more effective than any other means which might be adopted.

We have in our city 371 mechanical traffic signals of which 81 are in the down town or central traffic district. We have given considerable thought to the time intervals at all intersections so controlled. The "platoon" or "wave" system is being used, which from the standpoint of the motorist causes the minimum amount of delay, but we have also given careful consideration to the pedestrian phase of the problem.

There are 16 different cycles in use in our down town area. The "wait period," or that represented by the amber interval where the three light signal is used, varies from six to nine seconds. In the early morning and late evening hours the intervals are short, while at noon and during the five o'clock peak hour the nine second interval is used. The "Go" period for vehicles is never longer than 36 seconds, giving from 68 to 90 seconds for the complete cycle. I know that in some cities the "Go" interval has been set at as long as 180 seconds. There the pedestrian control is not effective. Try standing still in one location for three minutes some time when you are in a hurry,

and you will see why 180-second intervals make it almost impossible to control pedestrians.

We have recognized that in controlling traffic we must take into consideration the study of human psychology, rather than approach it solely as an engineering problem. As American citizens we believe in fair play. The pedestrian does not resent being regulated when he realizes that he is getting a fifty-fifty break with the motorist, which is the case if he is not required to wait an unreasonable length of time on the corner and is given some protection when he happens to be in the center of the street when the signal change takes place.

In conclusion I want to say that in the city of Los Angeles we do not have any different type of people than is found in any other community in this country. Our population is very cosmopolitan, having been drawn, as you know, from all over the United States. We find that even our visitors, after one or two false starts, fall into step and observe our regulations just as willingly as do the residents. I feel that this same regulation, with the consequent decrease in hazards to pedestrian traffic, can be effected in any community, provided the necessity for giving the pedestrian an even break with the motorist is recognized.

Pedestrian Regulation Effective Throughout the City

CHAIRMAN SINKE: Mr. Lefferts, I would like to ask if the pedestrian regulation with your automatic signals is effective throughout the entire city?

MR. LEFFERTS: Yes, Colonel, it is. Possibly one reason why it has been so effective is because we have a heavier vehicle crossing in our outlying areas than in our downtown areas. Seven thousand vehicles passing through an intersection in one hour make it hardly necessary to argue with the pedestrian that he should wait until all of those vehicles are stopped.

CHAIRMAN SINKE: Is this regulation effective throughout the 24-hour period of time?

MR. LEFFERTS: The regulation states that the pedestrian shall move with the signal "Go" for vehicles. If there is no traffic officer on the corner, or a traffic signal is not in operation, the pedestrians naturally are not regulated. We have a basic regulation that pedestrians shall cross at intersections. That is quite rigidly enforced in our downtown area. You see very little jaywalking there. In the outside area the regulation is, pedestrians shall not cross except at intersections if so doing interferes with the free moving of traffic.

WM. R. MILLER (Rochester Police Department, Rochester): Regarding the time on the amber light, did I understand you to say it was nine seconds? If the pedestrian is moving with your signal is it necessary to have the amber light on that length of time?

MR. LEFFERTS: Yes, that is in the most congested pedestrian period, for instance, in the noon hour. It is necessary in order to give the pedestrian who has gotten ten feet out into the street when the signal changes, a chance to continue his crossing safely. The wait period, or the amber period, of necessity must vary with the width of your street. Nine seconds is the maximum interval, down to six seconds, depending upon the volume of pedestrians crossing. We have pedestrians crossing 35,000 and 37,000 an hour on our busiest intersections, so we have to give them a little chance to get across the street after the signal has changed.

MR. MILLER: We have found we can't keep the amber on that length of time. We eliminate both left and right turns, which allows our pedestrian traffic to go with the light.

MR. LEFFERTS: That is a local condition depending upon your own particular

locality. We tried that for a while, but we got more congestion by prohibiting the right turn.

CLARENCE SPAYD (Brooklyn Safety Council, Brooklyn): I am very much interested in the work which the Automobile Club of Southern California has done and I would like to ask just what position the club took as an organization when this ordinance was passed. Did you do any propaganda work other than what you mentioned over the radio, or how did the club perform?

MR. LEFFERTS: We helped with the radio broadcasting. It was not a proposition of the automobile club alone. Civic organizations throughout the city were interested in putting this over. We helped with the drafting of the ordinance. We furnished summaries to our members. We have about 126,000 members and we circularized them quite generally with summaries and propaganda in favor of the ordinance; and also furnished, as did many other organizations I mentioned, the police department, the newspapers and others with summaries of the ordinance so as to try to disseminate this information in every way possible. I think there was nothing that could be done that was neglected in helping to make the ordinance effective and insure its passage, and then the acknowledgment of the people of its provisions after the ordinance was passed.

A. C. BURNETT (Bexar County Safety Council, San Antonio): You haven't given any information concerning the accidents prior to and after the enactment of this legislation. You mentioned the fact of the speed of motor traffic.

Many Things Affected the Accident Reduction

MR. LEFFERTS: The year after the passage of the ordinance there was a reduction in the fatalities in the city of Los Angeles from pedestrian motor vehicle collisions. There were a good many things that took place simultaneously—the pedestrian regulation, the change of the ordinance, the provision of lines across the street, giving the pedestrian very definite rights. There was a general education program calling to the motorist and pedestrian the fact that there had been some consideration to both of their rights. We had a reduction from 155 to 129 deaths in collisions between motor vehicles and pedestrians, in the period of one year.

REYBURN HOFFMAN (City Traffic Engineer, St. Louis, Mo.): May I add in support of Mr. Lefferts' figures, and also to answer the request of the gentleman on the left for some figures as to reduction of accidents, one small experience in our city? We have anticipated this question of pedestrian regulation at signalized corners; so based upon two years of experience at signalized intersections, one year before and one year after the signals were installed, we found this: We took a dozen typical intersections, some on very busy streets and some on relatively minor streets but where signals were located because of proximity to churches and schools. We found that the total accident reduction was 75 per cent after the signals were installed. We found the reduction in which pedestrians were concerned was somewhat less, only 55 per cent.

The logical conclusion to draw from that would be that the pedestrian still needed a good bit of regulation, and we are building up this data so we will have quite a complete file at such time as this subject comes up for serious consideration.

MR. SPAYD: How do the courts deal with those who violate this new pedestrian ordinance?

MR. LEFFERTS: I tried to make that clear in my paper. We have had but two arrests, to the best of my knowledge, where the pedestrians were hauled before the court. The people who are absent-minded and start out into the street are whistled down by the police officer and they are compelled to turn around and come back, and everybody thinks it is a great joke and they laugh at the poor unfortunate devil who has forgotten that he should stop. He doesn't like to be laughed at, none of us do.

and as a result the officers have not had to make any arrests. If we have a rather hard-boiled individual who is going to go across after the signal, the officer sometimes meets him on the other side of the street; and I have seen them go down 40 or 50 feet (because they lose their tempers the same as the rest of us do) get this individual and bring him back, escort him back to the place from whence he started. Everybody gives him a good laugh, to which he is entitled, and that is much more effective than any other measure that could be adopted.

I have a few pictures here I would like to pass around. They will give you an idea of how the pedestrians are controlled.

CHAIRMAN SINKE: Mr. J. W. A. Bollong, street maintenance engineer of the city of Seattle, is with us this morning. He has with him a reel of pictures taken in his city showing how they regulate pedestrians. It is a special feature not provided for in the program, but we will be very glad to give Mr. Bollong about five or ten minutes to show those pictures.

An Excellent Experience Also in Seattle

MR. BOLLONG: Our experience in Seattle has been almost identical with that of Los Angeles. Our regulations and ordinances are similar. We had two or three arrests. One of them was a woman. It was given very wide publicity and it sort of put the fear into everyone else's heart in regard to the disobedience of traffic signals. These pictures were taken primarily for the education of the traffic officers so they might all act alike. One could see what the other did and then govern himself accordingly.

(The film of pictures was here shown.)

J. H. LYONS (Toronto): In what period, as to time, do you get the best results?

MR. BOLLONG: Our changes are made 10 or 12 times a day to meet the conditions, in the same manner as they are in Los Angeles. The pedestrian change is from six seconds to twelve seconds in order to give them time to cross.

CHAIRMAN SINKE: We have a very interesting program this morning and the speakers on it are men of prominence in traffic studies throughout the country. We are exceptionally fortunate. Our next speaker is one whom I think you are familiar with and whom you all have heard on various occasions. The subject he has is another subject of great interest to us throughout the country, because we are interested in uniformity, we are striving for it; we know what the Hoover Conference has done, and Mr. Miller McClintock, director, Albert Russell Erskine Bureau of Street Traffic Research, Harvard University, Cambridge, Mass., is going to speak to us. He is eminently qualified to speak authoritatively.

Uniformity of Traffic Regulations

Miller McClintock, Director, Albert Russell Erskine Bureau of Street Traffic Research, Harvard University, Cambridge, Mass.

Uniformity of traffic regulations is a subject which would seem to need no discussion. The logical course would be to give a eulogy of uniformity. But sometimes it is more interesting and valuable to do the thing that isn't so obvious. Instead of a eulogy I am going to ask some embarrassing questions.

We are often too prone to believe in iron-clad adherence to a fetish regardless of varying conditions. But in the adoption of regulations in our cities and states it is highly desirable that we should have more than a mere standard to go by. The mere fact that somebody has said it is a good thing or that other jurisdictions have adopted the regulations is not enough. So the first question is, "Why is uniformity desirable?"

The Need for Uniformity

One of the oldest mottoes I know for getting on with people, and one of the most valid, is, "when in Rome do as the Romans do." That is merely a reflection of the fact that every community must have community habits if its people are going to live together without constant friction. The ability of people to get along with other people is their ability to abide by certain customs of movement and activity which have been found to possess social utility.

That is why we are interested in uniformity of traffic regulations. Uniform regulations are not new. Out of the Middle Ages there came two very basic principles of traffic regulation. They were the only two uniform rules controlling the acts of people on public highways. One of those rules was this: That all users of a public highway are mutually and equally responsible for maintaining the safety and convenience of the other users of the highway, and that they must so conduct themselves that other people will not be inconvenienced and endangered. Subject to that rule they may use any part of that highway at any time they please.

Another great rule which came out of common law practice in the English court was this: That when two people meet head-on on a highway, each shall bear to the proper side of the roadway. In English practice, that meant the left side. That common law rule was adopted in America to this effect. That instead of passing upon the left, people should pass upon the right. That rule is the most basic rule of traffic uniformity. If it were not in existence we would have almost complete chaos upon our crowded highways and streets. The significant point about these two rules is this: That common law principles are always based on acceptable community customs, and that I believe to be the proper basis for uniformity.

A quarter of a century ago there was no pressing need for uniform habits as between various communities of the nation. People rarely went from one community to another. The absorption of 23,000,000 automobiles by the American public has changed that situation entirely. It has freed us from geographical limits and we are no longer citizens of Chicago, or Grand Rapids, or New York. We are citizens of the United States very definitely, and in a very short space of time we may move from our community through several states or even across the continent. In any city you will see many cars from other states.

In other words, instead of a habit for Rome we need a habit for the world. It is not sufficient to have rules which can be understood by the people of Chicago; they should be recognized by motorists from all parts of the country.

The Basis For Uniformity

What is the basis for uniformity? Common law practice was satisfactory because it was a rule which the courts reflected as a customary and community habit. I think it is fair to say that the only validity which a traffic rule has is its ability to be accepted as a community habit.

Present practice in the United States, even in the better cities, is something like this. There is about one traffic officer to every thousand vehicles; sometimes it runs one to every two thousand vehicles. In other words, it is perfectly obvious that the ability of the police to enforce traffic laws is an impossible problem, if we are going to depend strictly upon police enforcement. The only rule that has any validity is one which will be adopted as a reasonable rule by at least 95 per cent of the motoring public and therefore will be self-enforced.

One needs only to look over the country to see rules which are, in the abstract, very desirable, but which because of their means of application are unreasonable in the community, and therefore subject to a great deal of disobedience. Disobedience to a rule which has been established in the community is not merely an inconvenience, it is frequently a very grave hazard. It would be my conclusion that it would be better to have no rule whatsoever than to have one which presumed to give protection but did not because it was generally violated.

I want to give a few examples. Unreasonable application of perfectly sound principles in traffic regulation are known to all of us. Speed regulations furnish the most notorious application of a desirable principle improperly administered. There is still a state in the Union which requires in all cities a maximum speed limit of 12 miles per hour, and six miles an hour through all intersections in the state.

Do you suppose that regulation is obeyed? Yet there are people in that state who complain because other people violate that law, even though they themselves do not obey it. Since the rule is on the statute books people come to believe that other people will abide by it. Therefore a false sense of security and a lack of uniformity exists.

Another example is the misadministration of the through-street regulation. I know of no single law better designed to facilitate traffic flow and give protection to motorists than the boulevard-stop or through-street regulation, yet because of its merits it has been used in such a way as to spoil its adoption in many cases. The over-use of a boulevard-stop regulation or its application to those arteries which obviously need no such protection will result only in one thing—a lack of sound community habit and repeated violations, regardless of police power.

So we come to the administration of traffic signals. The installation of signals at outlying intersections where traffic is never heavy, and where the driver feels the need of no control, will tend to break down the authority of the signal. What might be a very desirable habit of strict obedience to automatic traffic signals begins to diminish.

Pedestrians will willingly obey traffic signals at intersections where signals are so regulated as to make them seem reasonable. If you should change the cycle by only ten or fifteen seconds at some time of the day so that pedestrians must wait at the intersections with nothing but a red signal to hold them back and with no physical reason in front of them to make them stay on the curb, you will find pedestrian regulation breaking down.

You might even put eight, ten or twelve officers on the curb, as they do in New York, and you couldn't hold the people back. The reasonableness of regulation is the only basis for establishing the most essential thing in public safety—uniform habits on the part of the people.

The Limits of Uniformity

How far can uniformity go? As we talk about it glibly we assume that uniformity can be made a great deal more iron-clad than actual conditions would indicate. For example, it is a great deal easier to draw up a uniform vehicle act designed for adoption by the states, including general rules of the road which can be practically identical throughout the country, than it is to draw up a uniform ordinance for American cities.

For that reason I hope we shall not expect too much or be too greatly disappointed if we find that the regulations which are being drafted at the present time as a basis for uniform regulations in American cities are not too

elaborate in detail and leave something to the discretion of the communities.

I can think of nothing more disastrous to the program of sound traffic control than some arbitrary power which might force down on these cities a uniform code from which no variation would be tolerated. We are only beginning the development of a sound technique of regulation and it is necessary for us to experiment. For that reason I hope that any attempt at uniformity of local regulations will be a moderate one that will deal only with general principles.

There is a pressing need not only for an agreement upon some of the general principles of traffic movement but also for greater uniformity in the indication of those regulations. A great deal of the sting of local regulations which vary from uniform standards can be eliminated if motorists are given due indication and notice of local variations. If this principle is followed I can see no great harm which may result in general conditions from local experimentation.

Progress Toward Uniformity

The Hoover Code, or the National Uniform Code for the regulation of highway traffic, has been adopted in practically all of its details by ten states. Probably half of the remaining states have adopted the main essentials of the code, and I believe that within the next decade we shall see a general uniformity of standards of regulation throughout practically all of the American states.

There are a number of interesting movements toward uniformity which will serve not only as a basis for the ordinance which will come out of the Hoover Committee, but will likewise be a great stimulus to the movement. In Los Angeles the city drafted a simple traffic ordinance. The Automobile Club of Southern California, the California State Automobile Association, and the California Conference on Public Safety took up the remodeled ordinance and have obtained its adoption by about 50 of the larger California cities.

There was no attempt to force the ordinance on any city. All of the cities that have adopted it did so because they believed that it was desirable to be in line with the general practice and because some of its principles were better than those which had been in effect. As you drive through California cities you are rarely aware of any lack of uniformity in regulations.

Michigan and Minnesota Have a Uniform Ordinance

Some eighteen months ago Michigan drafted a uniform ordinance which has been adopted by more than 200 cities in the state. Minnesota, likewise, has a uniform ordinance, not yet sent out to the cities in view of the meetings of the Hoover Committee. Likewise the work which has been done in Chicago is being made known throughout the entire regional district by the Chicago Regional Planning Association. In many localities there is a movement toward unification, which, I believe, will greatly stimulate the adoption of whatever ordinance comes out of the Hoover Committee.

CHAIRMAN SINKE: The first part of Mr. McClintock's talk was very interesting philosophy. I was much impressed with what he said because he made brief mention of some underlying basic principles that govern all our conduct when we attempt to regulate traffic or regulate any other human action.

We will pass on to our next subject. Mr. Kopf, the speaker, represents the Metropolitan Life Insurance Company, is a member of the Statistics Committee of the National Safety Council, and is a specialist on this question.

What We Learn From Statistics

E. W. Kopf, Metropolitan Life Insurance Company, New York City

Each year it is the privilege of some members of the Statistics Committee of the National Safety Council to give you a summary of the report prepared for the year, and to bring before you a number of problems wherein the members may assist the committee in furthering its work.

We estimate that there occurred last year in the United States about 90,000 accidental deaths. That is an increase of about 10,000 over the figure of 79,350 which occurred in 1911. Motor vehicle deaths amounted to approximately 23,000 in 1926, which is an increase of 21,000 over the number which prevailed in the year 1911. Accidental falls last year approximated 15,300; railroad accidents a little more than 8,000; burns and scalds 7,300, and drownings 7,100. There was, of course, an increase in automobile fatalities. There also was an increase in the number of falls, there being 1,200 deaths in excess of the 1911 record. Railroad accidents decreased by 4,000 deaths in 1926 over the number which prevailed in 1911. The number of deaths from burns and scaldings was about the same in 1926 as it was in 1911, and we saw in our figures a decrease of some 1,700 deaths from accidental drowning.

Each one of you who has been associated with this safety work for the past 15 or 20 years can see in these figures gains and losses, the loss from motor vehicle accidents and the gains from increased safety on the railroads and from the decrease in the drowning hazard. The death record against population, of course, ought to be taken into consideration. The death rate per hundred in 1911 from all accidents was 84.7 and in 1925 it was 78.3. The Statistics Committee does not particularly care whether the death rate is going down or up, but what they are interested in is the number of persons killed. We often hear a remark that the number of deaths per thousand automobiles is going down. But it doesn't make much difference to the man who is killed.

We do wish you to take more cognizance of the absolute number of deaths which occur. As far as the United States and foreign countries is concerned, there is a very wide margin between the accidental death rate in the United States and that in other countries similarly situated. In 1925 our death rate was 78.3; in England and Wales, 35.9; Scotland, 49.2; New Zealand, 46.7; Australia, 52.6. Strangely though, while the accident rate for the United States between 1925 and 1926 increased 2.1 per cent, in England and Wales it increased 4.8 per cent.

Automobile accidents on a national basis also afford an interesting insight. The United States 1925 death rate was 17.0 per 100,000 population. That figure may be compared with the rate of 6.8 per 100,000 for England and Wales; 6.5 for Scotland; 8.7 for Australia, and 5.0 for Canada. Canada has a death rate of 5.0 per 100,000 and we have a death rate of 17.0 per 100,000. The accident death rate by sex shows a very marked difference between males and females. Males showed 108 deaths per 100,000 and females 42 deaths per 100,000.

The facts in respect to age are also of interest to the safety movement. For all accidents combined some 22 per cent occurred among children under 15 years of age. Eight per cent of all the deaths from falls occurred among children in this age group. A quarter of the automobile fatalities occurred among children under 15 years of age. Fifty-four per cent of the deaths from burns and 31 per cent of the deaths from drowning were of children under 15 years of age.

The comparison between accidents and other causes of death shows that all accidents combined are the sixth cause of death, preceded only by heart disease, cancer, tuberculosis, cerebral hemorrhage, and chronic nephritis. Accidents are the leading cause of death in the age period 5 to 9 years, and in the age group 10 to 14 years; they are the second cause of death in the age group 15 to 19 years.

The urban and rural data are also of some interest. In the cities of the United States the accident death rate was 83 per cent per 100,000, and in the rural districts, including communities of 10,000 or less, it was 69. About two-thirds of the automobile deaths occurred in the cities, 41 per cent of the railroad fatalities, 79 per cent of street car fatalities, 38 per cent of drownings, 33 per cent of firearm deaths; nearly 60 per cent of the falls occurred in cities, 59 per cent of the burns, and strangely enough, 53 per cent of conflagrations or fire deaths; that is to say, 57 per cent of all the deaths in conflagrations in the United States occur not in the cities but in the country. Of the deaths from poisons 49 per cent occurred in the cities, which is about an even break between city and country.

Then there are data on the relation between the accident death rate and the density of population. As the density of population increases the accident death rate decreases. That is quite contrary to what most of us have assumed. We have assumed that the accident hazards are concentrated in the cities both large and small, but as the density of population increases the accident death rate decreases. There seems to have been no difference, however, as between cities and country, or as between dense and less dense populations in the increase in the automobile death rate.

Statistics Tell a Detailed Story of All Accidents

Considering season of the year in connection with automobile accidents, the low point occurs in February and the high point in October. The high points are reached on Saturday, the lowest point on Thursday. We have taken these figures from the New York State Motor Vehicle Bureau and we hope that the statistical system which is there employed will be shortly extended to other states.

As to the types of vehicles, some 69 per cent were private passenger cars, 15 per cent trucks or commercial vehicles, 14 per cent taxicabs, busses less than 1 per cent, and motorcycles 2 per cent.

We have also gathered some data on the detailed type of hazard which gives rise to public accidents. Considering all public accidents as 100 per cent, deaths from transportation hazards make up 23 per cent of that total; deaths from pedestrians using the streets, 42 per cent of that total; sports and recreation, 6 per cent, and the use and occupancy of public buildings about 2 per cent. Other public accidents 27 per cent.

Public accidents considered by the type of injury show 55 per cent were automobile accidents, 18 per cent drownings, 9 per cent railroad accidents, 5 per cent falls. We also analyzed the different types of public accidents, which show that 71 per cent of transportation accidents were automobile accidents; 70 per cent of sports and recreation accidents were drownings; 74 per cent of pedestrian accidents were automobile accidents, and 44 per cent of public building accidents were falls. That is a figure that ought to be of interest to building managers and persons interested in the safe operation of buildings.

You will notice that elevator accidents do not rank first. That is the impression one receives by talking to building managers.

We also gathered what there was available in the reports of the Interstate Commerce Commission for 1926. We have found that of all the railroad fatalities in the United States last year, 73 per cent occurred to persons who were neither passengers nor employees, that is, trespassers; 25 per cent of those deaths occurred to employees, and only 2.2 per cent of railroad fatalities were those of passengers.

The committee has given extended consideration to home accidents. We are unable to quote an estimate for the number of home accidents in the United States, but we guess that possibly 20,000 to 25,000 fatalities occur in this country each year which arise out of hazards in and about the home. We are likely also to

issue an estimate that fatalities in the home are at least as numerous as fatalities in industry, if we can ever find how many there are in industry. Estimates prepared by responsible persons range all the way from 13,000 to 30,000 a year. I suppose we can take it to mean between those two figures that from 20,000 to 25,000 fatalities occur out of or in the course of occupation in the United States each year. That tremendous toll of home accidents is being attacked now on the basis of facts. The committee is endeavoring to secure information from men such as you, from the schools, from the homes, insurance companies and their agencies with respect to the types of accidents which occur in the home according to the specific hazard existing therein. Perhaps by the first of December we should be able to outline a simple statistical program for the study of domestic accidents. Perhaps at the next meeting we may have some reliable and extremely useful information in the home accident field.

We have some data gathered by the National Safety Council on home accidents. A third of the accidents were due to falls, about one-quarter to burns, 15 per cent to asphyxiation and suffocation, 8 per cent to poisons, 6 per cent fires and explosions, and 3 per cent to the use of firearms. We have had in this home accident study the cooperation of the largest insurance companies, such as the Travelers, the Aetna, and Metropolitan, and others, and we hope to supplement that insurance data with data directly gathered by the committee's staff, through the plans which the Committee will outline this winter.

"Accident Facts For 1927"

We should like to direct your attention to the report which was prepared this year. Five hundred copies were printed as a preliminary edition for this meeting, called "Accident Facts 1927." A few minor adjustments are going to be made in the figures and then an extended edition will be printed.

This last year the committee also prepared what I believe to be the most important publication in its history, a little pamphlet called "Public Accident Reporting." If you have not received this pamphlet get in touch with Mr. Williams or Mr. Forney. Read the pamphlet. Inquire locally whether your police and safety departments are using this standard system outlined by the Council's Committee. You ought to have that standard accident reporting system in every important city and, of course, in the states. New York State has had three years of experience with it and it has experienced no important difficulty in administering the system. It has produced data for the use of the Motor Vehicle Commissioner which have led to modification of his rules and edicts. The New York data was in such condition that when a traffic and safety survey was made in Albany a year ago, the state provided not only the data for Albany as a whole but also detailed facts on accidents in the city of Albany. Intersection accidents were plotted, deaths were segregated, and the data arranged according to age. If you have this system not only can you get out general reports monthly, semi-annually, and annually, but your material will be in such shape that when you want to tackle a specific situation in a given city the data are there for the use of the traffic engineer.

The committee has in mind that the Statistical System has two uses: First, in providing data such as we quote here and such as we publish, data used in generalized discussion of the safety problem. But we don't think that is the most important use for it. We do think the chief use of the system is the local study of cards prepared for specific areas, the utilization and the subdivision of that material, its plotting and spotting and rearrangement locally to point out specific traffic hazards that need to be abated.

Colonel Sinke has made such use of the system in Grand Rapids. He gets out splendid reports, not only reports that tell us what is going on in Grand Rapids, but he makes wider use of the material by having the data segregated, arranged

according to specific locality in the city and then he studies a specific problem and solves it. Thus the wider and deeper use of the statistical reporting system lies in making available information to the practical engineer who sets forth to abate public accident hazards.

The Safety Council System is now at work in its full array in some 59 communities and in New York State. The motor vehicle information becomes available from a population of 37,000,000; data on public accidents from a population of 18,000,000; non-vehicular accidents from 10,000,000; and home accidents from 12,000,000.

Only 20 years ago we had to get our automobile accident data from newspaper clippings and from almost any source, so you can see that marked progress has been made in providing actual basis for public safety work.

Cooperation in Securing Reliable Statistics

We have also been able to secure from the Census Bureau data which they did not in prior years publish. We have had exceedingly good support from W. H. Davis, Chief Statistician. He has shown in his annual reports facts which we called for and which we found to be useful in public safety work. They are also issuing every four weeks a summary of the available data on automobile accidents.

We have received support also from state motor vehicle bureaus, state highway commissioners, insurance companies, and state health departments.

Don't forget "Accident Facts, 1927," nor "Public Accident Reporting," a description of the standard system. Send to Mr. Williams for them and let us see when we come back here next year not only 59 cities but possibly 159.

We are greatly indebted to Colonel Sinke for suggestions which lead to the inclusion of nearly all the rational elements of this system. He has used a reporting system in Grand Rapids for quite some time and has had a lot of experience with it. We had a rather academic outlay at first, Colonel, and it was entirely due to the fine criticism which you offered that the excellence of this system stands as it does today. We also have had some splendid comment from the Chicago Police Department, from the statisticians and from public safety officials all over the United States. You may be assured that the accident reporting system is good and has gone through the fire of actual trial both in Grand Rapids and New York State, and if you apply it in your town you will have something which is absolutely solid and good. It is not new, there is two years of experience back of it.

CHAIRMAN SINKE: The National Safety Council is the only organization that is doing anything in a really large way in this field. In accident prevention, as much as in industry or any other place, we have got to have facts upon which to base our judgment and our actions.

The Program Committee has saved until the end a subject and a speaker which in the final analysis supersede all other topics. We can spend all the money we wish for control devices, we can hire as many police officers as we see fit, but unless the final authority for imposing penalties is in accord with the principles being followed, little can be accomplished and much time and money will be wasted. The enforcement phase has to do with the element of fear in the individual, and while through education we are trying to dispel fear, yet we recognize that it is necessary to appeal to that human trait of character which is concerned about fear. We have our courts for that purpose.

Last year Judge Bartlett talked to us in Detroit. We in Michigan are very familiar with Judge Bartlett and his work and know that when he took the bench in the city of Detroit and began sending violators to jail and treating them rough, they had a big reduction in the amount of reckless driving and casualties upon the streets of that city.

I am informed that the speaker is one of the pioneer traffic judges, that his specialty

is giving jail sentences to traffic violators and that he is also a member of the Executive Committee of the Brooklyn Safety Council. So on behalf of the National Safety Council I want to welcome Judge Lawrence C. Fish, of the Traffic Court of Brooklyn, New York, to this gathering, and to assure him that it gives me personally, and I am sure the gathering as a whole, extreme pleasure in having him with us and hearing what he has to say.

Traffic Law Enforcement

Judge Lawrence C. Fish, Traffic Court, Brooklyn, N. Y.

It has been said of me that I am the highest priced orator in Kings County because every time I open my mouth it generally costs \$25.

I have been greatly interested in listening to the remarks made here this morning by eminently qualified experts who discussed their specific subjects in an able manner. I think it does a judge good once in a while to get out where he can hear what the other fellow has to say, because most citizens are unkind enough to say that they must remain discreetly silent when in the presence of the court.

It was my good fortune once to be in Los Angeles and if the people fail to elect me municipal court judge this fall in Brooklyn, I think I will move to Los Angeles, because that must be the nearest place to heaven. Unfortunately, in New York with its cosmopolitan crowd, we do not find either motorists or pedestrians so thoughtful. About a year ago I was attempting to cross the street with a lady. The light was in our favor but it was suddenly changed when we got about two-thirds across the street. I tried to be gallant and save the woman's life, and put out my hand. You know sometimes judges, even when they are off the bench, seem to think that people must know who they are.

This taxicab driver said something to me that must not under any circumstances go on the record. I started to take his number, and again a vile remark. It has been said of me that I am a quiet worker between the acts. I looked up the name and address of this driver and telephoned the station house nearest to where the driver lived that I would like to have the pleasure of meeting him face to face in the morning. My friend appeared and told the lieutenant of the police station that he had received no summons but the nearest police station had told him to report. The lieutenant said, "Do you recall any violation that you made?"

"No," he said, "except that a little fellow was attempting to get a woman across the street and I said something to him that I am sorry for."

When the lieutenant told him that little man was Judge Fish, I thought he would have to give him special aid for the injured, because he seemed to collapse all of a sudden.

Sometimes I have grown weary in participating in these gatherings, but on the whole I think it is worth while for men and women who love to serve others to give of their time and money in movements of this character. I was pleased to note that as a result of the Hoover Conference various state legislatures have adopted (and others will adopt it) the recommendations of the Hoover Committee as to uniform traffic regulation. I don't think that we fully appreciate all of the good work that has been done by the National Safety Council.

When I first was called to preside upon the Brooklyn traffic court bench the number of deaths was appalling and I urged upon the patriotic citizens of that borough to form a Brooklyn Safety Council. Reliable statistics daily obtained from the police department of the borough of Brooklyn conclusively show that after the formation of the Brooklyn Safety Council the death rate decreased over 137 in one year's time. And so, as I said before, it is gratifying that in this pleasure-

crazed age, when everyone is seeking pleasure and in search of the dollar, that over 6,000 patriotic men and women will attend this National Conference and individually and collectively do their part in doing away with this wanton slaughter of our fellow citizens.

Of course, I have come in contact both with the policemen and the offending motorists, and as you know, there is nothing in common between them. I was amused a short time ago when a strapping Irish policeman had arraigned a diminutive Hebrew on a charge of driving on a one-way street, and when called upon to plead the Hebrew said, "I was going one way, Judge, what more does he want?"

I think it has been a fine thing that our engineers have devised and are giving thought to traffic signals. But, my friends, if we are honest, let it be said that the American people love to take a chance; and unless the bluecoat, the man with authority is there, all of us unconsciously take the chance.

Unfortunately, most of us look at this problem from an extremely selfish viewpoint. Shortly after going on the bench I received a postal card from a friend of mine who likened me to President Coolidge. He said I was not severe enough, and that was the first compliment that I had received after my appointment. He came to court the following morning, and to show my appreciation of his kindly expression of thought I had him sit alongside of me while at the bench.

The Root of the Evil Must Be Plucked Out

The following morning I received a letter from him that a very dear woman friend of his had received a summons for speeding and would I be kind enough to suspend sentence? It makes all the difference in the world whose ox is being gored?

Friends, I fear that I have not touched on the serious side of the problem, but I simply want to say this: That in my judgment the thing for us to consider is whether or not the state authorities in all of the states of the Union are careful enough in demanding a physical and mental test of applicants before they are turned loose upon the public highways. All the safety talk imaginable, all this talk about regulating pedestrian traffic, is not getting to the root of the evil. When we consider that before a railroad company will permit an engineer to take out a train he must serve an apprenticeship of at least seven years as a fireman and then submit to a physical and mental test, is it unreasonable for us to ask and demand that before the state grant the privilege of operating a car—it is a privilege—the applicant shall conclusively prove his capabilities, physically and mentally?

In all large cities throughout the country we find this deplorable condition prevailing. Take, for instance, in our own Brooklyn court. Last year over 53,000 persons were arraigned for various traffic violations. Thousands of policemen were taken away from busy street crossings, the judges were compelled to listen to every case, and in the great rush and in the desire of the court to get the policemen back to their posts and the citizens to their place of business, the court was unable to consider properly the more serious charges brought before it.

I am inclined to think the plan that I understand is in vogue in Chicago is a step forward, and that is this: That when a ticket is given, on the back of the ticket there is the prescribed fine that will be charged for every violation, and the citizen can, if he desires, waive his constitutional right, appear before the clerk, and pay the fine. A method of that kind does not clog up the court calendar and it does not take away from important posts the policemen.

I do hope that as a result of this conference and of other conferences, there may be an awakening in the heart and conscience not only of the motorist but of the pedestrian. I think Judge Cardoza, of our New York State Court of Appeals,

stated it ably in these words: "Mutual forbearance is the supreme rule of the road," and that is so hard for us to do.

Just one illustration and then I am through. A short while ago one of the leading officials inadvertently got into the private chamber to intercede in behalf of a doctor, and I said: "I don't try cases in chambers, I try them in the courtroom."

"Well," he said, "I am afraid that he won't get a chance to say all he wants to say."

"Well," I said, "I will tell you what you do. You sit right in the front row and I want you to listen to everything that takes place between him and me."

So when this doctor was arraigned he confessed he was going 45 miles an hour. I said, "Doctor, have you any excuse for going so fast?"

"Yes, I was summoned to a hospital to assist in an operation to save a human life."

One of the Typical Cases Before the Court

I said, "Sit down and we will try the case in a few moments." The officer who issued the summons was sworn in and, I suppose, bearing in mind the anxiety of his superior officer to be of service to the doctor his mind suddenly became a blank. Then the doctor went on the stand. The summons indicated that he was served at 7:40 p. m. "Doctor," I said, "did you receive a telephone call from the Bushwick Hospital to assist in an operation between 7 and 7:45 p. m.?"

"No, sir."

"Did you receive a call from that hospital between 6 and 7 o'clock?"

"No, sir."

"As a matter of fact, Doctor, did this doctor from the hospital telephone you to assist in that operation?"

"No, sir."

"Then do you want the court to understand that what you said was a deliberate untruth?"

"Yes."

I called my official up and I said, "Are you satisfied that your friend had his day in court?"

"Yes."

"What do you think of him?"

"I think he is a little nervous."

"He is more than that, he is a liar of the first type and I gave him a few days to study medical jurisprudence in the county jail of Kings County."

Talking about law enforcement, I simply want to say this, friends: That I believe and I hope that you citizens as you go back to your respective places will bear this in mind. The members of the police force are maintained at a great expense. They are not all honest men, they are not all brilliant men, but if they are honest, and if they are trying to do their best to safeguard your lives and your property, then in Heaven's name, back up the judges who support them in that move!

I read an article only a short time ago that impressed me wonderfully. It spoke of the difference between the enforcement of laws in the United States and Great Britain. A desperado had with impunity held up men in western cities (far removed from Los Angeles) and got away with it. However, this desperado had inadvertently got over the borderline into Canada and he whipped out his pistol and demanded that people dance at his command. A small, undernourished deputy sheriff appeared with a little tin shield on his breast and said, "Go down the street and leave your gun at headquarters," and this desperado was about to shoot when his friend said, "Don't be a damn fool; perhaps you don't know, but you

are over the border, you are under the English law. You will get a fair trial but you will pay the penalty within a very short time."

My friends, what we need in America today, not only in the enforcement of the traffic laws but every other law, as long they remain on the statute book, is honest enforcement of the laws; and whether or not we like them, as long as they remain there let us, as American citizens, have the courage to back up the judges.

ADJOURNMENT

Wednesday Afternoon, September 28, 1927

CHAS. A. HARNETT, Chairman
Commissioner of Motor Vehicles, Albany, N. Y.

The third session was called to order at two-twenty o'clock by the Chairman, Charles A. Harnett, Commissioner of Motor Vehicles, Albany, New York.

Opening Address

Charles A. Harnett, Commissioner of Motor Vehicles, Albany, New York

The Empire State regards it as a duty to be represented at this most important annual Congress of the National Safety Council. We desire to record our appreciation of the invitation, and at the same time, give public expression to the splendid assistance and cooperation rendered by your organization to New York State in its attempt to properly solve the all important problems arising from present traffic conditions.

The thing I want to emphasize most is this: This is my first occasion to be present personally, and I am sure we will all learn a great deal from these deliberations. We couldn't let the occasion pass without paying our respect and our tribute of appreciation to the National Safety Council for the work they have rendered us in New York State. Modest men as they are, Mr. Williams and his associates have been ever at our beck and call, ready to help and assist us in any way that we saw fit to call on them, and we want to in the most formal way express our appreciation for the help they have rendered us.

No more enlightened nation exists—or one in which there is more intelligent interest in the alleviation of suffering and the prolonging of human life—than our own. We have been uniformly free from devastating plagues and yet we have before us in this country a condition arising from the use of the automobile which is hard to understand. I refer not alone to the ever increasing appalling loss of life and property damage occasioned by accidents on the highways, but to the apparent indifference of the nation to this yearly toll which is being taken and which is killing so many of the youth of the country. If it were confronted by an epidemic causing 70 deaths a day, for even the brief period of one week, every governmental agency and the entire resources of the nation would be immediately coordinated in an effort to wipe it out and remedy the condition which produced it. The press of the country would demand its conquering, and study as to the best methods to prevent a recurrence. Today there is an agitation for the control of aviation—caused by the loss of half a hundred lives during the past summer months—and yet automobiles are killing more people daily than were killed in airplanes all summer.

It is estimated that more than 24,000 lives will be taken and a property damage of \$700,000,000 ensue before 1927 comes to a close. New York State has its particular share of this unfortunate condition. With a total of 2,000,000 automobiles and two and a quarter million drivers, the Empire State is confronted with a peculiar problem due to the vast congestion in a few great cities within its confines. In 1901 we registered 954 automobiles and in 1923 the number had increased to 1,204,000. During all this time the motor vehicle and its operation officially were viewed largely as a source of revenue. Little or no attention was given to the necessity of properly supervising and regulating the machine and its operator.

It was imperative that the increasing loss of life and waste of property be materially reduced, if not entirely eliminated, and in a special message to the Legislature Governor Alfred E. Smith, reviewing in a very comprehensive manner the conditions largely created by such an apparent policy, urged in no uncertain terms that legislative action be taken providing a means of supervision and control of motor vehicle operation that would bring about an immediate reduction in our annual loss of life. A joint legislative committee intelligent and alert to the problem—appointed as a result of the Governor's message—recommended amendments to the then existing laws which were adopted and resulted in the establishment of the Bureau of Motor Vehicles.

The value of a complete statistical division was apparent from the outset, and it is through the information thus compiled that we have been endeavoring to control the accident problem in our state, and it is a matter of satisfaction that slowly but surely other progressive states are about to adopt similar methods.

A Statistical Unit Is Essential

Let me depart a second and say to you who are so deeply interested in this automobile problem, that if you are attacking it in your local communities in any way and are attacking it without the establishment of a statistical unit, you might just as well stop. The gathering of statistics in an intelligent, comprehensive manner to indicate the way in which accidents occur, why they occur, and how they occur, and when they occur, is the whole soul of the question of traffic safety.

Through the establishment of a proper tabulation of statistics you will be able to then disseminate your information for pointing out the various phases that need correction. As I go along you will see, if you bear with me, how New York State is able to tell in an intelligent way how they are attacking the problem, mounting as it is in our state.

A comparison of our statistics shows that in the first seven months of this year automobiles killed 1,118 people as compared with 1,032 in the same period in 1926. The saddest feature of this loss is that 40 per cent of those whose lives were crushed out were children under 16 years of age.

Accidents in that time increased from 30,153 to 37,294 although in the same period there has been an increase of 10 per cent in the number of cars in operation in our state. Therefore accidents have not increased in proportion with the number of machines on the highway. In this period 44,330 people have been injured as compared with 35,057 in 1926, and it is important to note that of those injured and killed 84 per cent were pedestrians. We have developed the fact that Saturday and Sunday are the worst days of the week for accidents and that five o'clock in the evening is the danger hour of the day. Railroad crossings at grades continue to count high in the percentage of fatal accidents. Eighty-eight of these accidents caused 61 deaths and 121 injuries this year as against 79 accidents, 70 deaths and 85 injuries last year. This brings to mind very forcibly the campaign instituted by Governor Smith for the elimination of these grade crossings. On private driveways of homes, automobiles were responsible for 18 deaths, eight of which were children killed on property belonging to their own parents, showing to what extent care and caution must be exercised. Taxicabs represent but 3 per cent of the motor vehicles of our state and yet figured in 17 per cent of the accidents although it must be conceded, particularly in New York and other large cities, that these machines are in operation practically 24 hours a day. One hundred eighty-one lives were taken through machines striking fixed objects such as elevated railroad pillars, girders, cars overturning and skidding because they were being

driven at such excessive speed that they were out of control when it was necessary to make a quick stop.

In this connection I would remind the automobile manufacturers of this country that they have a duty to perform beyond the manufacture and sale of automobiles. Recently in our state two advertisements appeared proclaiming the fact that two different makes of cars passing through important cities from Buffalo to Albany had eclipsed the running time of the famous Empire State Express, and as a result the two drivers quoted as operating these cars have lost their licenses. This has a tendency to create a lust for speed among youthful drivers, particularly those who do not use their cars for the comfort, convenience and safe transportation of families dependent upon them. The average purchaser of an automobile—and I say this because I am satisfied that 94 per cent of the motorists of our state never in any one year get into the slightest difficulty with the law—is not influenced in the purchase of automobiles because of their ability to operate at 100 miles an hour. Automobile manufacturers must, in my judgment, give careful attention to this question lest the day come when by legislation the speed producing power of automobiles be regulated.

Ten per cent of junior operators between 16 and 18 years of age were involved in fatal accidents, while among adults there was but 3 per cent. I again reiterate that the most important feature of our statistics is that which shows the loss of life among children under 14 years of age. These youngsters have not the ability to think quickly, and it is a sacred duty imposed upon every automobile driver to exercise exceptional care when he sees them in the roadway.

How then shall we intelligently attack the problem?

The Examination of Drivers Has Become More Stringent

In our state this year 470,000 prospective automobile drivers have appeared for license examination. Step by step we have made more stringent the practical examination of drivers and in addition this year we have included an eye test which we regard as all important, and further, we plan to include in the near future a color test, believing it is quite as important on the highways as it is in the operation of railroad trains. We believe the power of suspension in cases involving serious personal injury and revocation of licenses when deserved is a forward step. We further believe the publication of the names of those who are responsible in these cases has a salutary effect.

In addition, the utmost care is given to applications for reinstatement of those who have been disenfranchised for serious offenses in the past. The automobile clubs and local safety councils in our state are rendering intelligent cooperation in solving the problem. The police agencies in our cities and the State Police through strict enforcement on the highways will eventually prove of great assistance in controlling the situation, and it is a matter of personal satisfaction and pride that I can refer to the progress in the control of this vexacious question by the Police Department of the city of New York in which the death rate not alone has been controlled but is slowly but steadily being decreased.

The courts can do their share in properly adjusting the punishment to meet the circumstances. Drivers operating at 30 or 40 miles in cities over streets in which children are playing should be severely dealt with. We are satisfied that except in minor cases fines have little deterrent effect. In our state the motorist has but one fear, and that is the loss of his license. The adult pedestrian can assist in reducing accidents by crossing at the crosswalks and other-

wise using care and judgment on the highways, for children are born imitators and if adults show a good example children are bound to follow.

Municipal authorities can assist by the extension of traffic lighting systems, increasing the number of traffic officers, providing oneway streets, eliminating parking where necessary, establishing uniform signals for traffic officers, and maintaining adequate playgrounds for children so they may not be forced to resort to the streets for their games. We utilized our inspectors by their giving short talks to the children in schools on the subject of safety on the highways, and we suggest that local police agencies adopt a similar program.

We commend to the attention of our sister states the adoption of a "Save-a-Life" Campaign, such as we have just concluded in New York State in which more than a million motorists voluntarily submitted their machines for examination for possible mechanical defects. Carefully compiled statistics reveal that 39 per cent of the cars thus examined were defective in some important respect such as the steering wheel, the brakes, the horn or the headlights. This campaign we believe brought home to the motorists the necessity for frequent inspection of these important parts of the automobile. We believe our state will soon have a compulsory insurance and compensation law similar to our present Workmen's Compensation Law, so that regardless of responsibility, injured persons and dependents of those killed in automobile accidents will be compensated.

CHAIRMAN HARNETT: The next speaker is a man who doesn't regard this subject in any degree as a plaything, he has lived with it, worked with it, and slept with it for years. He is a representative in an unofficial way, and possibly in an official way of the National Government. He is what we might describe in the human body as the heart of the Hoover Conference, which has had as its main endeavor the establishment and the adoption of the model Motor Vehicle Code in all of the states in the Union. There is no one whom I know in my contact in the official automobile world who has a better knowledge of the subject that has been delegated to him than the next speaker, and I take great pleasure in introducing Colonel A. B. Barber, the Director of the National Conference on Street and Highway Safety.

Plans of the National Conference on Street and Highway Safety

A. B. Barber, Manager, Transportation and Communication Department, Chamber of Commerce of the United States, and Director, National Conference on Street and Highway Safety, Washington, D. C.

Commissioner Harnett made some very nice remarks about me which I don't deserve. As for my heart to this conference, it consists of Secretary Hoover and of the great number of official and unofficial people from all parts of the country who gave their experience and their service. My part was simply to keep them spurred up to the good ideas which flow up to the top, so that there might be crystallized out of that a better understanding among the people at large throughout the country of what is needed to cope with this very serious problem that we have been discussing.

I would like to pay my compliments to Commissioner Harnett and his associates in the other states who are doing a similar work to what he is doing, by saying that to my mind, after being in fairly close touch with this whole movement for bettering the handling of traffic, I don't believe there is any more essential thing than the establishment in each state of a responsible official to whom the person can look for

light on this subject, Commissioner Harnett has mentioned with repeated emphasis the matter of statistics. New York State is to be congratulated in having a man who isn't afraid to let the light of statistics into the problem. He is conscious of the fact that the measures which he and the Governor and the Legislature of New York have taken are going to produce results, are going to get the accident rate down. They are not afraid of the statistics.

A year and a half ago the National Conference on Street and Highway Safety developed an extensive program of recommendations for dealing with many different phases of the traffic problem. These recommendations were based primarily on the reports of 12 committees that had studied various phases of the problem in the preceding two years. At the general session of the Conference in March, 1926, at which the program was adopted, however, there was opportunity for discussion of every point, and amendments were in fact made to the recommendations of the committee, although on most points the Conference found the committee recommendations to be sound. It could therefore be said with confidence that the program represented the most advanced thought on street and highway safety. This confidence is confirmed by the fact that in the year and a half which has intervened the recommendations then made have almost without exception stood the test of detailed scrutiny and application in many different parts of the country. A very few minor modifications might now be made if the entire program were to be again reviewed but these are so insignificant or so easily adjusted by local action that they in no way impair the value of the program as a whole. On the other hand, there were a few uncompleted items in the program on which, as I shall explain later on, work is now in progress.

Closing Words to the Hoover Conference

In dissolving the National Conference in March, 1926, Secretary Hoover referring to the reports which the conference had just adopted, said:

"Our work is not completed with the formulation of these results. You have already resolved that we should proceed in our next step through state conferences, and you have set up certain committees to continue the work of the Conference.

"It is not our purpose to create here an additional organization for safety, but rather to secure cooperation between the many agencies that are working throughout the country to that end. It is not our purpose at the moment to call another Conference of this character, but to hold ourselves ready at any time, so that if the representatives of the different states and the voluntary bodies of the country should wish it, we can again convene for the further advancement of thought."

The situation which then existed remains largely unchanged. As Mr. Hoover indicated, the Conference looked to the participating organizations to further the execution of its program; and this is a large task. Excellent work has been done along some lines. Along others there has not been much accomplishment. The fact that the accident rate continues to increase is indication enough that there should be no thought that the job is done. On the contrary, most of the work of execution is yet ahead, and every organization interested in street and highway safety has a large opportunity and a larger responsibility.

A program of recommendations of the Conference was divided into eight general headings, as follows: (1) Traffic Laws and Regulations, (2) Enforcement, (3) Education, (4) Statistics, (5) Causes of Accidents, (6) Design and Maintenance of Motor Vehicles, (7) Street and Highway Traffic Facilities and (8) Elimination and Protection of Grade Crossings.

Traffic Laws and Regulations

Under this first heading the major recommendation of the Conference was the adoption by states of uniform vehicle legislation, and as a basis and guide for such legislation the Conference in collaboration with the National Conference of Commissioners on Uniform State Laws developed the Uniform Vehicle Code of four acts.

This Code was brought formally to the notice of the various Governors, the designated State representatives at the Second National Conference on Street and Highway Safety were asked to work for the adoption of the Code in their states, and there was much concentrated effort by various organizations; to bring about the adoption of part of all of the Code in the states ripe for such legislation. While we have not yet complete information on all states, we know that this year North Carolina, North Dakota and Idaho adopted all but the licensing act; that Pennsylvania, Michigan, Minnesota and Washington adopted supplementary legislation bringing its laws into line with the Code; and that other states added to or amended their existing laws more or less in the direction of the Code.

On the other hand, in at least two states bills based on the Code were passed but vetoed. In several the bills were defeated by close margins, or lost in the final legislative congestion. Opposition developed in some quarters apparently due to misunderstanding which it is hoped may be cleared away before the next legislative sessions. Next year is an off year for State Legislatures and action will be concentrated in some ten states, but 1929 will see all legislatures meeting except four states. If all the organizations represented at this Congress will get behind the legislative program in the various states great progress should be made in the next two years. Besides education of the public as to the benefits of modern vehicle legislation there must be intensive work in adjusting the Code to state constitutional and other legal requirements, and in properly presenting it and following it up with the right legislative groups.

The Conference program recommend that the Uniform Vehicle Code be supplemented by state administrative regulations, local traffic ordinances and local regulations as nearly uniform as practicable. It was the consensus of opinion at that time that uniformity in local ordinances could best be worked out by state or regional conferences of officials and other persons or organizations interested. Since then, however, the belief seems to have been growing that regional conferences alone cannot produce the uniformity desired, and in response to a widespread demand Secretary Hoover recently appointed a committee to deal with this problem. I shall later on speak further of this new activity of the National Conference.

Enforcement

The First National Conference on Street and Highway Safety emphasized the great importance of uniformity both in the traffic laws and their enforcement, and enforcement was made the subject of a special committee study. The recommendations of that committee provide, in summary, that state laws should prescribe a uniform system of enforcement, through adequate trained police departments, adequate courts and adequate means for collecting evidence and maintaining records; that the courts and the police through vigorous enforcement and evenhanded treatment of offenders should instill respect for the laws and regulations; and that public opinion should be enlisted in support of enforcement.

The International Association of Chiefs of Police has been in close touch

throughout with the Conference and its findings. Secretary Hoover, as chairman of the Conference, has sent the report of the Committee on Enforcement to more than twelve hundred traffic judges and judges handling traffic cases. It is evident, however, that there is much opportunity for local effort in impressing upon the public the benefit to them of vigorous enforcement, in ironing out differences of opinion between police and courts, and in convincing that the public desires enforcement.

Education

The educational program of the Conference embraces instruction in safety and accident prevention in schools of all types; education of the driver through the compilation and distribution of a uniform manual; education of the general public through the newspapers, motion pictures, radio talks, public gatherings and special campaigns; and standardized plans for the selection and training of traffic officers.

School educational work has been making rapid strides, and the efforts of those engaged in the development and promulgation of the safety curricula are greatly to be commended. The initiative taken by the Education Section of the National Safety Council has borne fruit in securing active cooperation of the various educational groups. The Highway Education Board, the American Automobile Association, and more recently the American Road Builders' Association, have also greatly contributed through essay contests and otherwise. The general public is now receiving safety instruction of many kinds mostly of considerable value. The newspapers have a difficult task to reach the minds of great numbers who have not adapted themselves to twentieth century conditions and to keep the message before them.

The uniform drivers' manual recommended has not yet been compiled. This is a definite piece of work waiting to be done.

Apparently not all of those in charge of the police departments are alive to the importance of careful selection and training of police officers. Hence we find at important intersections officers with evidently very inadequate conceptions of the things to be done to expedite the traffic without endangering the public; some of them pressed into service from the regular force with little or no special instruction. The authorities should be persuaded that traffic control requires special ability and training.

Statistics

The Committee on Statistics made reports to both the First and Second Conferences. In both it pointed out the inadequacy of existing methods of reporting accidents, and the Conference recommendations include a standard form for reporting accidents as proposed by the Statistics Committee of the National Safety Council which is actively following up the subject and has secured the adoption of substantially the same forms in about sixty cities. The National Conference program also includes a recommendation for a comparative index rating of all states and communities and one for a contest in accident reduction. The index rating is in part being carried on by the Census Bureau, but no practicable plans for a contest in accident reduction have been worked out.

The Uniform Vehicle Code prescribes the reporting on approved forms of all serious accidents, and as adoption of the Code is extended to additional states adequate and uniform reporting of accidents will doubtless become a fact.

The Conference Committee on Statistics met recently with a view to following up some of this unfinished work.

Causes of Accidents

Since our traffic accident statistics are incomplete and inadequate, obviously our information as to the real causes of accidents is also inadequate, but even the available information has not been thoroughly analyzed. Nor have obviously needed original studies been made. The Conference Committee on Causes of Accidents reported in favor of a comprehensive program of research to be undertaken by a national body qualified for the purpose; and a recommendation to this effect is included in the Conference program.

This is much needed research which the National Research Council undertook to organize and sponsor. The understanding was that a special committee to be organized by the National Research Council would investigate particularly the human factors in accidents and that a Committee of the Highway Research Board, which also operates under the auspices of the Research Council, would specialize on a study of the physical factors in accidents.

Design and Maintenance of Motor Vehicles

The Conference program recommends continued effort on the part of manufacturers with a view to further improving the design and construction of motor vehicles and accessories from the safety standpoint. It also recommends the preparation of a simple and practical inspection chart and code applicable to all makes of motor vehicles.

The automotive manufacturers and their engineers are their own most severe critics, and we may rest assured that they will continue their efforts to make the vehicle as safe as possible when it leaves the factory. We have not the same assurance that after it is sold and put into operation its owner will maintain it in a safe condition. They are many vehicles on the road with improper lights, inadequate brakes, defective steering gear. One of the recommendations of the Conference yet to be carried out is the preparation of the inspection code.

In connection with this matter of maintenance, the automotive engineers realize that they need not only to make the vehicle safe as to design and construction, but to make the adjustments easy to understand and make. There has been material progress in this field in the more recent models of cars.

Street and Highway Traffic Facilities

The Conference recommendations urged that every community or metropolitan area confronted with a traffic problem should adopt a comprehensive traffic improvement program—this program to be based on a thorough traffic survey and to include a transit plan, a street and highway plan and a traffic control plan and to be carried on a sound financial program to insure properly balanced progress. To accomplish such a program the Conference holds that there must be a traffic planning organization consisting wherever possible of an official traffic commission, with preferably also an unofficial advisory committee of representatives of utility, business and citizens groups, and, for metropolitan areas, a joint official board and a joint advisory committee representing each community.

These Conference recommendations have been brought to the attention of the mayors of all cities and towns, to the automobile clubs, the chambers of commerce, and the safety councils. Reports indicate excellent progress in the past year or two. But this is a field for continuing effort. Despite widespread publicity and repeated circularizing of different groups, we have frequent indications from communities that those who ought to be are in no way familiar

with the findings of the Conference, and that the communities are struggling along without adequate plans or with no plan at all. It should be kept before those in authority locally that the Conference recommendations are based on what is succeeding in other communities.

On the more technical side the Conference program also includes recommendations relative to street and highway widths, curves, grades, bridges, clear view, illumination and other features. Highway engineers are generally keenly alive to these matters and improvement is constantly going on. Our consciousness, however, that there are still many miles of improved highways dangerously narrow, dangerous combinations of curves and steep grades, blind intersections in the city and the open country, one-way bridges on highways of considerable traffic, and a vast mileage of unimproved highways and unpaved streets over which motor vehicles are operated should lead us to support reasonable programs for alleviating these conditions.

An aid to traffic of perhaps greatest importance in comparison with the costs involved is afforded by proper signs, signals and pavement markings. Since the National Conference was organized in the spring of 1924 great progress has been made in this field. The Joint Board on Interstate Highways, made up of representatives of the American Association of State Highway Officials and the United States Bureau of Public Roads, after most careful study, has developed a manual of best practices in highway signs, and this manual is already being followed in the signs being installed in a number of states.

In general the state and federal highway departments do not have jurisdiction in cities and towns. With a view to promoting uniformity here also, not only in signs but also in signals and pavement and curb markings, safety zones, methods of marking turns and so forth, a committee of the American Engineering Council, working under the general auspices of the National Conference, has been studying this entire matter for several months. Detailed information as to the practices in about a hundred cities has been obtained and analyzed, part of the committee's report is in preliminary form, and it is hoped that the entire report will be available by the end of the year.

Elimination and Protection of Grade Crossings

The Conference program, recognizing elimination of grade crossings as the only perfect solution of the problem, but one which can only be approached gradually due to the enormous costs involved, recommends the carrying on of such work under a proper program, eliminating the most dangerous crossings first. It urges due regard to the relative costs and advantages of elimination and other forms of protection, and avoidance of the creation of new grade crossings. It also urges that crossings remaining at grade be safeguarded in every reasonable way, and that properly designated commissions be empowered to designate dangerous grade crossings at which motorists must stop. The Uniform Vehicle Code contains the latter provision, and a number of states have enacted it into law.

The American Railway Association and other organizations directly affected have done much to impress on the public a consciousness of the dangers of grade crossings. The grade crossing problem has so many ramifications, however, that there is need for much intensive cooperative effort to work out the remedies for specific situations.

Summary of Uncompleted Business

The foregoing makes clear what I stated at the outset, that, while much effective work has been done along certain lines in carrying out the program of the National Conference, on Street and Highway Safety there is far more yet

to be done—communities to be organized for more intelligent traffic planning; police authorities to be prevailed upon to provide special training for traffic officers; the general public, the police and the courts to be impressed with the vital necessity for adequate traffic law enforcements, better collection and analysis of traffic accident statistics, and a thorough research into the real causes of accidents; development of a manual for drivers and an inspection code for maintenance of the vehicle in safe condition; intelligent cooperative study of the grade crossing problem in general, and intensive study of local situations; and as important as any of these, continued and in many cases better thought out effort to bring about uniformity in motor vehicle laws and regulations.

Model Traffic Ordinance

As you know, it has been felt that most of these things must be brought about by the various organizations and groups, official and unofficial which participated in the Conference, not by the Conference as a body. It was understood, however, that the Conference should remain available for any further study the future might show to be desirable; development of plans for securing greater uniformity in municipal traffic ordinances and regulations comes in that category.

The committee recently organized to report on this subject has some 20 members, under the chairmanship of Mr. William E. Metzger, of Detroit. It has the same wide representation of interests that has characterized the other committees of the Conference and the Conference itself. The work has been distributed among six subcommittees, whose subjects are as follows: I—Vehicle Movement and Regulation; II—Pedestrian Regulation and Control; III—Traffic Signs, Signals and Markings; IV—Parking, Terminals, Garages, Loading Facilities and Street Obstructions; V—Public Motor Vehicles, Railroad, Street Cars and Emergency Vehicles; VI—Traffic Organizations and Enforcement.

It can be seen that every one of these subcommittees has a real subject. The subcommittee work is well under way, and it is believed that reports from all of them will be ready for consideration by the full committee so that a completed report can be made before the end of the year.

At its organization meeting those present recognized the need for determining in what matters precise uniformity and in what a considerable degree of flexibility in ordinances is desirable: to what extent the ordinance should supplement and to what extent repeat the language of the state law; what matters should be covered by a model ordinance, and on what the committee should merely make recommendations as to best practices. They also felt that the ordinance and recommendations should be supported by appropriate explanation. It is not for me further to attempt to forecast the findings of the committee.

I think you will generally agree, however, that this is one of the most important pieces of work undertaken by the Conference in the three years of its existence. The report of the committee should strengthen the cause of the Uniform State Code. The states that have the Code will see the need for the uniform ordinance to supplement the Code. The two will work together for the uniformity that all agree will be one of the greatest factors for street and highway safety.

Summary

Stated briefly, the plans of the National Conference on Street and Highway Safety are to complete in certain features the comprehensive program of recommendations developed by the Conference during the years 1924 to 1926 and look to the various groups—official and unofficial—who participated in the Confer-

ence to see to the execution of their respective portions of the program following within the field of their several responsibilities or interests. There are present at this National Safety Congress representatives of many of the groups which are able to carry a great part of the burden of this much needed work. I therefore venture to hope that this brief outline of the program of the Conference and the additions to it which are now being worked out will suggest to many opportunities to play a part in putting the program into execution.

CHAIRMAN HARNETT: The next subject is one that is very important to all of us, the question is "Who Is Responsible for Lack of Law Enforcement—Courts, Police, Prosecutor, or Public?" It was intended that Mayor Victor J. Miller, of St. Louis, speak on this question, but we learn now that the Mayor couldn't attend. He has, however, sent a very able representative and I know you will all be glad to hear from the Director of the Streets of St. Louis, Mr. Robert Brooks.

Who Is Responsible for Lack of Law Enforcement— Courts, Police, Prosecutor, or Public?

Robert B. Brooks, Director of Streets & Sewers, St. Louis, Mo.

Is there a lack of law enforcement? The homicide rate in the United States is double that of Italy; four times that of Australia and South Africa; eight times that of New Zealand and Spain; nine times that of England and Wales; twenty-four times that of Holland, and thirty-six times that of Switzerland.

The word of law means, a rule of conduct established by an authority able to enforce justice. The above comparison of homicide in various countries shows there is a lack of law enforcement in the United States.

Senator Wm. E. Borah, of Idaho, says, "Lawlessness is the insidious disease of Republics." It would seem then that a lawless person is one not obedient to law, such as an anarchist who recognizes no law except his own pernicious self-will. In short, government divides itself into two classes—those who obey the law and those who disobey the law.

It is essential that our government be maintained by the law abiding element, expressed in terms of courts, police, prosecutors and good citizens. Consider these four a chain which bars our national door to a flood of lawlessness. Any chain is only as strong as its weakest link.

Let us confine our talk on lack of law enforcement to traffic laws. Within twenty years St. Louis traffic has increased one hundred and twenty times. This phenomenal growth has made comparatively recent traffic laws out of date. In a large Iowa city there is still a law which requires anyone driving an automobile on a public street to send an outrider several hundred feet ahead ringing a bell. To us of the present generation this is as ridiculous as the law passed in Massachusetts within the present century, making it a penitentiary offense to own a bathtub.

Traffic laws to be enforced must be practical, the kind that will be respected by the riding public as well as the walking public, for their own safety and convenience.

Statistics compiled by the American Road Builders' Association show a five-year toll in highway accidents in the United States of about 115,000 killed, 3,500,000 injured, and an economic loss of nearly \$3,000,000,000.

Carelessness and recklessness caused nearly 90 per cent of all accidents. Rigid law enforcement will reduce this gigantic total of the last five years. Assuming that every death or serious injury affected, either directly or indirectly, five persons, nearly one-sixth of the nation's population suffered.

The first step is securing the right kind of traffic laws. The next is to secure the absolute cooperation of the Police Department in the enforcement of these traf-

fic laws, particularly the hazardous offenses such as driving while intoxicated, reckless and careless driving, speeding, leaving the scene of an accident, etc.

The Traffic Squad in St. Louis, headed by a capable captain, such as John H. Glassco, has done much to bring about law observance on the part of our citizens. When arrests are made the next important step is that our police judges let it be known by their judicial acts that violators of traffic laws can expect no favors at their hands. The result is a watchful attitude on the part of the driving public.

At this point comes the prosecutor's responsibility. It is up to the prosecutor to take steps to see that his case and his evidence are in proper shape. Without this the judge must give the benefit of the doubt to the defendant. It is very important that the prosecutor in the Court of Appeals have as much information of the testimony in the lower court as possible before him in the trial of the case on appeal.

Often a strong case is made in the lower court and heavy penalties imposed upon by the judge, but due to improper records taken, witnesses may be tampered with and when the case comes up on appeal their testimony may be changed, causing a reversal of sentence of the lower court. Written records should be taken.

Unless the prosecutor has his full case, even though the judge may be anxious to deal out stern penalties, many guilty violators will escape the meshes of the law.

The Law Is for Us as Well as the Other Fellow

The fourth link in the chain is the public itself. That group of individuals who have the greatest responsibility generally assume the least. They are the drivers themselves. Most of us take the position that the law is for the other fellow. Let us realize that we all have a Dr. Jekyll and Mr. Hyde complex, one personality being the driver and the other the pedestrian.

As to establishing responsibility of our courts, police, prosecutors or the public for laxity of law enforcement, I emphatically decline to indict any of these groups as such, for that would manifestly be unfair.

The really criminal indictment rests against those individual judges, prosecutors and police officials who are solemnly sworn to enforce the law and yet for fees or favors prostitute the law and perjure themselves. Law breaking Anarchists are not all in overalls. There are, on the other hand, thousands of honest and courageous judges, prosecutors and policemen (all honor be to them) who do enforce the law and remain true to their oaths of office.

Policemen will do their duty in direct proportion to the support received by way of convictions from the courts and cooperation from the driving public and voluntary compliance with the law. Judges and prosecutors will do their duty and return convictions after the police have reasonably enforced the laws, using a certain amount of discretion. Police, prosecutors and courts will assume their proportion of responsibility, inasmuch as the laws are reasonable. Therefore, there is a big responsibility resting upon the legislative branch of the City Administration. Ordinances should not be passed which are unreasonable and oppressive.

In St. Louis the Traffic Division of the Department of Streets and Sewers, headed by Reyburn P. Hoffman, City Traffic Engineer, develops, through an investigation, all the facts pertaining to pending legislation, thus giving the Board of Aldermen this benefit before legislation is passed.

Two and one-half years ago Honorable Victor J. Miller was elected Mayor of the City of St. Louis on the platform of economy, efficiency and enforcement. The Police Department, believing that he meant what he said, made a strenuous effort, and in 1925 had tried in the City Courts 50,000 cases as compared with 38,000 the year before his incumbency. In 1926 there were 70,000 cases tried. In 1925 the judges of two courts assessed and collected fees amounting to \$155,000, as compared with \$94,000 collected the year before Mayor Miller put into practice the enforcement plank in his platform.

To reduce the gigantic total of fatal accidents on our highways, two things are necessary; a program of education for the general public and strict law enforcement.

The St. Louis Safety Council, under the efficient direction of Girard C. Varnum, has welded into a unit the legislative, administrative and enforcing officials of the city, the trucking companies, public utilities, taxicabs, the School Board, and individual influential citizens. This nonpartisan group, without cliques, is working with an eye to the fact that each one of us is his brother's keeper.

The secret of educational success has lately been impressed upon the educators. The school children must early learn their responsibilities, both for their own preservation and for their future responsibilities as good citizens. Through the efforts of the St. Louis Safety Council, and through study and consideration on the part of Superintendent of Public Instruction Dr. John J. Maddox, and members of the Board of Education, the curriculum in our St. Louis public schools includes a definite course of study on safety, which should include law enforcement.

This program of education inaugurated by the St. Louis Safety Council, together with the law enforcement plank in Mayor Miller's platform, as practically carried out in City courts 1 and 2, with the 100 per cent cooperation of the Police Department, under Col. Joseph A. Gerk, has brought St. Louis to the fore. With its record of 192 fatalities and 6,434 injuries in 1925, the reduced record of 174 deaths and 6,011 injuries in 1926, and on the basis of its present nine months record an estimated 124 deaths and 5,625 injuries in 1927, St. Louis on a pro rata basis for these three years is recognized, on account of its record, as the safest city in the United States.

An Aroused Public Opinion is Effective

You representatives from other cities have seen what public opinion aroused through an educational program and a law enforcement platform rigidly enforced, can do.

It is rightly said, "A man's opinion is like a snowflake. It may fall upon our coat-sleeve and we may lightly brush it away; but if it is a real snowflake, many other flakes follow until soon they cover our coats, the roads, the whole countryside, and even the most powerful locomotive cannot burrow a way through."

After all, that is just what public opinion does with any subject, and lack of law enforcement is no exception. Christianity, Equal Rights, Religious Freedom, the Abolition of Slaves—every vital topic of world discussion since the beginning of time started as a solitary snowflake from the mind of a solitary man. It was brushed aside rudely, carelessly or lightly, but there were more flakes to follow. The bringing became more vigorous, oftentimes frenzied; great crews of "snow shovelers" were summoned to battle with the drifts. But eventually the single flake evolved into a mighty blizzard—and the opposition was smothered.

Business, finance, politics have their summers and winters. It behooves us to remember the power of the snowfall.

Let each one of our individual opinions be merged through our Local Safety Council into a campaign of education, so that lack of law enforcement on the part of individual judges, police, prosecutors and citizens will be a thing of the past.

A. K. GAGE (Detroit): I see nothing on the program of the Public Safety Section in relation to the lighting of automobiles. Last year, as I recall in Detroit, Colonel Barber had something to say about the lighting of automobiles on highways. I presume he has some progress to report in reference to the standardizing of automobile lighting. There are others here who would like to hear what progress has been made in that direction.

COLONEL BARBER: That is a very interesting question, but I don't believe I can say we have gotten very far with it. There are two schools of thought, one of

which is that the regulations now developed are O. K. All we need is a thorough enforcement of those regulations. The other school of thought among the automotive engineers and lighting experts is that the entire present system has got to be scrapped and some entirely different methods of handling the headlighting must be adopted. If you ask for my personal impression, I would say, that I question the latter view. I am inclined to think the course we ought to pursue is rigid enforcement of the present headlighting requirements. The great offenders in the headlights are on the cheap cars, where instead of paying \$5 for a good headlight the manufacturer puts on a dollar pair of headlights that won't stay in adjustment very long. That is why you see a lot of cheap cars come along that look like Rolls Royces, but when they buzz by you know they are not.

The automotive engineers after the 1926 conference undertook to take up a number of these important questions. I can say as far as lighting is concerned, the lighting experts have taken it up and they have been doing a lot of work on it, but there is that divergence of view as to the direct, ultimate solution.

The Unit Headlight Might Be a Vast Improvement

CHAIRMAN HARNETT: The Eastern Conference of Motor Vehicle Administrators, which comprises about 13 of the eastern states and the provinces of Canada, meets quarterly and has a lighting committee which has been struggling with the headlight problem. There is no question but that it can be to a great degree simplified, if not remedied.

We in New York state believe that one of the great factors in advancing the situation would be the construction of a headlight as a unit. We believe that the headlight should be constructed as one single unit and not be the collaboration of six or seven or possibly eight different manufacturers. We think if the headlight were made an integral part of one manufacturer's job that we would get a better headlight. We also think that the day may come when we may get a bulb of 21 candle power that will be made so that no other bulb of higher degree will fit into it. One of our great problems is that 75 per cent of the automobiles on the highways of New York State in or out of adjustment are carrying candle power of 32 instead of 21.

Of course, you never will eliminate the condition of headlights getting out of adjustment until you remove all the jars and bumps in the road, but in New York State under our law we established probably 5,000 headlight testing stations and up until last January they were to a great degree very effective. That was where a motorist could go and have an official inspection of his headlights and have them remedied at a nominal charge by the state. Now we have adopted a campaign of education, and I believe that of itself will be a factor in the future of educating the motorist how to adjust his own headlights, because it is a very simple matter to adjust your own headlights. In fact, every set of license plates issued in New York States carries with it, directly on the face of the envelope, simple instructions on how to adjust your own headlights. I think if all the states adopted that it might help a great deal. The headlight problem is still an acute one in New York State. We are getting a great many complaints about it.

G. F. H. WYSE (Toronto): It is a very simple matter for a motorist to adjust his own headlights, but a very small percentage of them have mechanical skill enough to do it. I would like to ask you, what percentage of success you have had in your scheme of having those headlights adjusted by your stations established for that purpose?

CHAIRMAN HARNETT: We had up to January of this year a great measure of success. It wasn't until about twelve months ago that we began to attack the problem from the viewpoint of teaching the motorist to adjust his own lights. I am sorry to say I do not agree with you that it is a technical matter, it is purely a

layman's job. A schoolboy could adjust headlights if he is told how to do it. It isn't a hard job.

CLARENCE SPAYD (Brooklyn Safety Council): When the request was made a few weeks ago to inspect the cars of New York State with respect to brakes, headlights, steering gear, and so on, the Brooklyn Safety Council, made a close check-up on how that was done and how the people owning motor trucks and private cars responded, and I think if I can depend upon my memory, about 90 per cent of the cars inspected were found correct so far as headlights were concerned. I think it was in a large measure due to the campaign of education which the Commissioner referred to, that has convinced the operators of automobiles in New York State that it is a thing which means much to the individual. Therefore, they all try to comply with the suggestion that their beams be turned down.

Any one who examines an automobile headlight knows it is a simple matter to turn it down or up. I realized this myself last summer when I made a little trip through New Jersey and Pennsylvania, out through Ohio and Indiana.

When I reached Pennsylvania—and I am not trying to throw any stones at that good, old state where I was born and lived for a good many years—I discovered myself off the paved part of the road. All the cars I met at night had their beam on so high I couldn't drive in the middle of the road. I had my beams according to New York regulation and they drove me off the road. Up above Harrisburg I stopped and turned my beams up as the rest did and I got my half of the road. When I was stopped by a state trooper above Harrisburg he wanted to know what I was trying to do. "I thought I was in a lot of good company because everybody else was trying to see how far they could shoot the ray in the road."

A Campaign of Publicity Is Advocated

"You're from New York, you ought to know better," he said.

I told him then that I thought it was largely due to the fact that they don't take them in. He hadn't issued a summons to anybody. He simply picked one up here and there and tried to argue with him. That is all due to the fact that in Pennsylvania they do not enforce that headlight law.

When I came back I forgot to change my headlights and came into New Jersey. I was stopped by an officer who wanted to know how far I had been driving with those headlights up as they were. I told him where I came from and he said, "That is the only reason I will let you go, because in Pennsylvania they have the beam up; but please turn them down because when you get into New York you will surely be locked up."

Not many of our accidents in New York State or Brooklyn are caused by the glaring headlight. We don't have many of them, but we have had during the past year some 18 or 19 cases where serious accidents resulted from that glaring headlight.

I would like to suggest when the Safety Council representatives go back to their own towns, that they get in touch with the newspapers and explain to the individual city editors just what this headlight thing means and what the lack of law enforcement means. I believe in that way they could get a campaign up without any trouble, in spite of the politicians who want to reach the judges and get them off. You can make public sentiment, and I would like to tell you a story if I were nearer home of what we did in New York State about law enforcement in the way of making public sentiment.

There was considerable opposition to the judges carrying out the law as they saw it, and only when a little campaign was put up by a few well-known citizens; but the judges were overwhelmed with letters (one man, I believe, received 10,000 letters of protest because he did not enforce the law) that something was accom-

plished. The result was in a few days we had jail sentences and suspension or revocation of licences.

SI MAYER (Chicago, Ill.): I happened to be one of the delegates at the Hoover Conference and I would like to ask Colonel Barber what has been done with the red light, the rear light. I know that a majority of the delegates who were at the Hoover Conference voted for the amber light, but because a few manufacturers' representatives were there they asked to defer action one evening until next day. It finally went back again into the hands of the committee and there is lying dormant.

COLONEL BARBER: Mr. Chairman, that matter was referred by Mr. Hoover to the Bureau of Standards for an investigation and report thereon. That report was very thoroughly gone into, and as you might expect, a good many conditions that weren't evident in that large gathering came up in the investigation by the Bureau of Standards. That report has been received but I don't think it is a final report. After the Conference terminated, the interest in the red versus amber light seemed to fade away in such a degree that I think it was felt best not to attempt to get up another session of the conference to consider that question, but to leave it until other subjects might call for another session.

The Law on the Rear Light is Clear

R. I. CATLIN (Aetna Life Insurance Co.): I should like to ask Colonel Barber whether any real study has been given to the matter of rear lights, especially on commercial trucks? We find in the insurance business a great many accidents are occurring because of the failure to have lights on trucks, especially those that get out of commission at night and have to be pulled off the side of the road for repairs. We have had some of the most serious accidents occur in just that way.

COLONEL BARBER: I guess you know more about that than I do. Commissioner Harnett. All I can say is that the code recommended by the Conference has been adopted by a number of states. It calls for a truck to be marked with two lights in the rear. The law is very clear on the subject of marking of such vehicles whether they are moving or standing, so the question is simply a matter of enforcement.

MR. CATLIN: That is true. I have noticed while a certain number of lights are required and while quite frequently they are lit, that it only means the lowering of a tailboard to cut off that light entirely. So many of the rear lights on trucks are hung right underneath at the rear end, and if there is any obstruction at all by way of a tailboard being lowered, there is no benefit at all from it. In view of the strides we have made in providing rear lights for busses, we have kept far behind in providing suitable lighting systems in the rear for commercial trucks.

COLONEL BARBER: The Society of Automotive Engineers appointed a small committee of three men, consisting of their president and two of their former presidents, and I will be very glad to convey to the chairman of that Committee your suggestion.

MR. CATLIN: At the close of your address, Commissioner Harnett, you stated that you believed that the next Legislature of New York would possibly pass a compulsory automobile law which would be built up somewhat along the lines of the Workmen's Compensation Law, which I would take to mean that persons injured would be compensated irrespective of the liability of the automobile owner. I believe I am correct in saying that the Hoover Conference in passing on the question of compulsory automobile insurance indicated quite clearly that they did not believe that that was the solution to the problem of automobile accidents. I also believe that since the Massachusetts compulsory law went into effect the first of this year, there have been more fatalities and more injuries in the state than for the same period last year, and with fewer cars registered. I should like to know, therefore, your opinion as to the benefit which might be derived from your proposed law in New York as having a bearing upon the matter of improving the traffic situation.

CHAIRMAN HARNETT: Speaking for myself, I will be very frank to say to you at the Hoover Conference I had the opportunity to speak for a moment on the subject and I took the stand that you have just taken that compulsory insurance is not the answer to the question of safe driving. I gleaned my information from some comments of legislators who comprise the Legislature of our state, of which I am not a member. I simply think from the trend of comment and opinion expressed that they are prone to pass such legislation.

Whatever means will be taken to work it out we are not certain at this time. However, there is no question but that something must be done, because a committee of the Bar, appointed by Judge Dowling of the Appellate Division, made a report which you probably read, that the calendar in New York State is congested to such an alarming degree that an ordinary action can't be tried for four or five years due to the fact that 70 per cent of the cases involve motor accidents, and he has urged, as others have urged before this committee, that there be a separate bureau for the handling of them, and in addition to that, some form of compensation be provided for the dependents, or those left behind.

MR. CATLIN: It seems to me that compulsory insurance is attacking the problem from the standpoint of the effects rather than the cause, and I believe we should lay far more emphasis on the necessity to study the problem of the cause than the effect. I think in speaking on the necessity for compulsory insurance we should analyze very thoroughly and carefully the matter of non-compensated cases, and I firmly believe that if any compulsory law is established which agrees to pay irrespective of liability, it is going to tremendously increase accidents.

There are at the present time three plans, in Massachusetts, New Hampshire and Connecticut, each of which I believe has some merit. I believe that it will require at least two or three years to get any real benefit from the application of the laws. Personally, I lean strongly toward the New Hampshire law, because I believe it is far more practical to leave it an optional measure as to whether the responsible people of the states should provide for the irresponsible ones. If the irresponsible don't provide it then I claim the sooner they are barred from the highways of the state the better.

GEO. E. CLARKSON (Pittsburgh): I would like to ask Colonel Barber whether or not the Conference on Street and Highway Safety has given attention to the emphasis that the automobile manufacturer is placing upon speed in their general advertising.

COLONEL BARBER: This Conference on Street and Highway Safety is not a continuing body that is having opinions about everything all the time. I would certainly join with others in saying, it would be detrimental if advertising is used to such a degree in regard to speed that it would be disastrous.

ADJOURNMENT.

Thursday Morning, September 29, 1927

A. C. GODWARD, Chairman
City Planning Engineer, Minneapolis, Minn.

The fourth session was called to order at nine-forty-five o'clock by the chairman, A. C. Godward, City Planning Engineer, Minneapolis, Minn.

CHAIRMAN GODWARD: We are fortunate this morning in having the best program I have ever known to be arranged in a matter of public safety, and I consider it quite an honor to be able to preside at this particular program, and more than that, I can assure you that all the men on the program are here and all ready to go. Each one wants more time than he can have, which is rather encouraging.

The chairman isn't going to take up any of the time that these men wish for themselves and I will try to reserve a little for discussion.

The first paper will be given by Mr. H. W. Eldridge, president and manager of Geo. Wyman & Co., South Bend, Ind. Mr. Eldridge is able to discuss his subject through personal experience, in the study of conditions in his own city, and in the making of surveys. I take pleasure in introducing Mr. Eldridge.

Taking Stock of the Community Accident Problem

H. W. Eldridge, President and Manager, George Wyman & Company, South Bend, Ind.

South Bend is a typical middle west city of something over 100,000 inhabitants. It has had a continuous and uniform increase in population of 50 per cent, or a trifle more, each ten years for the last seven or eight decades. Two or three hundred years ago this region had its traffic problems. At that time and many centuries previous the traffic was principally canoes. The chief accident problems were logs, sunken trees and Indians. This vicinity, or as it was later called, South Bend was the connecting link between Lake Michigan and the Gulf of Mexico by way of the St. Joseph, Kankakee, Illinois and Mississippi rivers. A portage was established about four miles in length between the south bend of the St. Joseph river and the Kankakee, over which were carried canoes, supplies etc., from one water system to the other. This portage was used by all the various tribes of Indians, even by the Peruvians in their traffic for Lake Superior copper, also by the early explorers, LaSalle, Marquette and many others. The traffic at this time was not quite so swift as that we now have, nevertheless the safety problems connected with it were of the greatest importance.

The early founders of South Bend laid out its principal streets five and six rods wide, wider even than many cities that were built at a later period. This excellent width of streets has helped in deferring the actual need of traffic regulations to a later time than many cities who are supplied with narrower streets. However, the time finally did come when the traffic became so heavy that it was necessary to scrap the many and various ordinances and regulations for traffic that had been gradually accumulating month by month. Our mayor, Mr. Montgomery, called together several citizens and laid this entire matter before them. The citizens had a fair idea of what was wanted but were not, of course, expert in supplying traffic regulations that were at least for the time up-to-date and workable. A number of meetings were held, some of the

members attended the National Safety Council convention at Detroit. The matter was discussed up one side and down the other but still could not come to a constructive plan that would displace the many regulations then in use.

The traffic committee finally sought the assistance of the National Safety Council, and Mr. Earl J. Reeder, supervising engineer, was sent to South Bend. After several meetings it was decided that time would be saved and a better traffic system could be evolved were we to work with and through the National Safety Council. The working out of the plan was quite simple. There were three important committees appointed by the mayor.

First—Committee on Statistics.

Second—Committee on Traffic Engineering.

Third—Committee on Public Education.

Both the citizens' original committee and the National Safety Council believed that large committees in the beginning would be more helpful than smaller committees, inasmuch as there would be the constant education of each member of these committees together with taking advantage of the experience and outlook of so many different men in different employments. The Committee on Statistics consisted of 20 members. The Committee on Traffic Engineering consisted of 25 members. The Committee on Public Education consisted of 30 members.

Committees Are Made Thoroughly Representative

When you consider that each of these committees was selected with reference to a wide distribution of employment and business interests as well as organization connections and location of their homes and businesses, you can readily see that the public education on traffic began with the very first meeting and helped materially to create public sentiment in favor of whatever plan might be adopted. While the present speaker had been chairman of the original citizens committee it was deemed best to have the Mayor general chairman of the three larger committees, and then the chairman of each one of the three committees would work with the Mayor as an Executive Advisory Committee.

The committees having been formed as explained, their meetings and deliberations began covering a period of two weeks. Collection of data was of course the first work and preceded the work of the other committees several weeks. Mr. Reeder met with each committee each time. Perfect freedom of expression of all members of each committee was the rule. The first thought concerning committees of the size that were chosen would be that the attendance would be poor and the interest divided. Exactly the opposite was the actual result. I have never attended public meetings where the attendance was so excellent and the interest so great. It appeared that nothing but absence from the city or appointments of great importance kept members from attending these meetings. They were mostly held at noon time with a luncheon and continued until the work of that day was accomplished, although several of the meetings were in the afternoon and evening.

I have neglected to mention that on all these committees the city was well represented by the various city officials working along with the citizens on matters that would later come directly under their care. This was helpful in the extreme as it enables the impractical things to be disposed of. It also helped to bring in the constructive and practical ideas. Preliminary reports were submitted after several meetings and gone over carefully by the committee and especially by those who would have to enforce the ordinance that was later to be passed.

While fundamentally the principles underlying traffic and safety problems are practically the same, each city has its individual problems. In South Bend the main north and south business street parallels the river, making it more difficult to handle traffic as the approach is mostly from one side. The tendency was for much unnecessary traffic to be attracted to this street. To relieve this condition a "By Pass" route was laid out about four blocks wide and six blocks long, making the streets that bounded the vehicular loop preferential streets. Much traffic being thus diverted from the three north and south streets within the vehicular loop.

Angle or diagonal parking had existed in South Bend on the wider north and south streets within the business district, which were the streets that carried the heavier traffic. This was changed so that all parking became parallel within the vehicular loop and practically throughout the city.

Due to parallel parking two lanes of traffic each way were possible on the wider streets and two lanes were enforced at street intersections by pavement markings. Right and left turns were permitted only from the right or left lanes respectively. At several chief intersections left turns were prohibited.

Results of the New Rules and Regulations

The time of the amber light of the automatic signals was lengthened from three to five seconds, and no driving into the intersection was permitted while the amber light was being displayed.

Additional street car safety zones were established. Discharging or receiving passengers at congested intersections, except as incidental to waiting for a go signal, was prohibited.

There were other rules provided relating to No-parking Zones, Loading Zones and the like. A number of minor regulations were inaugurated such as preventing U turns within the vehicular loop, rules applying to extra passengers in the driver's seat, embracing while driving, removing, or trimming to a certain height, shrubs or plants at intersections, and other regulations of like character.

In a brief way this furnished an idea of the changes that went into effect in South Bend the first of this September. That moving of traffic on our streets has been expedited there can be no question. The total cycle of traffic signals has been materially reduced which had not been possible before. The cycle at present is 65 seconds, five seconds for the amber and 30 seconds each for the green and red lights. We believe it can still be further reduced, except possibly at the more congested hours of the day. A much greater volume of traffic is now being moved in a shorter period of time, than heretofore, with less congestion.

No actual control of pedestrians was attempted in South Bend in the present ordinance, although certain minor rules were provided both as to pedestrians and as to vehicles, tending to promote greater safety for pedestrian traffic.

Two separate booklets were printed and simultaneously distributed prior to the ordinance becoming effective. These were given a wide distribution through the medium of gasoline stations and in other ways. One of the booklets contained the ordinance set out in full. It also emphasized the changes over former ordinances. The other booklet explained the traffic survey and stressed the point that the traffic problem is a growing menace and must be met by continuous study and by cooperation from the public. It also contained caution and safety rules and reminders. The booklets were eagerly sought and well received by the public.

South Bend, the first part of this year, installed a new system for keeping

more complete records of accidents, by adopting the National Safety Council record cards. This should materially aid, after a time, in accomplishing a reduction of accidents by reason of furnishing an additional and more reliable basis for deductions and conclusions for future action.

Many checks and counts were made of traffic at various intersections throughout the congested district. A considerable amount of data of this kind assisted materially in developing the vehicular loop district and the necessary regulations in the new traffic code. There is considerable doubt and confusion as to the exact proportion of conveyances used by patrons of stores in the down town district. The Chicago, South Bend and Northern Indiana Railway Company on March 19 of this year made an exhausted and careful check of this question. The hours chosen were from nine until seven. 25,863 persons were interviewed on a carefully prepared plan to avoid duplication. The results were as follows:

Street Cars	56.2
Interurban Cars	2.1
Busses	5.5
Automobiles	19.4
Walk	13.6
Taxi	.1
No reports	3.1

This emphasizes the necessity of amply guarding safety zones in the congested district, inasmuch as in South Bend 58.3 of all patrons in the down town business district arrive and depart on street cars. It is quite true that this percentage will vary according to the population of the city and its transportation facilities. The proportion using street cars being much greater in the larger cities and less in the smaller cities. All of this needs to be taken into account as a basis not only for reduction of accidents but moving of all kinds of traffic in any city.

Study of the Parking Problem

The parking problem is, of course, a difficult one. It has by no means been solved. If merchants want to make the most of their location it will be necessary for them either individually or collectively to provide parking space with or without service, near their stores. It will be far better to realize this in the beginning before their customers have formed other parking habits in less congested trading districts. Our own store is located at the center of the down town district. Realizing the probable growth of traffic and the very condition just described our store has furnished free parking space for customers' automobiles within a block of the store for the past three years. Several months ago we started a "parking at the curb" service where a customer drives to the curb, a Wyman attendant takes car to garage and returns it later to the curb for customer when it is wanted. Service of this kind established now will bear its greatest fruit as traffic and congestion increases. The new traffic regulation makes a far greater turnover of cars that can reach the central business district and will, when understood and observed be helpful to all those having business to transact in this district.

I have tried to relate briefly the story of South Bend's effort to put into operation modern street traffic regulation. Changes will become necessary, of course, as facts or conditions warrant. It is gratifying to know that results have already demonstrated that we are moving traffic more readily. We believe that results will also demonstrate in a short time that the cause of safety in South Bend has been promoted by the new traffic plan. Of one thing we are

quite sure and that is that the best thought of city officials, of the citizens of South Bend as represented by committees, and of the National Safety Council of Chicago have all gone into this work.

CHAIRMAN GOWARD: Thank you, Mr. Eldridge. Mr. Eldridge has covered problems that are common to all of us and I am sure that there are members who would like to ask him some questions. I know there are some I would like to ask. The Chair will take the liberty of postponing the discussion of this and other papers until all the papers have been given.

The next speaker on the program wouldn't need any introduction if he were farther west. There may be some here from New York who don't know him. He is well-known through the Middle West and Western cities. He has studied and knows, I believe, as no other person in America, the American city. He is familiar not only with the city itself, the officials of the city, but with its ambitions, its aims, and its hopes. He has helped many of them in answering their problems not only through his magazine, but through personal consultation. I have known him as a writer and a thinker for a long time. However, it is my first opportunity to know him as a speaker. I believe he can give us an answer to the question: "Have Our Cities Fallen Down on Their Traffic Job?" I take pleasure in introducing Mr. Harold S. Battenheim, Editor the *American City Magazine*, New York City.

Have Our Cities Fallen Down On Their Traffic Job?

Harold S. Battenheim, Editor, "The American City," New York City.

"You can walk over to Seventh Avenue, but don't go across. You hear what I tell you, Rosie, don't go across! You may get killed."

This warning, which the writer overheard a tenement house mother shout at her little daughter on the sidewalks of New York a few weeks ago, may well serve as the text for a discussion of the traffic job of our modern cities. Perhaps Rosie obeyed her mother and came home safely. But perhaps she was the little one who that day, as traffic fodder, helped to meet New York's average quota of three persons—one of them a child—killed by motor cars or trucks in the streets of that city every day in the year.

The terror of wild beasts under which the cave woman struggled to bring up her children in bygone days has its all too real counterpart in the terror of motor-driven juggernauts under which the cliff-dwelling mother in the tenements of our big cities is struggling to keep her children alive. Are we doing all that we might to remove that terror, or have our cities fallen down on their traffic job?

If Rosie was run down and badly injured, she probably had good hospital care; and if she did not recover, and her parents were poor enough, her doctor's bills and funeral expenses were probably met from public or charitable funds. Maybe her parents were even able to collect some cash damages from her slayer—though the failure of most of our states to pass compulsory accident insurance laws makes that relief, as yet, problematical.

The Motorist's Mental Attitude

In general, however, it may be said that our states and cities have fallen down less in providing some measure of relief *after the event* than in the adoption of preventive measures *before the event*. And in the preventive work thus far done, as is usually the case in our efforts for human welfare, palliatives have had more attention than the removal of causes.

As this is a *safety* congress, doubtless it is expected that I shall place the main emphasis on safety rather than on the facilitation of traffic. With this I am in hearty accord. No study of traffic problems is adequate, however, which does not recognize the fact that many persons prefer to drive in haste and possibly "see our jail" than to drive carefully and "see our town." If driving at high speed has slain its thousands since the automobile was invented, a foolish mental attitude of haste, when driving at comparatively low speed through traffic congestion, has doubtless slain its tens of thousands.

Next to the impulse of foolish haste I should place lack of courtesy as a primary cause of traffic accidents where the driver is at fault. The same man who invariably rises from his chair when a woman enters a room or removes his hat when she enters a hotel elevator—neither of which actions has any value other than courtesy—will too often forget courtesy entirely when he is at the wheel and she is a pedestrian or in another car.

The mental attitude of most motorists and of some lawmakers appears to be that pedestrians who still survive as such, are a well-nigh intolerable nuisance. We hear a good deal of the need of pedestrian *control* on the highways, but mighty little of the *consideration* which pedestrians, as a temporary or permanently inferior order, should receive from their betters. But there is a ray of hope for them in the recommendation made last year by the National Conference on Street and Highway Safety, that pedestrians be accorded a safe and *dignified* use of the highways.

Safety Education the First Essential

But do these factors of haste and discourtesy belong in a discussion of the subject assigned to me—"Have Our Cities Fallen Down on Their Traffic Job?" I am sure that they do, for statistics appear to prove that pedestrian fatalities constitute about two-thirds of all fatalities in which motor vehicles are involved, and that more than 90 per cent of the traffic accidents in cities are due not to defective mechanical equipment but to defective mental or moral or physical equipment of individuals. Some of these shortcomings can be reached by law, but for most of them education is the only hope. The most serious indictment, therefore, which can be made against our cities in relation to their traffic job is their failure to regard this job as primarily one of public education. Here, as elsewhere, the schools are the greatest potential force, but adult education through press and platform, and through local Safety Councils and civic organizations, demands much greater attention than it has yet had.

In addition to attacking haste, discourtesy and carelessness in drivers and pedestrians, a well-organized campaign of traffic education would seek especially to combat

(a) Ignorance of the mechanics of the automobile and of the laws and ordinances governing its operation.

(b) Lawlessness—failure to obey the rules of the game, such as no public opinion would tolerate on the tennis court or the golf links.

(c) Selfishness—often shortsighted—such as that which causes farmers to fight the enactment of drivers' license laws or merchants to oppose reasonable restrictions of parking in congested city streets.

Indictment number 1 is, therefore, the lack of a consistent and comprehensive educational policy directed against such human factors in the traffic problem as the foregoing.

Failure to Coordinate Local Efforts

Indictment number 2 relates to the failure of most municipalities properly to coordinate their own local efforts for traffic control and facilitation.

Perhaps no other municipal problem demands such intelligent and unselfish co-operation of the various branches of a city government. The traffic problem is not

merely a police problem; it is also an engineering problem, a legal problem, a city planning problem, and, as has already been pointed out, an educational problem. It involves, moreover, intercommunity relationships of a difficult and delicate nature. One of the essentials of effective traffic control is a much closer approach to standardization of traffic ordinances than has yet become the general practice. This involves one of the hardest things which we human beings have to do—the relinquishing of some of our own pet ideas in the interest of harmony and progress.

Compromise often plays an important part in human progress. When after months of debate there seemed danger of a deadlock in the convention which drafted the Constitution of the United States, Benjamin Franklin helped to bring harmony into the gathering by a speech in which, conceding certain points for which he had previously held out, he told his fellow-delegates that he had come to believe in the combined wisdom of many as against the infallible judgment of one.

Are not many city officials hindering progress in traffic control by stubborn insistence on their own infallible judgment or on the prerogatives of their own departments, instead of getting together with their fellow-officials and with local civic bodies in a joint effort to solve this well-nigh insoluble problem? A few cities have organized traffic commissions through which some approximation of such cooperation has been brought about; but comparatively little use has yet been made of the valuable suggestions on Organization for Traffic Planning to be found in the 1926 report of the National Conference on Street and Highway Safety.

More Engineering Skill Is Needed

A conspicuous result of this lack of local cooperation in many cities is that, in the control and facilitation of local traffic, too little use has as yet been made of engineering skill. This has been due largely to too strict an adherence to the tradition of police control of movement on the streets. Traffic officers are, and doubtless should remain, under the control of the director of public safety or the chief of police, but a much more effective coordination is needed in most cities between the police and engineering departments. The limits of this paper do not permit a detailed discussion of this problem; but emphasis should, perhaps, be given to the importance of expert-engineering skill in the selection and installation of signal systems and the marking of highways, as well as in activities generally recognized as of an engineering character, such as street opening, paving and widening.

During the last two or three years some progress has been made in the installation of signal lights operated on the so-called "progressive" or "coordinated" plan. Properly installed, this system makes possible an approach to a continuous flow of traffic at a predetermined speed, the lights changing from red to green as the motorist traveling at this speed approaches them. The result is the handling of traffic at a higher average rate of progress through congested sections than by the more common method of synchronized control; and the factor of safety is greater than on streets where all lights flash green at the same time with the result that the motorist is tempted to travel during the "go" period at a dangerous rate of speed in order to "beat" the lights for an extra block before they flash red and bring him to a stop again. Obviously, the grouping and timing of the lights in such an installation is a rather technical engineering problem. Would the chief of police or even the city engineer in the average municipality lose caste if he were to admit that it is beyond him, and call in an expert consultant to advise on this and other problems of traffic control?

As I have pointed out in my paper on "The Problem of the Standing Vehicle," in *The Annals of the American Academy of Political and Social Science* for September, 1927, there is need for a fundamental attack on the traffic problem through city and regional planning, and through much more drastic limitations of building heights and of density of population than American cities have yet adopted. Here

the efforts of city officials must be coordinated with those of city planning and zoning boards and of the regional planning organizations which are gradually beginning to function in our metropolitan districts.

Lack of Adequate State Laws

A third way in which most of our cities have fallen down on their traffic jobs is in their failure to insist on adequate state laws for the control of motor vehicles.

There has been available this year for enactment by the several states a Uniform Vehicle Code, drafted with great care under the leadership of Secretary Hoover, by committees of the National Conference on Street and Highway Safety. Some states have already adopted the code or important features of it, and several other states have laws previously adopted which are so good as hardly to require wholesale revision; but most of our forty-eight commonwealths are still without an adequate motor vehicle code—or any at all.

It may be said that this is not a municipal problem, and that it therefore has no place in the present discussion. My belief is, however, that the lack of adequate and uniform state laws for motor vehicle registration, and for the licensing of operators and the regulation of vehicles on the highways, is of such outstanding importance that every city, in states where such lack exists, has but two proper alternatives—to use every effort to secure the enactment of such laws, or to meet their lack as far as possible by writing into local ordinances features which, in the more progressive states, are to be found in state codes. The courts would, I believe, sustain such ordinances as a proper exercise of a city's right to protect the lives of its citizens; but the complications involved in local enforcement would be so many that cooperation with other municipalities in a vigorous campaign for adoption by the state of the Standard Vehicle Code would be much the wiser course.

The Grade Crossing Problem

Another traffic job of the first magnitude on which our cities and states have as yet largely fallen down, is the abolishing of railroad grade crossings. There were, on December 31, 1926, according to records of the Interstate Commerce Commission, 234,280 highway grade crossings. Of these, more than 88 per cent—206,433 to be exact—were unprotected with any gate, signal or watchman. At the 27,847 "protected" crossings the kinds of protection afforded and the number of casualties during 1926 were

Crossings Protected by	Number of Crossings	Number of Accidents	Persons Killed—Injured	
Crossing gates	6,148	227	100	175
Crossing watchman	7,760	603	195	718
Audible and visible signal	6,427	216	143	270
Audible signal	5,308	406	216	460
Visible signal	2,204	262	119	269
Total protected crossings	27,847	1,714	773	1,892
Unprotected crossings	206,433	4,148	1,718	5,099
Total grade crossings of highways with railroads	234,280	5,862	2,491	6,991

An analysis of these figures shows that at the protected crossings the average for the year was one accident for each 16 crossings as against one accident for each 50 of the unprotected crossings. This is due in part, of course, to the fact that the more heavily traveled crossings are as a rule the protected ones, but the fact that 773 persons were killed and 1,892 injured last year at "protected" grade crossings in the United States is a strong reason for preferring abolition to protection.

Analyzing the 5,862 grade-crossing accidents of 1926 as to persons and vehicles affected, we find the following totals:

	Number of Accidents	Persons Killed—Injured	
Pedestrians	519	293	241
Passenger automobiles	4,078	1,766	5,350
Autobusses	31	15	106
Autotrucks	861	281	902
Motorcycles or bicycles	26	18	13
Trolley cars	36	1	151
Animal-drawn vehicles	153	49	126
Other vehicles or machines	10	2	12
Pedestrians passing over or under trains or cars	27	7	20
All other grade-crossing accidents	121	59	70

The figures here quoted are from the forthcoming Accident Bulletin for the calendar year 1926 of the Interstate Commerce Commission, and have been furnished to *The American City* through the courtesy of M. O. Lorenz, Director of the Commission's Bureau of Statistics.

Automobiles Run Into the Side of the Train

An amazing fact disclosed by another of the Interstate Commerce Commission's tabulations is that of the 5,862 accidents listed above, more than 1,100 were caused by vehicles *running into the side of trains*.

Our automobile marksmen are evidently fairly expert in attacking a locomotive or railroad car, whatever may be their skill in hitting the side of the proverbial barn!

Another surprising fact disclosed by the Commission's figures is that there was an actual increase in number of highway grade crossings on Class 1 railroads last year. Grade crossings to the number of 1,184 were constructed on these roads during 1926, while the number eliminated was 1,158, of which only 195 were eliminated by the separation of grade.

It has been estimated that to abolish all the grade crossings of railroads with streets and highways in the United States would cost at least \$20,000,000,000. No one, of course, advocates any such expenditure in the immediate future. But New York has made an excellent start towards a state-wide program by the adoption, in November, 1925, of a constitutional amendment authorizing the Legislature to issue bonds aggregating \$300,000,000 for the elimination of railroad grade crossings, the expense of the work to be borne 25 per cent by the state, 25 per cent by the municipality and 50 per cent by the railroad company affected.

Separation at Grade Is Many Times Advisable

Any comprehensive program of grade separation, to accomplish the greatest good in saving life and expediting traffic, ought not to be restricted to railroad crossings. In many cases the separation of grades at intersections of highways with other highways would have much greater economic and humanitarian value than the abolition of crossings of minor railroad lines. Accidents and delays at street crossings are responsible for so many of our traffic ills that we must look forward to large and increasing expenditures throughout the United States for the separation of grades at the intersection of vehicular ways.

A nation-wide impetus that will grip the popular imagination and open the public purse must be given to the campaign for grade-crossing elimination before any substantial progress can be made. There is one way, at least, in which with the backing of the National Safety Council and other powerful organizations, I believe this could be done:

Unless the past is no guide to the future, the generally prosperous conditions now prevailing throughout the United States will be followed, some time within the next few years, by a period of business depression. One of the best means of minimizing such "hard times" when they come, and of re-stimulating industry and employment, will be to have a well-planned program of public works ready to set going with the aid of state and municipal funds. Why should not the abolishing of grade crossings be made a major factor in such a carefully prepared plan? Engineering studies; determination of proper division of costs between states, municipalities and railroads; the voting of funds to be available when the emergency arises—these and other measures of preparedness in times of prosperity are dictated, I am sure, by a sound public policy.

Revocation of Drivers' Licenses

As indictment No. 5, most of our states and cities have fallen down on their traffic job by undue leniency to persons guilty of reckless driving. The average American of today would, I believe, rather lose his right to vote than his right to operate an automobile. If the latter were made by law in all of our states not a natural right but a privilege to be exercised only by persons able to pass strict mental and physical tests, and if the license were always revoked by the courts for driving when under the influence of liquor and for chronic carelessness or disobedience to traffic rules, the effect would be very wholesome.

Many otherwise well-balanced advocates of personal liberty, in persuading themselves that the eighteenth amendment ought either to be repealed or nullified, have apparently overlooked the folly of allowing any or all of our more than twenty million motor cars to be operated by potential drinkers. There is a large measure of truth, I am sure, in the remark attributed to Henry Ford that the era of the automobile is necessarily bringing to an end the era of intoxicating beverages. That the manufacture and sale of intoxicants can be assumed to be a matter affecting only the persons who consume the stuff, is one of the most amazing examples of rationalization of which the human mind has ever shown itself capable.

This list of "indictments" might be further extended, but I have already exceeded the time limit assigned to this paper. In closing, may I make clear to the many friends of *The American City Magazine*, among the municipal officials and civic organizations throughout the United States, my realization of the suddenness and speed with which the traffic problem has come upon them. It was only eleven years ago that Henry C. Wright, in a treatise on city government, was able to write that "cities of less than 200,000 seldom have traffic congestion that requires regulation." During the interval the problem has spread to every village Main Street. The marvel is, not that so little has been accomplished, but that on the whole the traffic problem has received so much intelligent study. But redoubled efforts are necessary to the end that "civilization may outrun catastrophe." If in the five directions above outlined, and in other needed ways, substantial progress is made during the coming years, is it too much to hope that some National Safety Congress before the end of the present decade may be able to record an actual lessening of the traffic hazard over large areas of the United States? Perhaps, even in New York, Rosie may grow to womanhood!

A Paper Worthy of Quotation

CHAIRMAN GODWARD: You have heard a paper that I know many of you will want to quote in your home towns and in papers which you in the future wish to read and give. I hope your natural modesty does not prevent you from publishing that paper in the *American City Magazine*. I seem to have several seconds on that

I now take pleasure in introducing Mr. H. S. Simpson, Traffic Engineer, Essex County, N. J., who will talk to us on "Accidents as Symptoms of Traffic Ills."

Accidents as Symptoms of Traffic Ills

Hawley S. Simpson, Traffic Engineer, Essex County, N. J.

Progress of any sort in this world has always had its price, and it is an immutable law that the price must be paid. Aviation, for instance, is progressing but it is taking an enormous toll in human lives much of it seemingly unnecessary, but nevertheless every accident is teaching a lesson, which if properly studied can be used to prevent a recurrence of that particular type. New methods of transportation, whether by water, land or air, develop new ways in which human lives are sacrificed. This fact is regrettable but nevertheless true and cannot be ignored. The automobile is no exception to the general rule and in furnishing a new and more convenient form of transportation has exacted and continues to exact its toll. Keeping the loss within the bounds of reason and effecting reductions where possible is the duty of everyone concerned in the street accident problem. The price now being paid is admittedly too high and strenuous efforts will be required before any great reduction becomes apparent.

It is needless to quote statistics indicating the loss in life and limb sustained by this nation as a yearly tribute to the motor vehicle. All are familiar with the figures, which are so staggeringly large as to be almost beyond comprehension. And the condition is annually becoming more aggravated; fatalities are increasing rapidly, as is the fatality rate, while on the other hand the rate in fatalities per thousand motor vehicles is decreasing yearly. It might be assumed on the basis of the latter figures that the street accident problem was being conquered, because of the fact that 10,000 motor vehicles now cause only about 9 fatalities per year, as against approximately 24 fatalities per year caused by the same number of vehicles in 1915. But the assumption is erroneous. Statistics for the whole of the United States covering a period of 13 years prove conclusively that the motor vehicle fatality rate is increasing with a definite relation to the rate of increase of motor vehicle density.

The problem has not as yet been met and will not be met until it is faced squarely and attacked intensively by other methods than those now generally used. Misinformation and misinterpretation of accurate information must first be eliminated and a science of public accident prevention established proceeding in a logical manner towards the desired goal. Misconceptions of accident information may be illustrated by absurdities such as the distribution by well-meaning individuals of data tending to show that women are better drivers than men because the former are involved in less accidents, that straight roads are more dangerous than curved by reason of more accidents, or that wet pavement is safer than dry for the aforementioned reason. All of these fallacies have been given publication but each neglect the relative proportion of the factors involved, and tend to distort the viewpoint of the public in regard to the accident problem. Such erroneous ideas are typical of what might be called accident "frenzies" and are typical of many commonly held tenets arising from improper or incomplete analyses.

Street accidents and human illnesses are very much alike. The former attacks the community as a whole, while the latter attacks the individual. But how much better prepared is the individual to resist disease than a group of similar individuals to resist accidents. The mass may be swayed by "frenzies" and mob psychology, while the individual acts decisively, and in addition the individual has at his service the science of medicine which combats disease with certain tried remedies which have proven their value in cases of similar symptoms. The science of accident preven-

tion such as it is, is only now in the formative period, but as surely as the practice of medicine has developed from its progenitor, the witch doctor, so will a science of accident prevention develop through a period of "tom-tom" beating to establishment upon a firm basis of fact. This era has not yet arrived and regardless of whatever may be said to the contrary, the average official charged with protection of the public safety is extremely apathetic in his attitude toward public accidents. Deploring the loss of life and injury to the public and, feeling that some concrete action must be taken, accident statistics are collected and published, persons responsible for accidents are apprehended and attempts made to bring about convictions when the circumstances warrant.

But after this has been done—what then? Have you ever stood in a room in which were reports of a hundred thousand traffic accidents, in filing cabinet after filing cabinet containing information which had cost thousands of dollars to collect, and wondered to yourself whether this invaluable data had actually been used to the fullest extent in preventing a recurrence of any particular class or concentration of accidents? If you have, I am sure you will agree with me that not every use to which the information could be put has been exhausted.

Peculiarities of the Congestion Problem

The connection between traffic and traffic accidents is more or less disordered, or does not appear as one might expect on casual study. Great concentration of vehicles and persons does not produce the greatest accident hazard. It has been stated that one of the safest places in the world is at the corner of 42nd street and Fifth Avenue in New York during the rush hour, and the reason is readily apparent. Assume a street closely packed with pedestrians and vehicles so that no movement is possible. It is corollary that no accidents are possible. Reduce the concentration and allow movement and accidents begin to occur, the hazard increasing as the congestion reduces. Accidents are occasioned by the occurrence of the unexpected and the unexpected occurs with relatively greater frequency when the street or road is comparatively deserted. Proof of this fact has recently been made available in figures released by the Pennsylvania State Highway Department.* During the 6 hours—10 p. m. to 4 a. m.—traffic is at an ebb. Yet traffic hazard, measured in accidents per vehicle, during these hours average four times that of the remainder of the day, reaching a peak between 12 midnight and 1 a. m. approximately six and one-half times the average hazard of the other 18 normal hours. Further proof of this fact is furnished by the same authority in showing that there exists a sort of inverse relationship between accidents and traffic volume. The day of greatest traffic volume, Sunday, is not the day of greatest hazard, but Monday, the lightest traffic day of the week, is the highest in point of vehicle hazard. The relative hazard to the individual vehicle on Monday is nearly twice the hazard on Sunday, although Sunday traffic is twice as heavy. There is no apparent reason for the belief that concentration of persons and vehicles is the cause of accidents, or that decentralization will relieve the situation, since statistics show that the reverse is actually true.

In the central business section of Detroit, into which come and go half a million persons and 150,000 vehicles during the business day, there occurred only 13 traffic fatalities in 1925, and seven of these happened after business hours during periods of comparatively light traffic. Accident hazard in the same downtown area on the basis of number of persons and vehicles on the street is only about one-half that of the residential area three miles from the nominal business center. Comparing city fatalities in the 10-mile circle with a like area in a scattered residential section shows seven times more frequency in comparison to injured accidents than in the downtown business section. And probably, although general statistics are not

*G. G. Kelcey, on "Automobile Hazard and Its Reduction"—Proceedings Am. Soc. C. E., August, 1927.

available, the seriousness of the individual accident increases as congestion decreases in about the same ratio as that just quoted, so that the absolute seriousness of accidents is even higher in residential districts as compared to business districts.

These examples indicate only in a general way where some of the danger points in a community may lie. More detailed information regarding concentration of accidents at points of extra hazard is required before a solution can be attempted.

A city of 750,000 persons found that 28 per cent of all accidents occurred at only 64 intersections. In a smaller city 33 per cent of all accidents occurred at but 56 intersections. In a survey which the speaker has just concluded 59 per cent of all accidents in a certain area occurred at 22 per cent of the intersections. In another survey over 12 per cent of all the accidents in a built-up area of 3.2 square miles occurred at only one location. In a survey now being conducted in Detroit the 20 intersections of greatest accident frequency, estimated to be but 2/10 of one per cent of the total intersections in the city, were the scene of 4 per cent of the accidents to date this year, with an accident hazard 20 times the average. Similar cases are on record but the above are undoubtedly indicative of the relatively large concentration of accidents at a comparatively few intersections. It certainly appears logical that the angle of attack which has been generally neglected points to the individual extra hazard intersection.

Detailed Analyses of Extra Hazardous Locations

If in addition to the preventive work now being carried on, detailed analysis were made of all extra hazard intersections, it is reasonable to believe that progress would be shown. Certainly, if it is possible to attack, say 60 per cent of the accidents at only 25 per cent of the possible places of occurrence, concrete results can be achieved in a much shorter space of time than if the entire accident situation is attacked as a unit.

Elimination of disease in the human body is accomplished in two ways which may be classified as preventive and curative. Disease in general is prevented by the promotion of more sanitary living conditions, and the elimination of disease producing bacillus from food and water before being taken into the human body. But when an individual has been so unfortunate as to contract disease a physician is consulted and a remedy prescribed for the *particular* form which the disease may have taken, and a cure attempted.

The first, or more general attack is being used to considerable extent in the prevention of street accidents and is largely responsible for the results already achieved. It includes safety educational work, elimination of unfit operators, improvements in roadway and lighting conditions and work of a similar nature. But while this has been going on, too many of us have lost sight of the second line of procedure. An ounce of prevention may be the equivalent of the proverbial pound of cure, but when prevention fails curative measures should certainly not be neglected even though the methods are more involved and require more careful analysis to be effective. A "sick" location, meaning a place of occurrence of more than the normal number of accidents; is an indication not perhaps of failure of preventive measures but rather an admission that preventive work does not cover the entire field. "Sick" locations then require just as skilled treatment as a sick individual, and more, it might almost be said, for certainly more is at stake.

The individual is able to make his needs known to a physician. The intersection is not. Attention is usually called to a serious condition, not by accurate accident data, but by popular petition and invariably the remedy is prescribed by the residents of the neighborhood, usually taking the form of a "stop and go" traffic signal, when this may be the worst possible solution.

We are fully aware that most up-to-date police departments keep some sort of

spot map indicating the place of occurrence of accidents, but the records are not always such that it is possible to immediately list the 10 or 20 most dangerous intersections either in number of accidents or in point of total loss involved. Previous mention has been made of the variation in individual accident seriousness in different area and at different periods of the day. Similar variations are found when comparing different intersections. Studies of personal injury accident reports reveal the fact that a large number of very minor accidents are included in the total, each having the same weight in a numerical compilation as accidents causing total disability. Accidents represent actual losses to the community in property and productive ability of individuals, which can best be expressed by a common denominator, the dollar. Who knows what the trend of loss per accident is? We all know that the number of reported accidents is increasing but what of the individual accident? It may actually be that the individual accident seriousness is decreasing and the increased number of accidents is due mainly to better reporting. With estimated accident losses running into the millions, it seems that some effort should be made to close the last gap and determine actually what this loss is. It is a safe conclusion that the amount of the losses involved in accidents and not the number of accidents should be the basis from which the accident situation should be analyzed.

Keeping the "Account With Death"

There thus appears to exist a largely undeveloped and very fertile field for the analysis of each extra-hazard intersection, the degree of hazard being based upon a computed monetary loss dependent upon the seriousness of the injury or amount of property loss involved. Because of the fact that there is the possibility of reducing the majority of accidents by remedial measures instituted at a minority of locations, it seems that this procedure might offer the outstanding hope for the amelioration of a very serious condition. This work is now being spasmodically carried on in several localities under the urge of public pressure, but not in an orderly, careful and unbiased manner.

Successful prosecution of a plan with the foregoing as a background is dependent upon the establishment of a department which might be called the Bureau of Public Accident Prevention under the Department of Public Safety and entirely divorced from the regular accident department which functions in an investigational capacity more especially from the criminal angle. The sole duty of such a department should be to keep a record which might be called an "Account With Death" for every intersection in the community and prepare analyses of particular locations with recommended measures tending to reduce the death rate at the location.

How this account is kept is not material. Any of several methods might be used, the essential difference between this record and the various forms of accident "spot" maps and records being that a monetary standard is known for various types of injuries is used. Briefly for each intersection at which has occurred a certain minimum number of accidents the "Account With Death" should be established, showing the date of each accident, the actual number and the total monetary loss suffered, divided as between fatalities, personal injuries and property damage. An accumulative total should be kept so that the average loss per month or year can be readily determined.

Assume that such an accident prevention bureau has been established and records have been kept for six months upon 30 intersections which have proven to be especially hazardous. The procedure would be to first classify the locations in regard to the amount of loss involved so that analysis would begin with the most dangerous locations, progressing systematically towards those of lesser hazard. Starting with the most hazardous location, the accident records for this location should be subjected to a most careful analysis to determine if possible the underlying cause back of the majority of the accidents. The exact details of such a study

may vary materially at different locations and cannot be accurately forecast in advance, and should be entrusted to a competent engineer or person trained in this particular work. From the information will usually appear a predomination of accidents, perhaps at certain hours, perhaps from vehicles moving in certain directions or in any one of a dozen other classifications. If a field study of particular location were made, keeping in mind the data assembled from the office records, some form of remedy would undoubtedly be developed. Apply the remedy and record the details upon the ledger record for the intersection. Compare the accident loss per month following the change with that preceding and whether or not an improvement becomes evident can be absolutely proven. Continuation of these studies to cover more and more hazardous intersections will undoubtedly reveal certain more or less standard remedies which can be applied to like intersections, and the progress of the work materially advanced. That this can be done has been proven in many instances throughout the country, so that the ideas brought out here are not essentially new, except in so far as indicating a more exact and orderly method by which this type of work may be carried on.

This State of Connecticut, after having gathered and compiled accident records for, I believe, five years has recently announced that it is embarking upon just such a curative campaign by applying the information which has been collected. The results which may be achieved are fully realized by them and should be very valuable to the country as a whole. But we must not sit back and "let George do it." Other states and municipalities should begin to make practical use of the information which has been collected and, rather than using accident statistics for round-table discussions, someone must take the records and put them to work.

Facts About the Situation in Detroit

To refer again to the city of Detroit, with whose work the speaker is most familiar, it might be stated that Detroit's accident record has been most unfavorable. But strenuous efforts are put forth to bring order out of chaos. Detroit has used the standard report form of the National Safety Council for some time, and this present year is using the system of Hollerith mechanical tabulation, with excellent results, not especially in the preparation of the monthly report, but in detailed analyses of special classes of accidents. One investigation of this sort concerned accidents on protected safety zones of which Detroit has many. It was found that in the first four months of 1925 and 1926 no accidents occurred on protected safety zones between 5 a. m. and 4 p. m. approximating the border line between dusk and daylight. Additional information was indicated and immediately provided, and the average number of accidents per month decreased from 29 to 21. This may appear to be a small item, but not on a city in the 21 persons who possibly have been saved from injury within the four month period, and it does indicate that the procedure is correct.

As an added method of accident study, the department has kept, for two years, a location record, giving a cross index on all accidents occurring at every intersection in the city, so that each extra location intersection may be studied as a separate problem. The 25 intersections with the highest accident total are now in process of analyses along the lines just discussed, and although but one has been completely analyzed, it is interesting to know the survey showed that most of the difficulties lay in confusion caused by large volume of irregular turns, essentially again the unexpected. Efforts are now under way to re-plan the intersection, to eliminate as many as possible of the unexpected movements and to confine them to their proper channel. I have with me a few of the sample tabulation sheets given to the field investigators who have been trained in this type of work by the survey bureau—a continuing adjunct to the police department—with instructions not to return the sheet until some solution has been discovered. Whether or not it will

be correct on first analyses, will remain to be determined by its effect on the accident records; the effect cannot be determined around the table, it must be put into practice and given a fair trial. If correct, it should be continued and amplified. If incorrect, perhaps it will point the way to the correct solution.

I hardly feel that the title of this discussion has been fully justified. Accidents may or may not be symptoms of traffic ills. We would rather like to believe that accidents are symptoms of lack of information, or lack of use of such information as is available. Yellow fever was not conquered by compiling and filing records of deaths. General Gorgas took upon himself the task of analyzing the information previously collected and after sifting it all, arrived at the cause and knowing the cause was able to practically wipe out the dreaded plague. Sufficient traffic accident information has been collected in most communities, but too often it has merely been compiled and published, with little or no concentrated effort to make use of it. After this has been done, we shall be better able to discuss whether or not accidents are symptoms of traffic ills.

CHAIRMAN GODWARD: The next subject on the program is "A Community Safety Program at Minimum Costs," by Mr. A. C. Burnett. I take pleasure in introducing Mr. A. C. Burnett, president of the Bexar County Safety Council, San Antonio, Texas.

A Community Safety Program at Minimum Cost

Arthur C. Burnett, President, Bexar County Safety Council, San Antonio, Tex.

I am quite sure I can cover the subject assigned to me within the twenty minutes allowed. I am to talk to you about maintaining a safety council at a minimum cost. Having had four years experience in the operation of a council with a very small budget, those of us who have been interested in it have learned to economize in time as well as in money, so that what I have to say will be directly to the point. I shall not attempt to tell you how we organized our safety council in San Antonio or the many disappointments we encountered. It is enough to say that the public demonstrated very little interest at first.

We, of course, realized that 95 per cent of the results we would obtain would be through education. We then set out to see how we could come in contact with the people so that they might become interested. Our first job was to get the San Antonio public schools to teach safety. That cost us nothing, except that we could not get the School Board to buy the pamphlets and periodicals from the National Safety Council. We bought them.

The main problem was to get a little money. We found, as everyone else does, that the Public Service Company and four or five of the largest industrial concerns were willing to help support the movement. That, however, required constant solicitation and was abandoned when the financial committee of the Community Chest decided that we were entitled to a share of the chest, by reason of the fact that our activities would tend to reduce the calls on the charity organizations of the city for help. We have been receiving from the chest \$270 a month.

We could not hire a manager for that small sum, but we cast about for a man to undertake the work and found him. He was making \$10,000 a year. His work was such, however, that he did not need to devote all of his time to it. We started out with him at \$300 a month on a temporary basis, having some reserve funds in the treasury, and after he had worked for about three months, giving most of his time, we pointed out to him that we could not continue on that basis. We calculated correctly, that if he was the man we wanted, he would be sufficiently interested in the work to be willing to go on with it

even at the reduced salary. He accepted \$100 a month and has been working for that ever since. He had an office and a stenographer for his own business. He also had a telephone. We paid for a listing in the telephone directory, reimburse him for such time as his stenographer would have to put in on the safety council work, and after having paid for postage stamps we have a sufficient amount left each month to devote to various educational projects.

I have already spoken of the work in the schools. That has continued without interruption and I can refer you to the various representatives of the National Safety Council as to the efficiency of this work in San Antonio. You would be interested to see Mexican children from seven to ten years, who, without prompting, can be called on in class to answer almost any question about protecting themselves in traffic and answer intelligently, promptly and clearly. They also have a better idea as to the emergency measures necessary when a fire occurs, when a live wire falls, or when a companion is drowning, than a great many American grown-ups. These children have had absolutely no home training along this line and all of their knowledge of English has been gained in the schools, but they absorb knowledge of this sort more rapidly than our native born children.

Organization of a Chauffeur Class

The next work in the schools was the organization of a chauffeur class. We found a man who had been in the public schools for fourteen years, whose training qualified him to conduct a class of this sort. He solicited the owners of automobile fleets and met with encouragement in almost every instance. This chauffeur school started about a year ago and has cost us nothing. We charged the employers \$1 a man for the course of ten hours. We use one of the high schools and we discovered that we could obtain a certain amount of help from the Federal Government through the Smith-Hughes Bill, which with the \$1 paid by the employers was sufficient inducement to Mr. Peavey to continue his work. He has graduated, now, 218 chauffeurs of whom 26 were colored. I attended one of the first sessions of the colored class and instead of finding a lot of tired, sleepy men, I found 30 negroes intensely interested, volunteering information and answering questions at every opportunity.

Our main difficulty, however, was in interesting the public as a whole. We tried meetings of the Council at noon at the hotels, and averaged not over eight or ten business men, who came rather reluctantly, tardily and irregularly. Then, we found the answer. We went to one of the leading industrial concerns and suggested to them that we have a night meeting in their plant. We picked the Mistletoe Creamery, manufacturers of dairy products. We suggested that they furnish us with a room large enough to hold a meeting for 400 or 500 people, and, more or less by our suggestion, they agreed to serve a lunch after the meeting. They also furnished music. It was easy enough to get speakers, and by a notice to the owners of other plants, educational institutions, public service companies, etc., urging the managers, themselves, to come and bring the heads of their safety departments and all other employees interested, we had a successful meeting of about 400 people. It was a very complete cross section of San Antonio citizens, including presidents of the largest corporations, members of the fire and police department, heads of the safety departments, chauffeurs, mechanics and their helpers, and other interested citizens. It is true, of course, that some of them came because we were going to serve refreshments, but we were not interested in why they came, because we felt that we could put out propaganda and make converts. This you will see cost us nothing also. I have given you the story of only one meeting, we have had a great

many of them, averaging one a month except during the summer when the meetings aren't held quite so regularly.

We got the Police Department to standardize the method of keeping records of accidents as suggested by the National Safety Council and on forms furnished by the Council and paid for by us. We have on various occasions suggested to the city authorities that certain dangerous street intersections be made safe. This, of course, cost nothing. We helped organize the Texas Council of Safety and participated in the quarterly meeting in April. The city authorities gave us the free use of the city auditorium, in the basement of which we conducted sessions all day; here also were placed exhibits by various local industries, the police and fire departments, our own safety council, and others who had safety appliances for sale or display. At our night meeting we had about 3,000 people, the largest meeting of that sort that has been held in the South. We worked up interest in this meeting by employing a man to speak in the schools, to conduct demonstrations in the streets and to test automobile brakes. He tested the brakes on 3,145 automobiles, with the aid and cooperation of the police department. This man, of course, cost us several hundred dollars, but it made possible a very successful, satisfactory day.

At an expense of not over \$75 we have equipped the Chamber of Commerce with a safety library, obtained, of course, from the National Safety Council. This library is available, particularly, for manufacturers and has been found extremely useful and helpful on many occasions.

What I have had to say, today, I am sure would be of more interest to men from cities about the size of San Antonio than to men from larger cities. I hope that I have made the point that any town, regardless of its size, can have a Safety Council and can keep it going at a very small monthly cost. If there is no such organization in your city, start one now on your return, even though you have nothing but the idea.

St. Louis Created a Traffic Council

R. B. BROOKS (St. Louis): Mr. Chairman, Mr. Bittenheim's paper appealed to me very strongly, on whether our cities have fallen down on their traffic job. I think everybody here likes to think that his city is the exception to the rule, but one of the observations I have made in these meetings so far is that all of us have been going after a bear with a shot gun instead of a rifle. One thing we have done in St. Louis, and inasmuch as it received the personal approval of Mr. Hoover I am going to tell it to you. We realized that the various agencies in our official life might have petty jealousies or might want to do it all themselves. We realized that there were three divisions of our city government that had to do with traffic regulation. There was the legislative branch which passed the laws, the board of aldermen; the administrative branch; the department of streets and sewers; and there was the enforcement branch. We conceived the idea of passing an ordinance creating a traffic council, composed of the president of the Board of Police Commissioners, representing the enforcement end, the chairman of the committee of the Board of Aldermen, representing the legislative end, and the director of Streets and Sewers, representing the administrative end, and later adding to that the traffic engineer, Mr. Hoffman, as the secretary of that council.

Through that ordinance we meet once a week. We had authority to put into effect anything that we thought would better conditions in St. Louis traffic. Our decision was law for a maximum period of 90 days, from which there was no appeal. For instance, we wanted to make a one-way street out of Ninth Street from Olive to Locust. We three would simply get together and say that shall be the law, and if at the end of three days we decided that it didn't work out very

well, why we met and said we would cut it out. But within that 90-day period if we thought that it was good for the city of St. Louis we would introduce into the Board of Aldermen an ordinance to that effect. It didn't make any difference whether the Board of Aldermen passed that within six months after that time or not, it was still the law. It was the law until they killed it.

We had no trouble with our enforcement because every single patrolman knew that if he didn't carry out the orders of the Traffic Council he had to answer not only to his chief, but to the president of the Police Board. We had no trouble in getting our laws through the Board of Aldermen because the Board of Aldermen was represented, the chairman of their own legislative committee had passed on it.

The Supreme Court knocked this out temporarily on the basis that it was delegating legislative power to other than a legislative body, but I asked the Supreme Court to give us some constructive criticism so that we could pass a law that would get by the Supreme Court of the State of Missouri. I am giving you this for your own information because you may want to do it yourselves sometime. The Supreme Court said this: If the enactment carries with it a clause that this fact-finding authority will extend to the city as a whole or to certain general conditions covering the city, we will approve it. It was a minor item and we have taken care of that situation. We are going to call it the Traffic Commission so as to make some change in the old law. The Traffic Commission will have this power on all streets in St. Louis where the traffic exceeds 100 vehicles per hour. So that covers practically every condition that we would want to cover and, after all, the proof of the pudding is the eating of it, and if you get a chance to try out something it may be foolishness, it may be all wrong, but the best way to prove it is to try it out.

The Outline of An Extraordinary Accident

GEO. HERROLD (City Planning Engineer, St. Paul, Minn.): I want to speak on Mr. Bittenheim's paper, which I think is the most scholarly and the most practical treatise on the subject that I have ever had the pleasure of listening to. He spoke of the number of accidents through people running into railroad trains. I think it was Carl Gray, president of the Union Pacific, who called attention to the appalling number of accidents of that character at the Cleveland conference two years ago, and I know my reaction at the time was that there must be a lot of incompetent drivers. It seemed impossible that a man could run into a train. We drove back from Cleveland to St. Paul, and in crossing the line between Illinois and Indiana, just south of Chicago, we ran into a train, or at least we took the ditch in preference to a train, and a little analysis of that situation shows that it is possible to run into a train; that is, it is possible for good drivers to do it, and especially under certain atmospheric conditions. In this particular instance there was a haze, it had become dusk and the lighting of this haze with our lamps had blended so with the train that it was impossible to see it until we were right onto it. That is a situation that needs to be analyzed, as Mr. Simpson has brought out in his paper. The analysis of these things are the things that are going to cure it. There were four men in this car and all of us perfectly awake and alive to the situation, and yet not one of us saw this train.

I also want to say in speaking of grade crossing separations that many cities are accepting and putting on record plats of additions that are creating grade crossings much faster than we are eliminating grade crossings, and some publicity should be given to this phase.

I want to compliment my old friend, Mr. Simpson, on his very wonderful diagnosis of the accident situation, and his emphasis of the necessity of more careful analysis. It is quite remarkable how a close study of some of these things develops almost unexpected results. For instance, in our own city we had at some intersections flashing beacons and at others we had "stop" and "go" signals. The police

department took out the flashing signals because they didn't think they were efficient. An analysis, however, showed that in the case of the "stop" and "go" signals we were passing 4,000 vehicles per accident through the intersection, but in the case of the flashing beacon we were passing 13,500 vehicles per accident at the intersection.

B. N. WHEELER (Duluth Safety Council, Duluth): Mr. Bittenheim's list of indictments was exceedingly interesting. I think he had them correctly listed. Lack of education was the biggest one in the group. We realized that in Duluth when we tried to get into some kind of an educational program for adults. The children are taken care of through the Junior Safety Councils. Ten policemen in uniform visited all the high schools. We took a speaker with us and we talked to 10,000 children in the course of a month or two. Duluth is a city 25 miles long. It is a hilly city and in the winter there is a lot of coasting. Many children were killed in coasting accidents the year before. As a result of this campaign we didn't have a single death in the months of January and February.

A Pledge Was Secured From 1,500 People

Then we went on into regular schools for adults and we had four sessions of the safe driver's school. We worked with the automobile club and had a pledge-signing campaign. We got 1,500 people to sign a pledge in which they solemnly promised to drive carefully during the entire year of 1927, and especially as far as children were concerned. Once a month we sent out postal cards telling them what was going on in the city. We even ran display advertisements calling attention to the necessity of careful driving and careful walking. We had a campaign for pedestrians as well as for drivers, and as a result, at the end of our first eight months we had only killed seven, whereas the year before we had killed fifteen or sixteen during the same length of time.

It was nothing but a deliberate campaign using the Chamber of Commerce, the Parent Teachers Association, speakers and writers and every conceivable idea of publicity that we were able to use.

NEAL FUNK (Louisville, Ky.): I heard Mr. Bittenheim's paper and I thought it was wonderful. There was one indictment I have heard at every convention I attended in the last three years. I have constantly heard how reckless and negligent the automobile driver is at crossings, and that is probably true. I am with the railroad company myself and I hold no particular brief for motorists, but I do know this, and I am sure all the gentlemen will agree with me: Anyone who has toured through the states of this country, not in all states, but in the majority of states, has no doubt noticed the way railroad crossings in a tremendous number of localities are allowed to be blocked by shrubbery, by debris, and by various things of that sort, which an active safety director could correct.

After all, the finest safety device, better than watchman, better than the gate, as long as we have grade crossings, is the human eye, and it is no more than fair that we remove all obstacles that obscure the driver's view. He is an ordinary human being. As he goes along the road perhaps he is not at all times thinking about a train, perhaps he may not see a wig-wag, and that doesn't signify that he is a terribly careless fellow. Before we talk so much about what the other fellow does, let us go home and clean up our own crossings, especially those on the interurbans. People have beautiful country places and they want to have beautiful foliage around their homes. That is natural. I think if the safety director or someone in the community visited these people in the fall and pleaded with them from a humanitarian standpoint, he could clear up these places along the crossings.

H. O. ROUNDS (Detroit): I am very glad to hear the remarks of the brother, but he is about six months behind Wayne County. I will say that the Road Commissioner of Wayne County has hauled about 5,000 loads of cut-down trees. They

have men constantly doing that. They have cleaned up about 40 crossings, and as time goes on they are going to clean up all of them.

R. W. WORM (Traffic Division, Toronto): I would like to tell you some of the things we are doing on the Toronto police force in connection with the examination and testing of brakes on commercial vehicles. This year the chief constable, S. J. Dickson, inaugurated a system of brake inspection on all motor vehicles, especially motor trucks. Two men were detailed for this duty with a set of loadometers for weighing trucks. These men were chosen for their courtesy and also for their firmness in carrying out whatever duty they were set to do. They would stop the truck and weigh it, at the same time speaking to the driver in a courteous manner and telling him what they wished to do. When the truck had been weighed they examined the brakes. Then they checked up on his steering, his horn, his whistle, or whatever it might be, his muffler, if he had one on, and also on his chauffeur's license. All of these things were done in the one operation.

We found in the first month especially, there was a tremendous number of trucks going around the city overloaded. We found after the first week there were fewer trucks being overloaded. We also found that in the design of a number of these trucks, when they had the load on, their brakes would not function properly, and when we weighed them the drivers would make the excuse, "Well, the brakes were all right before I put the load on." In that case we would weigh them after the load was taken off and very often we found the brakes in perfect condition. We came to the conclusion that these trucks must have been designed improperly.

I am not an expert by any means—we just approached this thing in Toronto in a quiet, practical, common sense way. We have had very little trouble with the truck owners or drivers. They have been asked in a nice manner to cooperate with us and in so far as possible I think we have been very successful. We have told them that it is not a revenue-producing scheme at all. We don't bother to summon them to court if it is at all possible. But where we found both brakes on a truck not working, or any motor vehicle, we took the car off the road immediately. We have the power to do that. The car or truck is taken to the nearest police station and the owner, if he is not the driver, is at once notified to come down and have his brakes put in proper condition before the truck is allowed out on the streets again. If the brakes are found in a deplorable condition we also inform him when he comes after his truck that he will be summoned and the minimum fine for a first offense is \$10, and so on up to \$50, as the case may be, or the truck may be confiscated. The law is very clear on this point and needless to say we get splendid backing from the courts in carrying out all these little laws.

ADJOURNMENT

Thursday Afternoon, September 29, 1927

CHAS. M. UPHAM, Chairman
Director, Highway Research Board, National Research Council,
Washington, D. C.

The fifth session was called to order at two-ten o'clock by the chairman, Charles M. Upham, director, Highway Research Board, National Research Council, Washington, D. C.

CHAIRMAN UPHAM: Our first speaker has taken it upon himself to do quite a job. If anybody can tell why some people have had luck I think he is undertaking a very big task. It gives me a great deal of pleasure to introduce at this meeting Dr. Knight Dunlap, of Johns Hopkins University, Baltimore, and also an officer of the National Research Council.

Why Some People Have Bad Luck

**Knight Dunlap, Chairman, Division of Anthropology and Psychology,
National Research Council.**

The collection of reliable statistics on the causes of automobile accidents, is still a problem, but I believe we have at present enough information to serve as a source of guidance in the work of making traffic progressively more safe. There are, of course, two main groups of causes of accidents: (1) defective cars and equipment, and (2) inefficient drivers. Automotive engineers are taking care of the first group rather effectively. The second group pertains to the problems of the psychologists, and I believe that it is now the important factor in danger. The enormous improvement in the efficiency of the automobile and its equipment during the past few years has not been paralleled by any improvements in the human beings who drive them. The human machine remains the same as it was when the automobile was first invented, and we cannot change it within the next few thousand years. With the increase in number of cars, and the steady increase in the speed of traffic, the demands upon the human machine are vastly greater than they were a few years ago, and these demands will become greater year by year. With these increasing demands comes an increase in the accidents, until we devise means of employing the human machines more efficiently.

The real problem of safety, therefore, is: What can we do to make the driver use his capacities more efficiently?

Now, we know that some drivers are efficient, and are therefore relatively safe drivers; others are extremely inefficient, and therefore dangerous to themselves and others. What we have to do is to increase the number of efficient drivers, and decrease the number of inefficient ones. A pertinent question, therefore, is what makes an unsafe driver? Why are so many drivers inefficient? To these questions there are several answers.

In the first place, the drivers who have certain organic or bodily defects are unsafe. Cases of accident through heart disease are known. It is possible that other accidents have been due to epileptic attacks; at any rate, the driver subject to epilepsy is obviously unsafe. Such causes of accident are, however, comparatively rare, and it is perhaps not possible to guard against them. Really adequate medical examination of drivers is practically impossible, so that this source of accidents is not a highly important matter. Whether the man with an arm or a leg missing should be allowed to drive is another matter, and the answer depends on conditions which are not difficult to analyze. It is possible to equip cars for some of these

drivers so that they are safe; and a practical test of ability to manage the car under different conditions should tell the tale.

Defects of vision and of hearing offer a somewhat more serious problem. There has been controversy over the effects of deafness, but up to date, it does not seem to be shown that the deaf man is more unsafe than the man with normal hearing. Very little dependence is normally placed on hearing, and the man who does depend on it is surely unsafe. The deaf man is less apt to cross the railroad in front of a train because he does not hear the train, and he is more apt to use his mirror to see whether there is a car behind him, than is the man who depends on his ears. The deaf pedestrian is really the man who is out of luck, and perhaps we ought to compel him to wear a distinguishing costume.

Defective eyesight is a much more serious matter, and here we have two sorts of defects: (a) unclearness of vision, and (b) defects of color vision. Theoretically, it is possible to examine the eyes of all candidates for drivers' licenses, and pass only those who have clear vision; or whose vision is sufficiently corrected by spectacles, but practically this amounts to very little, since changes in vision may occur subsequent to examination, and there is no way of compelling drivers to wear their spectacles. On the other hand, the evidence that any serious accidents are really due to unclearness of vision is small. The vastly more serious problem concerns the man whose vision is clear, but who doesn't look.

Defective color vision, at first, seems to be a definite factor in danger, and in some states all candidates are required to take a color test, and are rejected if they fail the test. In this case, the danger has not been definitely made out, and the remedy is certainly worse than the disease.

Defective Color Vision Found in Many Persons

Defective color vision, or color blindness, as it is popularly called, exists in several types. But the only color blind persons who occur with any considerable frequency are those unable to distinguish green from red where the colors are dim; or rather, those who are apt to have difficulty in distinguishing these colors under certain conditions. Since perhaps two per cent, or slightly more, of the population are defective in this way; and since safe driving depends more and more on color signals, this defect might appear to be an important source of danger. Really it is not. There is no evidence that the color-blind man is more subject to accidents than the man of normal color vision. Furthermore, all persons are color blind in peripheral vision; one sees colors properly only when he looks directly at them. If you want to see how a green light looks to the color blind man, all you have to do is to fix the center of vision on a point about fifteen degrees to one side of the light. Now, it is not advisable that drivers should keep their eyes directly on the signals. It is much more important that they should watch pedestrians and other cars. We must assume, therefore, for purposes of safety, that all drivers are color blind, and arrange our signals accordingly. Analogy with railroad practice, where conditions are quite different, has been a source of fallacy which we must take care to avoid.

Fortunately, there are two colors which the color blind man can discriminate as readily as the man of normal color vision, and moreover these two colors are the best for distinguishing in peripheral vision. These colors are orange-red and blue-green. The best signal practice is in the direction of these two colors, which are the safest for all persons.

Testing color vision as a measure of safety is especially fallacious for several reasons, aside from its needlessness. The color blind do not really constitute a separate class, but there are all degrees of defect, ranging from the normal to the worst cases. Tests as ordinarily administered do not even catch all the worst cases. To catch these requires a prolonged test, sometimes an hour in duration for each candidate, and a high degree of skill on the part of the tester, skill which it is hardly possible to obtain for testing large numbers of candidates. Even with

the best test, it is impossible to say whether the candidates that just get by are any more secure in their color estimations under traffic conditions, than those just excluded. The testing, moreover, tends to obscure the real needs for color signal work, namely, the securing of colors which shall be safe for all.

A second cause of inefficiency in driving has been alleged to be low intelligence, and it has been urged that all candidates for driver's license should be given intelligence tests, and only those above a certain grade should be passed. While it is true that intelligence is required for safe driving, a great deal depends on the kind of "intelligence" that is meant. Intelligence, unfortunately, is an ambiguous term. In the one statement it means ability to drive; in the other case, it means whatever an intelligence-test tests. Now it is by no means certain that what is tested by so-called intelligence tests is important for driving. What these tests really test is a group of skills of certain sorts; skills which are important for the college student, and for many other lines of work. But that doesn't mean that they are skills needed by the ordinary auto driver. It is probably true that the man who is very low in an intelligence test probably isn't skilled in anything, and can't acquire skill in anything. The idiot and the imbecile are not safe drivers. But even the low grade moron may be an excellent and safe driver. I don't say that he is, but that he may be. In fact, I suspect that shutting out the morons would work havoc with commerce, which needs many drivers for trucks and delivery wagons.

Intelligence Tests Not Always Just

Here statistics are exceedingly fallacious. If you are employing taxi drivers, and have no better means of selection, and have plenty of applicants, you are wise in taking only those who stand high in an intelligence test. You will accept some inefficient drivers, and will turn down many efficient ones; but on the average, your selected drivers will be more efficient than your rejected ones. The man high in one kind of intelligence is more probably high in others than is the low man. But in the licensing of drivers, the problem is an entirely different one. You can't turn down a lot of people who have every right to be licensed, in order to catch a few who have not that right. Nor is it probable that public safety would be essentially increased. I think that intelligence tests as a means of selecting drivers must be frowned upon as ineffectual and unjust.

On this account, the suggestion has been made that we should test candidates on the kinds of skill that are believed to be actually required in driving. There are two alternatives here. One is to test candidates on their actual ability as drivers under traffic conditions. The other is to test them more exactly in certain kinds of elementary skill which would seem to be required in driving. A number of ingenious devices have been put forward for this latter purpose, mainly depending on the measurement of the reaction time; namely, the quickness with which the candidate can make a hand or foot movement in response to a sudden signal. I believe all these methods are fallacious, and dangerous if they are depended upon. Quickness of response, for example, is not a requisite in driving. The requisite is to do the proper thing. Very frequently, safety depends upon making the responses slowly. The man who sets his brakes with a snap may cause a serious accident to the man behind him. More complicated tests fail, because the responses under test conditions are no index of what the driver will do when on the road or street, where conditions are entirely different.

As for tests of actual driving, such as are now employed in various places, where an officer accompanies the candidate in his car, and directs his operations in traffic, these are unquestionably useful, but not as means of selection. All candidates eventually get by. The real value of these practical examinations lies in the fact that they compel the learner to really try to learn something, or at least to practice driving, before he starts out as a full-fledged driver. It is a good thing for the examiner to flunk a few candidates, to stimulate to more practice on the part of

candidates generally. Even if he flunks the wrong ones it makes little difference, as a week or so more of practice is not a serious hardship.

This consideration brings us up to another factor in the improvement of drivers, namely, training. This is the most important factor in safety. The drivers who are by nature incapable of learning to drive safely are relatively few, and may be eliminated. The important thing is the proper training of the others. Unfortunately, a large number of drivers are not properly trained. Many of them are untrained in the elementary details of controlling cars. They don't know how to apply their brakes properly, how to change gears properly, or how to start their engines, how to avoid skidding, how to manage their cars at a railroad crossing. These may be minor matters, seeming to have little to do with the matter of safety of life and limb, but I believe they are important indications, not of incapacity, but of ignorance of the conditions of driving, and of dangerous inefficiency. A campaign for better driving should start at the bottom, with learning how to perform the essential details of operation properly. These operations are a more potent factor in safety, or in danger, than might be supposed.

The more important feature of learning, however, is learning to drive in accordance with traffic rules, and here the greatest source of danger exists. The man who has not learned to obey the rules is to be considered as ignorant, just as the man who has not learned to shift gears. But in both cases he is fully responsible. He has neglected to learn something that he can learn, and should learn. For obeying the rules, or not obeying them, is a habit, like gear shifting, and should be as automatic on the part of the driver. What are the rules the unlucky drivers do not follow? They are very numerous. To slow down on corners; to keep to the right going around corners; not to overtake on a hill top; to hold out the hand before stopping or turning; to give pedestrians the right of way; to approach all intersections cautiously, and so on. These are the lucky rules. The man in trouble has usually broken one of them, or some other driver has broken one and made him the goat.

Training the Driver to Be More Careful

There are no simple cures for carelessness and recklessness, the two grand divisions of unsafe driving. Yet, from the general store of psychological facts and principles, we can point out certain types of training of the driver which do conduce to safe driving; and we can suggest, tentatively, at least, certain ways in which such training may be applied.

1. The rigorous examination of the candidate does conduce to his training, and this examination needs to be insisted upon. In some instances, the examination is casual. It needs to be systematic and carefully planned, so that candidates will fully understand that a considerable degree of competence will be required. This examination should be largely practical, but I believe that a certain amount of theory also should be demanded. Theory is of no use by itself, but as an aid to practical knowledge it has unmistakable value. Many boys learn to drive before they ever touch the controls of a car, just by watching drivers, and analyzing their performances in different situations. The case of the 9-year-old colored child who drove a car successfully in Baltimore traffic, after having merely watched others, is not exceptional. Most women, it would seem, acquire little in this way, and drive solely by rule of thumb. The problem of women drivers is really an important one, and we cannot accept the statistics which have been compiled to show that they are as safe drivers as men. Many men, however, have but vague ideas as to the reasons for the various operations in starting the engine, shifting gears, and applying brakes, and their learning is much accelerated by being made to study the principles.

2. Schools for drivers who show signs of incompetence should be seriously considered. There are great numbers of borderland cases, in which the driver shows

slight incompetence, and is either reprimanded by the officer or taken to court and made to pay a small fine, where the better plan might be to sentence the suspect to a training school or training course, with no prejudice to his record. The organization and administration of such a program will be indeed difficult, but it is worth considering.

3. The habit of obeying traffic rules is the most important desideratum. This is a matter of learning, just as much as the habit of stopping without stalling the engine, shifting gears smoothly, and avoiding skidding are matters of learning. The man who is sloppy about traffic rules has failed to learn a habit which he can certainly be required to learn.

In connection with the formation of the habit of driving safely, it is worthy of remark that while it is possible for a driver habitually to obey certain safety rules, and habitually disregard others, the certain tendency is for the habits to ooze through these distinctions. If the driver is in the habit of breaking certain rules, there is a strong tendency to break them when he thinks he can get away with it.

Necessary Qualities of the Enforcement Rules

The enforcement of the general safety habit is a complicated and difficult matter, but although the training school plan for some offenders seems worth trying, law enforcement is not the only end. The important preliminary and supporting factor is in the rules themselves, and the accessories of the rules. Little can be done towards the attainment of safe habits, until certain requirements are met by the rules.

1. They must be uniform.
2. They must be reasonable.
3. They must be consistent.
4. They must be clear and unmistakable.
5. They must in all ways be easy to follow.

With regard to the first two demands, it would seem that little need be said. These have been well emphasized by the National Conferences on Street and Highway Safety. Yet there is a great deal to be done in these regards. It is, however, the other points which I wish to emphasize. Too much confusion exists at present both in rules and in the signs and signals accessory to the rules. For example: on many roads, signs indicating "dangerous curves" are placed at various points. But the curve may actually be a gentle bend, or a really dangerous one. On many roads some dangerous points will be marked and many other equally dangerous ones not marked at all. What is the result? Drivers pay little attention to any of these signs. In many cases the signs are direct sources of danger. In all cases, the habit of disregarding rules is fostered. Every time a driver disregards a rule of the road, he increases his tendency to be an unsafe driver.

The laws requiring a full stop at a railroad are undoubtedly causes of unsafe driving. For 90 per cent of these signs are disregarded, and will be. They are merely breeders of unsafe driving.

The confusion of signals and rules in cities is perhaps a more serious evil. Here traffic is being impeded, and made dangerous, by drivers needing to take attention off the prime conditions of driving, in order to read words lettered in the street, read signs stuck up in various places, and hunt for traffic lights. The worst part of them, however, is that drivers are constantly being bawled out by officers for minor errors due to confusion which might be prevented. Every bawling out for a dereliction not intentional increases the tendency to be an unsafe driver.

For example: a driver starts to make a left turn where it is prohibited by an obscure sign, and is bawled out. He passes a red traffic light which is located in an unusual place, and is bawled out. He goes around the officer at some corner where he is expected to cut behind him. And so on, through a long list of mistakes due to confused rules and signs. In every case the driver is sore, and says,

"Hell with the signs," or "How can anybody follow their fool rules?" and his unsafe driving is increased.

Simple principles of signals are plain. They should always mean the same thing. They should always be in the same places. They should be visible without hunting for them. There may be no accidents at points where these conditions are not fulfilled, but the deficiency inculcates unsafe habits. We can never get drivers into the habit of obeying rules, signals and marks, until the present confusion is cleared up.

Running through all our requirements in the way of safety is the basic principle that we don't want drivers to have to think. We want them to act from habit, that is automatically, so far as the conditions are possible. We don't want drivers to stop, or slow down to read signs when it is possible to avoid it. The Baltimore system of no-parking signs is a splendid example of the possibilities in the way of signs which can be quickly learned, so that reading is unnecessary.

We don't want drivers to look around for stop-go lights or no-left-turn signs and to think of the possible places where they might be, at busy corners.

We don't want drivers to think whether a sign means one thing or another. In Colorado, this summer, I came to a railroad crossing marked as such, at which in addition there was a blinking red light. I stopped and waited for the train. Soon I found there was no train for an hour; the red light was kept blinking constantly. I learned to disregard this sign, and perhaps some time later I will have to think, in some other state, whether a flashing red light means stop, or proceed cautiously. And I may think wrong.

At Loveland, a lady driving a small coupe thought a red light on a street obstruction was a tail light on another car. Her thinking wrong cost her her life, and serious injury to several other people. There is no excuse for the confusion. Drivers ought not to have to decide what a red light means. Thinking a red stop light on a car to be a red tail light has caused many crashes.

The maximum safety is secured, when drivers are not required to think, or speculate, or guess. All rules should be consistent and uniform. Every signal should mean one thing and one thing only. When this is attained, the driver can learn to obey them automatically. Until we reach this point, the habit of guessing, and driving unsafely, will stay with us, and eventuate in accidents.

The Red Light Should Always Mean Stop

J. T. PRATT (Reading Co., Reading, Pa.): What sort of a signal did you have flashing at a grade crossing?

DR. DUNLAP: A one-light signal. I haven't seen that thing before, immediately associated with two flashlights.

MR. PRATT: That does cause some confusion because there are many advertisements along the highways in the east that have flashing signals. The standard in the east is a double flasher and they only flash when trains are approaching.

J. H. LIEGLER (Racine, Wis.): May I ask whether you consider the red light the proper signal at a highway, railroad crossing?

DR. DUNLAP: The whole problem of the red light is a very complicated thing. My opinion is, the red light should always mean stop. A man should never have to decide whether it means to stop or to go along. Where the signal does not mean actual stop some other light should be used. The practice of putting a red light at the end of a strip where an ordinary street turns into a boulevard, or putting it on a division of a bridge, leads to a great deal of trouble. There may not be trouble there; except in smoky conditions people stop to see what that light means. However, it has something to do with the accidents at other points. There is no excuse, it seems, for using a red light in a position where it might be interpreted to mean other than stop.

MR. LIEGLER: Isn't the red sign overburdened with duties?

DR. DUNLAP: Yes.

MR. LIEGLER: Might there not be established something which traffic hasn't at the present time, a positive stop? In other words, instead of having a red light at a highway grade crossing, why not get away from the railroad's idea of the use of the red and install something distinctive, by the use, we will say, of the two other colors which you mention in your paper, your orange and your green?

DR. DUNLAP: The simple solution which I believe we are headed toward is to relieve the red of everything except positive stop. It is a very difficult matter to remove the red sign from that position. It now means in the most important cases "stop." The red should stop a driver before he thinks.

H. D. WOOD (Yellow Cab Co., Chicago): I would like to ask the Doctor if he doesn't consider the ability to concentrate, on the part of the driver, a very important part?

DR. DUNLAP: I don't know whether I can answer that question. The trouble with many drivers is they concentrate on something other than the important thing at the moment. The driver with a keen mind happens to concentrate on something over here and fails to note something over there. The ability to concentrate when required is a valuable asset. I don't know how that compares with the ability to distribute the danger. For ordinary driving purposes, the driver who can distribute his attention over the whole range, so he will notice pedestrians darting into the street, is, I believe, a safe driver.

Nothing Should Distract the Driver's Attention

MR. WOOD: I am interested only in taxicab drivers. Their job is to transport individuals from one place to another. Sometimes the address may be confusing. He may not know where the particular street is. While going down the thoroughfare he will be wondering in his mind as to the best way to get there. That, of course, hinders his ability to concentrate on the most important subject—the safe operation.

DR. DUNLAP: I think his operations should be so automatic he wouldn't have to think about them. Your taxicab driver should not have to think about ways of getting there; that should be automatic. Without further reflection he automatically should know the proper route. If he is thinking about something other than the driving situation it is dangerous driving. Of course, emergencies arise, but the most useful thing to provide against those emergencies is to drive automatically to his destination.

B. N. WHEELER (Duluth, Minn.): Isn't there a third factor in these accidents? Isn't there the efficiency of the pedestrian in the crossing of the street? Two-thirds of the people that are killed are walking, not driving.

MR. WOOD: I think probably the best answer to that is the ruling of the Supreme Court, which contends it is up to the automobile driver to look out for the pedestrian. The pedestrian doesn't have any responsibility.

DR. SNOW (Yellow Cab Co., Chicago): Dr. Dunlap, you gave a very illuminating and interesting talk. I quite agree with everything you said because I have spent a little time working along the same line. I find that education is of tremendous importance, there is no doubt about that, but it is also a tremendous task to educate anyone. Some, of course, we can educate with greater ease than others, but even the ones that learn very quickly we have some difficulty in educating.

I know at the Yellow Cab Company schools it takes two weeks or more to educate the best, and then we cannot be sure that he has really learned to respond unconsciously the way we want him to. We doubt very much whether two weeks of constant driving in traffic can educate one where he can automatically respond properly. If you take a class of taxicab drivers who have difficulty in mastering any habit, this period is prolonged sometimes a month or two months.

These methods of responding to certain situations do not become automatic with them. We find that these individuals can be classified if tested by certain methods.

There are few, but nevertheless they are a problem in the taxicab industry. I am speaking of individuals who are trained carefully for a long period of time and when they go out to drive get into trouble invariably. Even if they attend safety schools afterwards and are sent back to the driving school again, they come out and have difficulty.

Dr. Dunlap was quite right in saying that intelligence, as it is measured today by pencil and paper, is no indication whatsoever of man's ability to master these necessary habits. In fact, we have a lot of data to show where simple reactions are no factors. At least, they do not weed out the incompetent from the competent, they do not weed out the man who has accidents from the man who has no accidents. There are, however, certain measurable behavior types. You can assign a man a certain task and measure his response and see if he belongs to a group who has difficulty in mastering these necessary habits, or a group who with comparative ease can master these important habits.

Therefore, I think, it is imperative that we should segregate them. We should have a law licensing the small group of individuals who are found incompetent to master these habits properly.

The Discharge Sword May Be Wielded Too Much

DR. DUNLAP: You are speaking of the taxicab driver now. Can you apply that to the general field of licensed drivers?

MR. SNOW: I am not prepared to say. I can realize a tremendous task in testing a large group of individuals.

DR. DUNLAP: I didn't mean to imply anything to the contrary with regard to employee driving. I know exactly what you are up against there. My question is in regard to the licensing of the regular driver.

MR. WOOD: I believe that the discharge sword is wielded too much at times. As the Doctor brought out in his paper, the majority of individuals have the capacity to grasp things, and if you hire a man to drive an automobile and he measures up in other qualifications, then it is your obligation to spend some time with him in finding his faults and training him and educating him to a point where he will be efficient.

A discussion came up the other day that was very important. It was in connection with a driver who had a fatal accident. Some people are very quick in saying, "Why that man should be discharged! There is no question about his guilt." His record may show in many cases just the contrary.

I have in mind a serious accident we had about two months ago. Two cabs, one of our cabs and another cab, met at an intersection, a wide, open intersection. There was no excuse in the world for them to meet there if the drivers had had their eyes open; but owing to the fact that our driver had his last load and was in a hurry to get back to the garage to have his morning coffee and doughnuts, that man had a very serious accident. That man has been with the company for over five years, I think, and I can vouch that during the past three years he has not been involved in what we would term an avoidable accident, and still he makes that fatal mistake once and has that terrible crash. Unless the accident has had too much mental effect on the driver, you are not taking a chance by taking that man back and putting him back to work. You might be criticised for it in some cases, but it is unquestionable that that man is going to make a good man for you from then on. He is too valuable a man to lose, probably.

CHAIRMAN UPHAM: They say in order to teach a person the correct methods you must catch him young, and I do not know where that is any more applicable than in highway safety. We have a very important subject on "Reducing Accidents Through Junior Safety Councils," by Mrs. C. C. Owen, of the Dallas Safety Council, Dallas, Texas.

Reducing Accidents Through Junior Safety Councils

Corita C. Owen, Secretary, Dallas Safety Council, Dallas, Texas.

The most effective educational processes are those which enable the learner to participate actively in the thing being mastered. By his own action he makes the thing learned a part of himself, and thus acquires not only the theory but also the habits which come from doing.

The Junior Safety Council offers an excellent opportunity for the school to teach safety, and at the same time build up safety habits that will persist long after the actual instruction has been forgotten.

With such an audience as this Congress provides it is unnecessary to "sell" the idea of teaching safety in the schools. More important is a practical illustration of how safety is being taught in a given case and the results that accrue. The school conditions, as well as the general types of hazards met by children, are much the same the country over, and the experience of the Dallas Safety Council in bringing safety to school children through the Junior Safety Council applies almost directly to similar situations everywhere.

In Dallas an unfortunate accident record, particularly as to traffic accidents, several years ago resulted in the formation of the Dallas Safety Council in 1920.

For three or four years this Safety Council used traditional methods of committee activity, publicity, etc., to interest Dallas citizens in safety. Much good was accomplished, but the results were not satisfactory. The number of fatalities from traffic accidents steadily increased, and among them were many accidents to children.

The next step taken by the council was to gain the cooperation of the Dallas Public Schools. It was thought that by working through the schools the safety lesson could be given to children and they in turn would take it home to their parents.

✓ In 1924 the Dallas Junior Safety Council movement was started. At first only a few schools undertook our safety program. By the close of the school year the success of safety work with children through the schools had become so evident that plans for the next year included its extension to all white elementary schools in Dallas.

The move toward educating the child along safety ways proved to be the best move that we had made. We soon discovered that though we couldn't properly impress the driver that he should watch the child, it was more effective to caution the child to be on the lookout for the reckless driver and to stay out of his way. We found the children were considering the dangers very seriously and were responding immediately to our advice. They were carrying home the safety messages as we had hoped. Children and parents were soon discussing the proper ways to cross the street, and many a father was reprimanded when he told his child to *hurry* across. One young child told her father that she had been told to *walk* across the street, never to run, and when in doubt to stop and let the driver see that she was waiting for him to go around her, so that there would be no danger of her confusing him.

In 1925 the Dallas schools designated Julius Dorsey, supervisor of elementary education, to have charge of the Junior Safety Council activities, and he was instructed to work closely with the Dallas Safety Council. Mr. Dorsey threw himself into safety work and much of the splendid record accomplished is due to his wholehearted cooperation. One of the first essentials for success is that the schools actively cooperate with the local safety council.

Junior Safety Councils were organized in each elementary school. One teacher, usually the principal or auditorium director, was designated to head the work in each school. The Junior Councils elected officers and named

numerous committees. An effort was made to give safety work assignments to as many pupils as possible.

A premium was placed on membership in the Junior Safety Councils by requiring pupils to earn it. This was done by learning the safety code and pledge and by following safe practices. When proficient in these, pupils were admitted to membership in the council and given an attractive membership button. The price of membership was adherence to all safety practices.

If a member of the council is seen violating safety practices he is brought before the School Council and his case is discussed. If the action is serious enough his button is taken from him and he is placed on probation for a certain period of time. This is the most humiliating thing that could happen to a boy, to have his button lifted before all of his classmates and fellow members. This tends to make the child stop and think before he commits any act which might be dangerous. We find as a result that children do not hop on the back of trucks or on street cars and are very careful about going into the street, and in this way many accidents which result from carelessness have been eliminated.

No School Children Were Killed in 1925 in Dallas

The results of this work were at once apparent. In 1923 nine children of junior safety council age were killed in traffic accidents on Dallas streets. In 1925 no children of this age were killed, and no Junior Safety Council member was involved in a traffic accident.

Our Junior Safety Councils are self-governing. The teacher has little to do with them, other than to give such assistance as is requested and to lend a steadying influence. More than that, the Dallas Junior Safety Councils have become the student self-government bodies in their respective schools. In most cases the principals and teachers allow the safety patrols to control discipline in the halls, on the stairways, on the playgrounds and on the streets about the school. This practice has become so prevalent that the Junior Safety Council is the most important student morale force we have.

These Councils consist of the student body of the fourth to seventh grades, inclusive. These children have patterned themselves upon older organized bodies as much as possible. The Dallas Safety Council gave them their original organization plan including a constitution and by-laws. Their meetings are carried on in perfect order even to the smallest parliamentary detail. Their work includes inspection of school premises to discover accident and fire hazards, studies of traffic safety, home safety, play ground safety, etc. Children are organized into Safety Patrols to aid younger children across the dangerous streets.

These patrols control traffic in and near the school buildings. In the smaller schools their duties are confined mainly to the buildings and grounds, but the larger schools have a real problem to face because of the heavy traffic in front of their buildings. Sometimes patrols are placed several blocks from schools. The patrols are equipped with attractive arm badges, police whistles and red flags. They are instructed to keep out of the street as much as possible, but to control traffic and clear a safe passage for children.

At the beginning of the school year police officers of Dallas go to the different schools and talk before the children on safety practices and habits. The man in the uniform is a big man to the child and his every word is law. For a couple of weeks the policeman often stands on the walk with the child and together they direct traffic while he explains many of the dangers to the child and impresses it upon him to stand on the walk and never allow the children to cross the streets while a stream of traffic passes. It is a real sight to see

the little lad of twelve years control traffic by blowing his whistle and waving his red flag—the cars stop while he takes the smaller children by the hand and leads them across the street. Then he blows his whistle and traffic moves on. Motorists usually give friendly nods to the “little officer.” Often business men stop their cars at the curb and watch these little fellows perform their duties. Then the Safety Council office gets a call telling us about the good work the children are doing. The fathers take as much pride in the work of their children as do the children themselves. We have received much favorable newspaper publicity and the public seems enthusiastic over the work.

We have had only a few cases when the motorist failed to cooperate with the patrols. In these few instances the car license number is taken by the patrol and turned over to the Auditorium teacher or principal, who calls the Dallas Safety Council. We locate the owner of the car. If he cannot be reached by telephone we write him a letter, though when it is possible we always talk to him personally. The purposes of the Junior Safety Council and patrols are explained to him and we give him an opportunity to go to school and apologize to the patrol, otherwise he is called into Police Court. In every case we have found the driver willing and even glad to make this apology. No one thing probably has given the children more confidence than to have a grown man come to them and admit that he was wrong and apologize, then offer his cooperation in the future. To know that he is right and is being backed by the citizens of Dallas gives the little patrolmen increased confidence in themselves. We have found that the patrols never abuse their privileges. Responsibility brings thoughtful and considerate action.

The Fire Prevention Committee Cooperates

The Fire Prevention Committee of the Dallas Chamber of Commerce has worked closely with the Junior Safety Councils. The efforts for fire prevention have been very successful. The Junior Safety Council members have inspected and cleaned their home premises so thoroughly that no fires of preventable nature have occurred in their homes during the past two years.

The excellent safety and fire prevention record established during the first year of Junior Safety Council operation has been repeated each year since. During the last three years in Dallas, no Junior Safety Council member has been killed or seriously injured in an accident of any kind, and our records show no instance of a preventable fire in their homes. Surely this is sufficient evidence of the value of Junior Safety Councils in bringing about greater safety and reducing fire losses.

Each Junior Safety Council holds meetings at least once a month, often more frequently. These meetings are under the supervision of the Auditorium teachers and the students themselves have charge of the programs. The Dallas Safety Council furnishes them with safety plays, slogans, songs, etc., which they learn and give at these meetings. Often these plays are put on before luncheon clubs in the city, so that the man who is too busy to visit the schools may know the work they are doing.

During the past spring when the National Education Association met in Dallas one of the Auditorium teachers in the city was asked to put on a program which would show the visiting teachers what the Dallas schools were doing along safety lines. This program was attended by members of the association from all over the United States. They seemed much impressed with the safety program enacted by the children. Especially was the audience pleased with the Schaefer Prone Pressure Resuscitation demonstration, put on by the children who had been instructed by the employees of one of the local power companies.

Following this N. E. A. convention in Dallas, more than 100 requests for additional information and material were received from those who had become interested in school safety work.

We feel that our children are greatly responsible for the reduction of accidents in Dallas during the past four years, mainly through their "ounce of prevention," but we recently have had cause to learn that they are doing even more than that. They are approaching the problem of accident prevention from a constructive point of view and doing much to eliminate accident causes.

In one of our Dallas schools which is located in a cotton mill district a boy was brought to our attention because of an act which he performed in the interest of safety. This boy, a member of the Junior Safety Council, had not been a very active worker in the Council. The boy had unfortunate influences in his home. His father was a fighter and a trouble maker and the boy seemed to have inherited the same tendency. One afternoon he was standing on the banks of a river watching two boys on a raft. Suddenly the raft was overturned, and he discovered that only one of the boys could swim. Without a moment's hesitation he jumped in and rescued the drowning boy. When this act was brought to the attention of the Dallas Safety Council we awarded the boy a Distinguished Service Certificate. Later, at a mass meeting of all the Junior Safety Councils in the city, this certificate along with a membership in the Y. M. C. A., was presented to him. Though the boy was very timid and did not want to discuss his act, one could see that it was probably the first praise he had ever received and he appreciated it greatly. The wholesome Y. M. C. A. environment is proving very helpful.

The Junior Safety Council Has Been Most Valuable

Many other acts of merit have come to us during the past year, but this one, coming from such a source, stands out as the most valuable safety service rendered during the year.

The Dallas Safety Council feels that its Junior Safety Council program has been the most valuable activity it has undertaken. We give the schools entire credit for the work they have done in the prevention of accidents and we are glad to have had the opportunity and privilege of fostering such a movement.

It is suprising how easily and cheaply Junior Safety Council work may be carried on. In 1927 the Dallas Junior Safety Councils enrolled more than 25,000 active members in the grades from the fourth to the seventh, inclusive, in thirty-five elementary schools. Using the facilities of the National Safety Council—especially the Education Section, we were able to supply teachers with numerous helps in the form of multigraphed copies of lesson outlines, slogans, playlets, etc. We printed the safety code and pledge on large 18 by 24 inch posters and placed them in school rooms. National Safety Council safety posters were distributed and the children themselves made many posters. We provided 500 arm badges for patrols, 500 red flags and police whistles. The total cost of all these supplies was less than a thousand dollars.

Each year the Dallas Safety Council holds several mass meetings in large down town auditoriums where Junior Safety Council members gather to listen to programs arranged by various schools. We also show safety pictures, comedies and have prominent speakers. Capacity audiences always attend.

Success in Junior Safety Council work depends wholly on the adoption of a constructive program and willingness of the schools to cooperate. The Safety Council must stand ready to give aid and assistance whenever possible. Children must be made to understand that safety work is worth while and that it is their job. They must be allowed considerable freedom in carrying out the plans they make. Good work must be suitably recognized.

This done. Junior Safety Council work will succeed and the lesson of safety will be learned by the children, and by them will be taught to adults.

CHAIRMAN UPHAM: This is very important work and it has grown in every city in the United States. How susceptible the younger people are to work of this kind is evident in the safety campaign that is now being carried on, starting October 1, where the children in the schools are asked to sign a pledge, a simple pledge; and while that is not supposed to start until October 1, already we have thousands of pledges sent into the office. In one school 1,400 have signed the pledge, making it 100 per cent for that school.

E. R. FARRA (Grand Rapids Safety Council): How do you expect to tie in the local safety council?

Adopting the Slogan "Courtesy and Caution"

CHAIRMAN UPHAM: That safety campaign as run by the American Roadbuilders' Association is nothing new. Last January, when the American Roadbuilders' Association met at their annual convention they wished to contribute something toward highway safety. After talking it over with Mr. Williams and two or three others, we decided to start a highway safety campaign beginning October 1. We summarized all the rules that we could find in about 25 or 50 pamphlets into two words, "Courtesy" and "Caution," feeling that if everybody would be as courteous and as cautious when they are on the highways as they were at other times, it would help the cause of highway safety to a great extent.

We find that 90 to 95 per cent of all the accidents originate with the individuals. The mechanical devices play a very small part in highway accidents. Knowing that our problem was in the individual, we decided to appeal to the individual. If you go to the individual with a lot of complicated rules and regulations you don't get as far as going to them with very simple rules, so that is the reason we selected the very simple rule of Courtesy and Caution to appeal to the individual.

Then the question came up, how should we appeal to the individual? We tried to appeal in groups, the Rotary Clubs, the Civic Clubs, Kiwanis, Lions. Then we appealed to the schools through the principals of schools, the Parent-Teacher Association, and so forth. The Federal Council of Churches became interested. We got the information to them, made a direct appeal to about 25,000 churches in a little prospectus that was printed based on the simple rules of Courtesy and Caution. In all we sent out 100,000 of these prospectuses to these civic clubs, schools, country departments, highway associations, and everybody that has to do with the masses. In some of the cities the safety councils have written in and said they would like to conduct a campaign within their city. In that case we simply sent them all the literature and they are conducting the campaign in their city.

For a background, we appealed to nearly 1,500 newspapers and magazines, and I should say we had at least 1,000 letters from newspapers and magazines stating that they would be pleased indeed to help in this campaign, to send along the copy and they would print it, so beginning October 1, there are over 1,000 newspapers in the United States and some two or three hundred magazines that will print this copy every day for two weeks. That will be the background for the campaign.

Then in order to have an appeal to the individual, we used what we call our pledge card. It is a very simple pledge card which pledges the signer to courtesy and caution while on the highways.

It is evident from the results that have followed from this campaign that the public right now is eager for a full-fledged highway safety campaign, and I believe the press of the country and the magazines are more than willing to help in a large, well-organized, well-timed, safety campaign on the highways.

In addition to what I told you, the Roadbuilders started a highway safety contest

open to everybody. They gave a thousand dollars in prizes. It has yet to run for six weeks. One of the manuscripts that came in said something like this: that if the motorist would use just common, ordinary, everyday, barroom courtesy a lot of our accidents would never happen. That is about so. When a person gets behind the wheel he assumes a dual personality and he is not as courteous or as cautious as he is at other times.

R. M. ARUNDEL (Washington, D. C.): I, too, am connected with the American Roadbuilders, and one of the things I would like to mention is the education of children as to the following of traffic rules: We have an idea that we think would be very good, and that is of installing on the stairways of each school a regular traffic signal. When the boys and girls came in in the morning we could have them march into their schoolrooms according to the traffic signals. When they are dismissed they could march out under the green signals, and have that repeated day after day during the entire school season. We believe that that will bring about habitual obeying of the traffic lights.

R. M. SHERRARD (Board of Public Education, Pittsburgh): We are using the "stop" and "go" signs in a great number of schools under the direction of our junior safety patrols at the interchange of classes, so the idea isn't new to us, and the children are very much accustomed to that sort of thing.

A Junior Safety Council in Every School

J. M. MORRILL (Frisco Railroad, Pacific, Mo.): At Memphis they have a police lieutenant who is paid by the city but reports to the safety council manager, and he organizes a junior safety council in every school, public and parochial, and has meetings arranged after the close of the school hours, so as not to interfere with the school work. He is a scout master and he is a man that the boys love, and he is doing a wonderful work.

F. C. LYNCH (Kansas City Safety Council): I would like to ask Mrs. Owen about one part of her paper, the part about the motorist disobeying the regulations of the patrol. How did you bring the motorist back to apologize, and to whom did he apologize, and in case he refuses to apologize, who enters the complaint to have him arrested?

Mrs. OWEN: The first thing we did was to either call or go to the highway commissioner and get his name and address from his number. Then we look him up and call him immediately, usually within an hour or two, and we ask him to call at the Dallas Safety Council office. When he calls there we tell him about it and ask him if he would like to apologize, telling him we would be very glad to give him a chance; otherwise, he would be turned over to the police court. Our police judge said he believed in enforcing the law. When a motorist is brought up to him he is fined usually, and they really have a fear of the judge. So in every case the man went to the school and apologized. He apologizes to the officers of the patrol, or once in a while he talks to the whole assembly and tells them he is sorry. He usually says he didn't understand, of course, and would not have committed such an offense if he had known in advance.

MR. LYNCH: Our police department will not issue a warrant unless someone is willing to volunteer as a complainant or witness.

Mrs. OWEN: The manager of the Dallas Safety Council puts in the complaint. So far we have never had to go to court.

E. R. FARRA (Grand Rapids Safety Council): We have gone one step further in going into the high schools. We bring together the representatives of the high schools once a month and analyze the accidents that have occurred the month previous, and in a couple of weeks I am going to have one of those high school boys or girls broadcast over the radio on Wednesday night the

findings of that board. In the Children's Hour they get more kick out of hearing those youngsters over the wire than they do me.

NORMAN ANDERSON (Ohio Bell Telephone Co., Cleveland): I don't see that I could let this opportunity go by without introducing to you Sergeant Roth, who spends all of his time on this school work. I think perhaps he could tell you in a few words some of the things he is doing.

SERGEANT A. ROTH (Cleveland Police Dept., Cleveland): I have organized safety patrols in all the schools in Cleveland. Each school has a safety council. They make the laws for that school. If a child runs out into the street or hops on a truck, or a street car, or anything of that kind, and one of the patrol sees this boy or girl, as it may be, his name is taken and sent into this legislative body. They decide what is to be done with this child. Then they have a judge, a prosecuting attorney, a defense attorney and a jury. That child is brought up to this court and tried the same as any offender would be tried if he had violated a traffic regulation. In that way, the children do not only get the idea of safety, but they also get their civic lessons through this court.

I have also made up a set of stereopticon slides of actual accidents, and also some of the things that children do on the streets. I lay in back of billboards and places of that kind probably for a day or a day and a half trying to get these children in the act.

I also started to work with the commercial drivers, the general drivers of the road and the taxicab companies, of which I think there are four in Cleveland. They were running as high as 25 accidents a week in four companies, making 100 taxicab accidents in a week. I went to these men and pleaded with them. I showed them these pictures and in that way I reduced the accidents to four slight accidents in a month.

CHAIRMAN UPHAM: The next subject is "Safety at Grade Crossings." It is something like the weather, there has been a lot of talk about it, but not much done about it. I don't know of anyone who is better equipped, on account of his previous experience, to begin solving that problem than Senator Drexler, of Delaware. He is the President of the Delaware Safety Council. I have great pleasure in introducing Senator Drexler.

Safety at Grade Crossings

**Senator Louis A. Drexler, President, Delaware Safety Council,
Bethany Beach, Del.**

The grade-crossing problem had its beginning with the advent of the railroad at a time when the highways were used almost, if not entirely, by pedestrians and animal-drawn vehicles. While the traffic on both railroad and highway has changed in many particulars with the increased number of trains, the advent of the motor-driven vehicle on the highway, the increased speed of both and many other elements which enter into the problem, one feature remains to challenge the best efforts of all concerned, the railroad and highway officials and the public. It is a fact that of all forms of highway accidents, the grade-crossing accidents are, in proportion to their number and the number of persons involved, the most deadly. This cannot be otherwise as long as such accidents occur, owing to the great forces and weights involved in grade-crossing collisions.

The fatal character of railroad grade-crossing accidents is evidenced by the facts regarding such accidents. For example, in Delaware, during 1925, there was a total of 14 such accidents with four deaths and nine persons seriously

injured. No figures as to those slightly injured or the property loss were available. During 1926, in the same state, a total of 22 such accidents have occurred with 25 deaths and eleven persons seriously injured.

In the State of New York, during the year 1925, the Bureau of Motor Vehicles reports the number of railroad grade-crossing accidents as 148, with 103 persons killed and 178 injured, or about one death and one injury for each accident. A similar report for New York State for 1926 shows 161 railroad grade-crossing accidents, with 151 killed and 158 injured, showing such accidents to be extremely fatal. These figures are only for accidents where automobiles are involved. Other vehicles using the highways and pedestrians are also victims of railroad grade-crossing accidents. Such data as can be studied from various sources warrant the statement of the Connecticut Department of Motor Vehicles, "That the most dangerous hazard known to motor vehicle traffic from the standpoint of serious damage and death is the railroad grade crossing."

Highway Accidents Challenge Our Best Efforts

In view of the greatly increasing number of vehicles using our highways and the larger number of persons involved in such use, the number of accidents may seem comparatively small; but, like other menaces fatal to mankind, they challenge our best efforts to eliminate them or by protective measures reduce their extremely hazardous nature so far as is humanly possible to do.

A study of the grade-crossing accident reports of the various states and the several railroads reveals a certain number of accidents due largely, if not wholly, to the carelessness and recklessness of drivers of motor vehicles.

The mental attitude of drivers toward the potential danger of a crossing differs greatly. There are those who always take a chance whether at home or abroad in respect not only to railroad grade crossings but to all crossings and other road circumstances. The elimination of these wholly reckless drivers through appropriate legislation and strict vigilance by patrol officers may never be complete but should be a matter of constant effort upon the part of those officials charged with the duty of making and enforcing traffic laws and regulations.

In any effort to reduce the fatalities at railroad grade crossings, through the drivers of vehicles (motor or other types) or pedestrians, we are confronted with all those elements of mind and body which constitute the human factors which enter into the problem, and herein is the great field for the work of those interested in public safety to remove, by education, publicity, etc., as much as possible this human factor.

However, we cannot place responsibility for the large toll of deaths at grade crossings wholly upon the reckless class of operators. The hazards which the railroad grade crossings present everywhere are too real to pass over lightly. Many a well-balanced and a reasonably careful driver has come close to disaster, and others have met fatal accidents through seemingly no fault of their own.

Almost every motorist can recall some nerve-racking personal experience encountered in approaching or crossing a railroad at grade. He recognizes that serious attention must be continuously directed to the extreme hazards which these crossings present. He expects that a definite program for the gradual elimination of the most dangerous and heavily traveled crossings shall be planned and financed through the cooperation of the railroads and the proper public officials. Recent fatalities are focusing general public attention upon the necessity of such a procedure. Sentiment also is being crys-

tallized into the demand that adequate protection be provided within a very reasonable time to safeguard human life at every railroad grade crossing in face of the present day railroad and highway traffic conditions.

A considerable number of grade-crossings might be eliminated by the diversion of a slight amount of vehicular traffic using same to more important and better-protected crossings and the crossings from which the traffic has been diverted should be abandoned. This requires the cooperation in many instances of local authorities and the state and country highway officials with the railroads and should receive careful thought and attention. At a number of points, especially in some of our smaller communities there occur an excessive number of grade crossings within comparatively short distances of each other. Additional safety might be provided at the price of slight inconvenience to the few for the safety of the many by the diversion of traffic as heretofore suggested. Local opposition in some instances has prevented the carrying out of this feasible and reasonable solution of such cases.

A Definite Program Should Be Laid Out

Elimination of grade crossings, either by relocation of highways or rail lines, or by grade separation, which constitutes the only perfect solution of the problem, should be carried on under a proper program, first eliminating the most dangerous crossings on thoroughfares carrying heavy traffic and with due recognition of the enormous costs involved, which if elimination were attempted on a wholesale scale would impose an excessive financial burden resting in the last analysis upon the public. Elimination is impossible of accomplishment at every location; however, a comprehensive survey of the physical circumstances and traffic conditions of railroad and highway in detail at every crossing will supply the necessary information to permit a classification of the various crossings.

A very admirable survey of the railroad grade crossings in Memphis, Tennessee, was made by a committee appointed for that purpose by the Memphis Safety Council at the request of the Mayor. All crossings were scientifically rated as to the degree of hazard, having regard for the following factors: Topography, visibility, traffic on highway and rail, possible means of protection, and recommendations for improving conditions were made in accordance. The program should have due regard to the relative costs and advantages of grade crossing elimination and other methods of protection and should be given the most thorough joint consideration by the proper authorities. The elimination and protection of grade crossings are of such importance and involve to such extent the public safety as to require that priority be given to them in the allocation of capital funds by the railroads and of public moneys by public authorities over expenditures for other safety measures designed to protect the public.

In locating new highways or railroads, or re-locating existing highways or railroads, grade crossings should be avoided or eliminated wherever practicable. Re-location of highways offers many possibilities not yet fully developed which should be worked out by the State authorities in cooperation with the railroads. In eliminating grade crossings, narrow or obstructed underpasses and sharp turns in the approaches thereto should be avoided. Authority to order grade separation at grade crossings in Delaware is vested in the State Highway Department and Chancellor. The State Highway Department plans the improvements and initiates the proceedings for all highways under its jurisdiction, the Chancellor having authority to determine finally the practicability and the proper division of costs between the railroads and the public. A like

authority should be vested in some State agency in each state to determine and prescribe the proper protection at grade crossings. Time is an essential element and a prompt decision should be provided in the law. Railroad crossings remaining at grade should be safeguarded in every reasonable way.

Present protection at railroad grade crossings consists of a variety of forms and devices. Some grade crossings are guarded by watchmen; at others gates, bells, flashing light signals (both island and side road, either blinker, wig-wag or fixed) and signs of various types; at a number of grade crossings a combination of the above are in use.

Standard warning signs and pavement markings should be used to mark the approaches to all public railroad crossings. Where the volume of traffic requires it additional protection should be afforded by the use of flagmen, gates, or approved electric or mechanical devices standardized as far as practical. So far as possible a clear view along the track in both directions from both sides thereof should be maintained. The placing of railroad cars near grade crossings so that the view is thereby obstructed should be discouraged. Sharp curves, abrupt changes of grade, roughness of the pavement, or other conditions at or near the tracks, which tend to divert the attention of the motorist should be avoided. Properly designated state authorities should be empowered to indicate dangerous grade crossings at which motorists must stop. Of possibly greater importance than the elimination of grade crossings to the motorists of today is the adequate protection at an early date for every grade crossing. Removal of physical dangers as far as possible and the installation of suitable warning devices are of paramount consideration. Without question, the sign "STOP, LOOK & LISTEN," and the signal bell warnings placed immediately at the railroad crossings are out of date. They must be discarded and replaced by visible as well as audible signals located so that the motorist, traveling at an average rate of speed, has sufficient time to come to a halt through "due and timely notice." Signals or signs depending on the light from automobile headlights for their visibility should be regulated as to location and height with due regard to legal restrictions on elevation and power of such headlights.

Adequate Warning and Information of Danger

In approaching a crossing a motorist desires first to be advised "Railroad Grade Crossing . . . Feet Ahead," and, secondly, to have answered the question, "Is it safe to cross this crossing now?" The first signal as to the presence of a crossing is unnecessary for the alert, frequent user of a highway. He is wholly concerned with the answer to the second consideration. To the transient traveler the former is more important for if he were unaware of the existence of a railroad crossing, the answer to the second would be too late for his guidance. As far as practicable such warnings should be uniform in character without regard to state or county lines. They should, we believe, be so located as to serve their purpose effectively without detracting the attention of the motorist from the crossing itself or obstructing his normal path of travel. It must also be recognized that in this day, when motorists are roaming everywhere, even the remote and little-used byways may attract a wanderer from some distant place. No crossing can be neglected. At some locations where railroad or highway traffic is heavy and also possibly visibility of the tracks is poor, no series of advance signs and mechanical warning devices may be deemed adequate. Here it would seem that the watchman and gates are appropriate to follow the advance signs or supplement the mechanical warning devices. The watchman then holds the position of highest trust. He is

custodian of the lives of the traveling public. He should, therefore, meet the same high qualifications of other traffic officers and be deserving of the same public confidence. The highway user, generally, we believe, is opposed to relieving the railroads of any portion of their responsibility, relating to railroad grade crossings of public highways; but he also realizes that the magnitude of the problem makes necessary financial participation by the public to secure any degree of relief commensurate with the exigencies of present conditions. Human lives must be conserved regardless of expense.

We cannot be unmindful of the excellent work carried on by the several railroad companies in their endeavor to educate the public as to the dangers of grade crossings. For six years they have conducted during the summer months a "National Careful Crossing Campaign" designed to bring forcefully to the public's attention the necessity for care at grade crossings, and to impress upon railroad employees the necessity for doing everything in their power to prevent such accidents.

A List of Railroad Obligations

These National Careful Crossing Campaigns have been carried on under the guidance of the American Railway Association's Committee on Prevention of Highway Crossing Accidents. This committee in its report of March 28, 1927, reminded the member railroads of the committee's suggestions (which they term railroad obligations) made in a letter of March 1, 1927, as follows:

- "Early re-inspection of all grade crossings.
- "Removal of unnecessary obstructions to highway traveler's view of trains.
- "Adequate, suitable protection at crossings.
- "Proper maintenance of signs, signals, gates, lights and other warning equipment.
- "Proper maintenance of surface—approach—drainage conditions.
- "Check up on efficiency of crossing flagmen day and night.
- "Adequate sounding of locomotive crossing whistle signal.
- "Proper Maintenance of whistles and bells upon locomotive.
- "Adequate ringing of locomotive bell.
- "Proper protection in backing movements and when trains are out, particularly on multiple tracks.
- "More than ample space between crossing and cars when latter are stored on sidings.
- "Special attention should be given where crossing casualties have recently occurred.
- "Improvement in the record of crossing accidents can be attained by all concerned faithfully performing every duty.
- "It is hoped that railroad executives will give further prompt and full consideration to those features of crossing accident prevention other than the separation of grades, being prompted therein by motives of humanity, expediency and economy."

Further, the following language in the conclusion of this report is most emphatic and impelling: "The continuous presentation of a logical plan of safe action at crossings must ultimately impress even the most unwilling mind. We, as railroads, must do our full duty in suitably safeguarding our crossings: go beyond our duty in warning the highway traveler of his hazard at the crossing, and endeavor to encourage him to constant watchfulness and an intelligent understanding of the various protections thrown around him."

We agree most heartily with the suggestions and conclusion as quoted

above and believe that if they are harkened to and carried out in sincerity and positive action, and with the cooperation of such organizations as the National Safety Council and kindred bodies in energetic and sustained campaigns of public education, railroad crossing accidents will be yet further reduced, and death and suffering eliminated.

In conclusion, gentlemen, let me say, I have not taken up your time with a battle of figures and statistics, for in my judgment to argue around such statements as "only 6,991 injuries at grade crossings occurred in a given time as against 800,000 injuries on the highway in the same period" is like trying to set up an alibi, to ease our conscience.

In a study of the various reports obtainable on railroad grade-crossing accidents, one cannot fail to note the almost universal attitude more or less defensive as regards the interests of the railroad. This is probably owing to the fact that most of the information and data have been compiled by those whose position gives them the railroad point of view and contact. Many of these reports go so far as to try to establish an alibi based entirely on figures which would almost lead one to believe that grade-crossing hazards had been or could be entirely eliminated by mathematical juggling, intending to show how few fatalities occur at grade crossings compared with other causes.

The viewpoint of the public, however, is that of an eminent jurist of one of the eastern states who stated that the hazard is inherent in the railroad grade crossing as a physically existent fact, the duty being imposed upon the railroad of giving "due and timely notice" of such danger.

"Contributory negligence" in approaching or entering within the zone of hazard is an entirely different thing. The elimination and placing of safeguards around such hazards is the especial duty of the railway, aided by highway officials and engineers. The elimination of "contributory negligence" upon the part of the users of the highways should be the constant effort of the various safety organizations, and the cooperation of all should bear fruit in robbing this menace of its victims.

Let us always remember that the victims and those to whom they are near and dear are the great losers. Only those who have experienced the sudden taking from their midst of a dear one can fully realize what such fatal hazards as grade crossings really mean. To these and the public generally who are confronted with the reports and details of such accidents there can be no answer but the elimination of the hazards, or full and adequate protection where such hazards exist.

Safety at Grade Crossings

Chas. E. Hill, General Safety Agent, New York Central Lines, and Vice President for Public Safety, National Safety Council

In discussing safety regulations at railroad highway crossings, we must do so from a broad standpoint, having in mind not only the problems with which we are confronted today, but must take into consideration the conditions we may reasonably expect to exist in the future. This subject is a vital one, and is of tremendous importance in any plan we may adopt in our efforts to reduce what are commonly termed "Grade crossing accidents."

We must approach this subject from a national viewpoint, for it has indeed become a national problem, one which has perhaps created more discussion than any other question in which the railroads of this country and the public are mutually concerned. While the crossing accident problem is but one of the many types of problems with which the railroads have to contend, it is no less

important, and today is being given greater consideration by the carriers than ever before.

The Extent of Crossing Accidents

During the ten year period from 1917 to 1926, inclusive, in the United States there were 20,021 persons killed, and 55,771 persons injured through accidents at railroad highway crossings, or an average of 2,000 deaths and 5,570 injuries per year, the increase in deaths alone during this period being 28 percent.

As a result of automobile accidents in the streets and highways of this country, there were 23,000 deaths last year, as compared with 6,000 ten years previous, an increase of 283 percent. In other words, during 1926 there were more people killed through automobile accidents than were killed at grade crossings during the entire ten year period. We must always look to the future, and in doing so, upon the assumption that the same increases will obtain, we see history recording during the year 1936, the deaths of 65,000 men, women and children, through automobile accidents in our streets and highways, of which number less than 5 percent will be the result of grade crossing accidents.

We do not deprecate the seriousness of the crossing accident problem, and it is not our purpose to minimize the tragedies due to such accidents. Our only purpose in making these comparisons is to undertake to focus attention on where the difficulty lies, and to this your attention will later be more specifically directed.

The Physical Situation

We have in the United States at the close of 1926, 234,280 crossings at grade. In seeking a remedy we must do so upon the theory that the future holds no panacea in so far as the physical situation is concerned, for it has already become an acknowledged fact that a solution of this problem through crossing elimination as the *immediate* remedy is unthinkable, by reason of the prohibitive expense which is conservatively estimated at 20 billion dollars, and the time required to perform such a stupendous task. Twenty billion dollars is equal to the preliminary estimated value of all railroad property as made by the Interstate Commerce Commission. It is almost equal to the combined resources of the national banks of our country. It is a little more than our public debt. Certainly no further argument should be necessary to show the utter inability of the railroads and the municipalities to shoulder such a financial burden.

A gradual process of crossing elimination has been, and still is being carried on by the railroads, but they have been seriously handicapped by the addition of many more new crossings. For example, in one recent year, while the railroads of the country were eliminating 972 crossings at a cost of about 100 million dollars, during the same period 3,065 new crossings were constructed under conditions over which the railroads had no control. We fully agree that the final solution of the crossing problem lies in the elimination of the crossings and that this is the real remedy. The point we desire to make is that it is not the immediate remedy for reasons heretofore stated.

A progressive plan of crossing elimination should be carried on. Even so, we could not hope for a solution of the problem by this means for many generations to come. Therefore, it is our duty to face the situation as we find it.

The Motor Vehicle

We have, in the United States, 81 percent of all of the automobiles of the entire world. The state of Illinois, alone, has more than Germany, Italy, Spain and Australia combined. In fact you could take the automobiles in Illinois and match

them with the four countries named, and still have enough left to supply the city of Chicago.

We had, at the close of last year, 22,100,000 automobiles, as compared with 5,000,000 ten years previous, an increase of 340 percent. The saturation point is far distant. If the same rate of increase continues, we will have 40,000,000 cars by 1936, one for every four persons. In fact, by that time, there might be a sufficient number to supply one car to each individual who is old enough to reach the steering wheel. The automobile is here to stay, and progress will demand not only a continuation of its use, but a greater extension of its services. Therefore, these facts also should be taken into consideration when we are attempting to find a solution of this problem, and this should include *a regulation of the use of the motor vehicle so that it will serve the purposes for which it was intended*. The automobiles play an important part in our crossing problem, for they will be involved in 90 percent of our crossing accidents this year.

Analysis of Accidents

We must know the causes of crossing accidents before any real progress can be made in their reduction. This plan is followed successfully in connection with accident prevention work as it relates to other classifications, and there is no reason why it should not be applied in this instance. In making this analysis we find that a large majority of crossing accidents occur in daylight where there is an unobstructed view of the approaching train, and in the locality where the driver resides; which indicates that the motorist is either so familiar with the situation that he lulls himself into a feeling of security and drives on without any thought of the consequences, or he sees the train approaching and attempts to beat it over the crossing. What is of still greater moment—more than 22 percent of these accidents result from the automobile running into the side of the train. The large number of accidents due to this cause is so appalling that recently I mentioned the matter to an eminent psychologist, thinking perhaps he could give the answer. He replied that it was not a problem for the psychologist to determine, and referred me to the familiar story of the farmer's mule. The farmer purchased this mule upon the representation that it was in first class condition. No sooner had he turned it loose in the pasture than it immediately began to run into trees and knock down fences. He took the former owner to task, claiming that the mule was evidently blind. The reply was that the mule was not blind, but he didn't give a damn.

About 95 percent of the motorists of this country are reasonably careful. The remaining 5 percent, however, represents a large army of more than a million reckless and incompetent drivers flitting about the country without any regard for the safety of themselves or their fellowmen. They include drivers who are deaf, blind, of immature age, enfeebled condition due to old age, those who are intoxicated, and then there are those that are analogous to the farmer's mule.

A Contrast in Qualifications

Contrast the comparative qualifications of the driver of an automobile and the driver of a locomotive. The former, as a rule, needs no qualifications other than his ability to possess a car. He is not only unfamiliar with its operation and mechanism, but is wholly lacking in a knowledge of our laws governing its use on the highways. In many instances his responsibilities are such that he is weakened in his regard for the rights of others, whereas the locomotive engineer has earned his right to a seat in the cab of his engine by virtue of many years of training. He is not only familiar with its mechanism and operation, but also with the rules governing its movement over the road. His responsibilities are

a part of his make-up. He sits in his cab not only with these qualifications but with a steady hand, a clear head, a brain that is nowise affected by anything he may have drunk, and with a keenness. He is so alert that he is, in fact, a part of the locomotive being operated under his guidance.

What is the Remedy?

There is a joint responsibility between the railroads and the public. The railroads have a duty to perform. We must not lessen our efforts toward increased efficiency in the maintenance and protection at highway crossings, and in the manner of train operation as it applies to accidents of this character. Our every act in the discharge of our duties in this regard must carry a sincerity of purpose of such positive character as will convince the public of our real devotion to a most worthy cause.

The immediate remedy lies largely in a constructive campaign of education. We must find some means to curb the reckless motorist, and at the same time make driving safe for the great majority of motorists who are careful.

As a further aid to this plan, the following suggestions are offered:

First, see that advance warning signs are properly maintained.

Second, require school busses and trucks carrying explosives or flammable liquids to stop before passing over railroad tracks at grade, the same as is required of revenue operated motor vehicles.

Third, prevent the building of unnecessary highways crossing railroad tracks.

Fourth, eliminate crossings through the re-routing of highways whenever possible.

Fifth, eliminate obstructions to view on the highway within 500 feet of the crossing.

Sixth, enact uniform and stringent laws in the various states requiring a proper standard of qualifications so that operators of motor vehicles will be required to meet a mental and physical test, including penalties for violations, that have a real effectiveness.

The carrying out of the latter suggestion, alone, would result in a marked decrease not only in crossing accidents, but also in other accidents in which automobiles are involved.

It is our hope that all organizations and agencies, civic, political, and otherwise, that are in any manner concerned in the conservation of life and limb, and whose aid is so essential to the success of this movement, will unite in a common enterprise, and that as a result our cooperation will become more extensive, so much so, it will assume a force of such magnitude and power as will serve to wipe out this needless slaughter of human life.

Friday Morning, September 30, 1927

W. M. COLLADAY, Chairman
Superintendent, Motor Vehicle Department, Des Moines, Iowa

The sixth session was called to order at ten o'clock by the Chairman, W. M. Colladay, Superintendent, Motor Vehicle Department, Des Moines, Iowa.

CHAIRMAN COLLADAY: There has been in session this week, as well as the Safety Council meeting, a meeting of the Mid-West Conference of Motor Vehicle Administrators which consists of different states of the Mid-West. We have been discussing safety matters as well as reciprocal relations between states. These meetings have been held in Chicago for the last two or three years and we have arranged numerous items in regard to reciprocity. We want to go on record with you people as favoring the driver's license. Driver's license we think is about the only way we can rid the road of the undesirables by being in a position to revoke their license. We have in numerous states now a revocation proposition but it is only for driving while intoxicated. If the judges would only recommend it we could go through with it, but in some cases they will not recommend it.

It has been suggested in the legislature that they organize a safety or motor vehicle division with proper enforcement officers, to be operated by a fund; instead of using all the license fees for building highways to use a part for the enforcement of safety after we get the highways constructed.

We have on our program this morning for our speakers men who are leaders in their line of work, a work that is fast becoming a necessity. Our first speaker, Mr. K. W. Mackall, is engineer for the Crouse-Hinds Company of Syracuse, New York, who are one of the leading manufacturers of traffic signals. The subject which was assigned to Mr. Mackall is one with which he is thoroughly familiar, and one in which the general public is vastly interested. Mr. Mackall!

Recent Developments in the Control of Traffic

**K. W. Mackall, Engineer, Crouse-Hinds Company,
Syracuse, N. Y.**

Any discussion on the subject of the control of traffic by electric traffic signals, or by any other means, must be of vital interest to the National Safety Council, since its activities are solely directed toward the elimination of accidents.

It is in this phase of the subject that we are most interested, since it is of the most importance. City authorities may assign other motives for the installation of signals, and yet there is no denying the fact that signals are actually installed today for the very same reason that the traffic squad was created—namely safety. Other results may be, and usually are, accomplished by the installation of a well-designed signal system, but were it not for the prime consideration of safety there would be no signals, nor would there be any traffic squad. It was owing to the desires of the municipalities to protect life and property, that the traffic squad was created—which also sponsored the installation of the modern traffic signal system.

Most of us think the traffic squad was created to handle the automobile problem, but I can assure you that such was not the case, for many cities had traffic officers before the automobile became a factor in our daily lives.

It is quite true that the automobile enhanced the problem and caused the enlargement of existing traffic squads. As the traffic problem became more acute, traffic officers were given mechanical aids, such as whistles and semaphores, but even with these aids, the traffic officer was unable to cope with the problem, because of his limited vision and complete lack of coordination with traffic officers at adjacent intersections.

Let me make this quite clear—I do not mean to imply that the existing traffic officer is inefficient. As far as one particular intersection is concerned, the intelligent traffic officer is far better than the best traffic signal, because the traffic officer can observe traffic conditions within the range of his vision and act accordingly. It is only because he is concerned solely with his own particular intersection that he becomes inefficient in the broad scheme of traffic control. He may clear his own particular intersection most admirably and yet do a very bad job of traffic control since he may send traffic to adjacent intersections which are not ready to handle it.

In the original scheme of things, the traffic officer's job was not only the direction of traffic, but he was also a bureau of information and of great assistance to the aged and infirm and was more or less able to move around and enforce traffic rules. He was really efficient. The dense traffic created by the automobile turned the human traffic officer into a human semaphore—an automaton, with no time to do other than direct—and oftentimes dodge—vehicular traffic. He could not give information, since no one could get to him, and he dared not leave his post in the center of the intersection to assist anyone or even to enforce traffic regulations. He blew his whistle and sometimes the violator stopped—sometimes not.

Reasons For the Installation of Signals

Let me, for a moment, briefly review the reasons why signals are installed and the results to be accomplished. The reasons for the installation of signals are three and they are very simple. They are tabulated below in the order of their relative importance.

1. Safety.
2. More economic utilization of the police force.
3. Expedition of traffic.

Analyze these three reasons carefully and it will be seen how closely they are inter-related. The first—safety—is of the utmost importance and were it not for this consideration of safety to life and property the police force would not be involved at all.

The third—speeding up of traffic—is really the result to be accomplished, if it can be done with safety.

Granted now that the result to be accomplished is the speeding up of vehicular and pedestrian traffic with safety—what is the best means of accomplishing this very desirable result? If it were actually possible to accomplish this result with traffic officers; unaided by other means, such as traffic signals, it would still not be economically possible to control traffic solely by means of traffic officers. We are past the days when a few intersections in the heart of a city's business district constituted the "traffic problem." The problem today is almost the entire city and it will gradually become more and more acute until the point of automobile saturation is reached.

Unfortunately, the city fathers and planners of other generations could not foresee our problem of today and plan our streets accordingly. Only a few cities—such as Salt Lake City, Utah, and Birmingham, Alabama, were laid out with thoroughfares sufficiently broad to handle modern traffic, and even

with their broad streets the use of a traffic signal system materially assists in accomplishing the desired result—expedition of traffic with safety.

The economics of the problem are quite simple and they are convincing. An intersection of signals will cost between \$700 and \$3,000, depending upon the type of signal and the method of installation.

The expense of a policeman for an eight-hour shift, including his salary, his supervision and his maintenance is upward of \$3,000. For some intersections this means \$6,000 per year when an officer is required for two shifts. A safe average for signal cost is \$1,500 per intersection, which means that for the cost of one traffic officer, two intersections of signals may be had. After the first cost of the signals has been paid, there is only the maintenance cost of say \$150 per year. Thus, 20 intersections of signals may be maintained for what it costs to keep one traffic officer.

Please do not misunderstand me. I am not recommending the complete signalization of a city and the elimination of the officer. With human nature what it is, that would be impossible. I am merely pointing out the economics of the thing and showing how a city may economically spend its budget money for greater protection to life and property. Signals at all bad intersections, traffic officers at the worst ones and officers mounted on motorcycles patrolling all others. This will solve the problem economically. No city has sufficient funds available to place traffic officers at all bad intersections.

Systems of Control

The subject of this paper is "Recent Developments in Automatic Control." To the engineer, designing control apparatus, the word "recent" means the thing he hopes will solve the problem while he is looking for something better. That may seem strange, but it is, nevertheless, a fact. The development of control apparatus has been very rapid, during the past two years and will, in all probability, be more rapid during the next two. It is not the purpose of this paper to enter into a description of the mechanical and electrical features of timers, but rather to describe briefly what degree of flexibility may be had. Early timers performed a set traffic cycle without any variation. Then followed a timer capable of performing two set cycles. In order to use them an accurate traffic count had to be made and it had to be predetermined just how many seconds traffic should be permitted to go in each direction. These were followed by timers which could be varied at will both as to total period of the traffic cycle and the split in each direction, keeping the amber of change period constant. This seemed to be all that was needed—and in fact a timer of this nature will meet most problems.

However, a further refinement in timers has been developed during the past year and it is the last word in flexibility, whenever such control is really needed. This latest timer will vary the north-south GO period at will, it will vary the amber period between the north-south and the east-west GO periods at will, it will vary the east-west GO period at will, and it will vary the amber period between the east-west and the north-south GO periods at will. With this new timer any of these four variations may be made independently of the other three, without the use of tools and without shutting down the system. Surely that is all that will ever be required.

The mechanism to accomplish all this is small and pretty reliable. There will be improvements in design—that is to be expected. The same engineer who designed such a mechanism will not be content until it has reached a stage of perfection equivalent to a grandfather's clock.

So much for the timer itself.

Now for a moment let me explain systems of control and their relation to the broad scheme of traffic control.

During the last year or two there have been many improvements in the control apparatus for signals and even more particularly in the methods of control. I shall briefly review these improvements and endeavor to point out when the various systems of control may be applied to advantage and possibly predict the trend of future development. In order to make the matter perfectly clear, let me name the various systems of control now in use together with a description of each. They are:

1. Synchronous control.
2. Progressive or modified progressive control.
3. Coordinated control.

These types of control have very definite meanings, at least to traffic signal engineers, and it is important that each system be thoroughly understood, together with the accomplishments and limitations of each system.

When the Traffic Moves Simultaneously

Synchronous Control means that traffic moves simultaneously on all north and south streets while all east and west traffic stops—followed by the simultaneous movement of all east and west traffic while north and south traffic is stopped. Such a system is accomplished by a very simple timing device, located at a central control point which may be varied as to total period of the traffic cycle and the split in each direction. The outside wiring is very simple and no controls are required at each intersection. Synchronous control may also be accomplished with synchronous motor timers located at each intersection, dispensing with the inter-connecting signal cable. However, with this latter method, it is not possible to vary the total period of the traffic cycle. Such timing devices, when connected to a common A. C. Supply line, will remain in step indefinitely.

Progressive Control is the simplest method of attempting to provide a continuous movement of traffic without the stops that are inherent in synchronous control. An ordinary synchronous system may be changed to progressive control by simply reversing the signal colors at the beginning of each traffic block. This is a straight progressive control system and is open to the objection that the split in time between north-south and east-west timing must be even. The total period may, however, be varied at will. The more up-to-date modified progressive control does away with this limitation and provides the same flexibility as the synchronous control. This may be accomplished by a duplicate set of interconnecting cables, connecting the signals of each alternate traffic block to corresponding cables, or by using a special progressive timing system consisting of a central station timer and sub-controls at each intersection. If no variation in the total period is wanted progressive or modified progressive control may be accomplished with synchronous motor controls at each intersection, dispensing with the inter-connecting cables.

Coordinated Control is the perfection of timing since it gives the utmost in flexibility. So far as I know, it originated here in Chicago and has since been used in several other places. With such a system the total period of the traffic cycle may be varied at will and the split in time between the north-south and the east-west directions may be varied for each and every intersection, if desired. The only limitation being, that the total period of the traffic cycle must be the same for all intersections. Here in Chicago this system of control was accomplished by means of a very elaborate central station timer and separate cables

running from each intersection back to the central control station. This made a rather expensive installation. Since the system was put in traffic control engineers have been working on the problem and have developed new control apparatus which will accomplish the same result with a very simple central station controller and simple sub-controls at each intersection, dispensing with all but a single cable between intersections.

Improvements in control systems are coming not so much in results accomplished but in the methods of accomplishment such as the reduction or total elimination of connecting wires.

The problem before any city is, therefore, the selection of the proper system of control to fit its needs. Off-hand, a city would be sure to select the coordinated system of control, owing to its extreme flexibility. Unfortunately the question of first cost and maintenance expense is a troublesome problem for most cities to face and the selection must only be made after a very careful study of conditions. The speed and density of motor vehicle traffic, the speed and number of street cars, the volume of pedestrian traffic, block lengths, width of streets, boarding platforms for street car patrons, right and left turning vehicles, parking, etc., all affect the selection of a system. All of this must be nicely balanced against initial cost and maintenance—and—against the phase of ever changing volume of traffic throughout the hours of the day—remembering always that the result to be accomplished is speed with safety.

A Real Need For the Traffic Engineer

It may readily be appreciated, then, that there is a real need for each city to employ a traffic engineer, whose sole duty is to study the problem from every angle. It is not a part-time job, nor is it a problem which will be solved for any fair-sized city in a day, a week, or a month. It is a permanent job for an expert.

Let me cite an extreme case where the most elaborate system of coordinated control will not work one bit better than the simplest synchronous system. On a narrow street, carrying one lane of traffic in each direction; where, due to parking, all traffic must follow the back of street cars and stop with the cars. The street car schedule, with its extremely variable periods of loading and unloading, will absolutely govern the speed of all traffic and upset any prearranged attempt at the continuous movement of traffic.

The one cardinal principle necessary for the continuous movement of traffic is the presence of at least one lane of moving traffic in each direction — a lane of traffic not affected by street car stops and not affected by other cars pulling into and out of a parking space. Unless there is such a lane for continuously moving traffic, no elaborate system of control will work.

One of the things most overlooked in traffic control is the number of vehicles in any given block. It is thought by some that the full block is ideal, but such is not the case. Let us assume for a moment a street with 400 foot blocks and cross-street widths of sixty feet from property line to property line, making a running distance of 460 feet per block. During the rush hours, when streets are taxed to capacity, an average speed of 12 miles an hour is good and 15 is the most to be hoped for, though the usual result is much less. To illustrate the point let us take 12 miles per hour as the average. If there are five vehicles in line waiting at each intersection the speed of get-away of these five vehicles will control the running speed of the street. Each standing vehicle takes approximately 15 linear feet of street and takes approximately two seconds to get started. At 12 miles an hour the first car in line will travel the 460 feet in 26 seconds; it will travel 460 feet minus 75 feet (the space consumed by the five

waiting vehicles) in slightly less than 22 seconds, or will before the fifth car in line has started. This applies to synchronous control of traffic.

With a continuous movement of traffic afforded by progressive or coordinated control the street loading is about the same. Vehicles moving continuously in line at 12 miles an hour will string out, each one occupying about 35 linear feet of space. Since, however, with the progressive or coordinated systems each alternate traffic block must be entirely free from running cars to allow for cross traffic, the figure of 35 feet must be doubled, thus allowing 70 linear feet for each vehicle. Seventy feet per vehicle will permit only six cars per block of 400 feet. (Actually there would be 12 cars in every other block). It would, therefore, seem that there is no great advantage for any system so far as effective utilization of street length is concerned. Actually, however, the average speed of cars under a coordinated system will be better than 12 miles an hour, particularly on streets which do not carry street cars, but the street loading of one car for every 70 linear feet is seldom bettered, since at higher speeds, vehicles require more rather than less space.

Uniform Traffic Laws

The crying need of the day is for uniform traffic laws and many states are now at a point of passing state-wide laws to apply to the control of traffic by means of electric traffic signals. The creation of such laws is a laudable ambition which, however, is utterly impossible of accomplishment, except at a sacrifice of individual city efficiency and safety, merely because what is excellent for one city may bring chaos in another, and what may be accomplished on wide streets, cannot be done on a narrow street.

Let us consider only two of the points which are under discussion in the formation of uniform traffic laws. First—when and how should the right turn be made? Second—when and how should the left turn be made? There is enough disagreement about these two points to show the uselessness of endeavoring to create uniform traffic laws. And yet uniform traffic laws are most desirable.

The right turn is made with the green light only or with either the green or the red light. Some cities permit it at any time—even when the amber light is showing. It is quite easy to say that the right turn should be made only when the green light is showing, and yet in some cities, like New York City with a very large number of very short blocks, traffic would soon become completely blocked were this rule enforced at all intersections.

Under ordinary conditions, with reasonable length blocks, it is far safer to permit the right turn only when the green light is showing—safer for pedestrian traffic and safer for vehicular traffic moving at right angles to the turning vehicle. The best law that could be possibly made for the right hand turn would be to permit it only when the green light is showing and only when the turning vehicle is in the lane of traffic nearest the right hand curb. When the physical layout of streets demands that the right turn be permitted on the red light also, that particular intersection should be clearly marked as an exception to the general rule.

The right turn is relatively simple—since there are only three or four ways in which it may be made. The left turn, however, presents a far more difficult problem. During the careful study of traffic, as governed by the three-color traffic signal, I have found 17 different methods of making the left turn. I'll not enumerate them but instead I'll cite a particular street condition which is all too frequently found in our cities and then apply to it the only rule for the left-

turn; and the right turn, too, for that matter; which may be applied. Assume a street which has just sufficient width for one lane of moving traffic in each direction. It may be a 20 foot street without parking or street cars, a 40 foot street with parking but without street cars, or a 60 foot street with parking and a double line of street cars—all provide just sufficient road width for only one line of moving traffic in each direction. On such streets, of necessity the left-turn must be made with the green light. No special signal for the left-turn may be used, for there is no place in which to store the cars temporarily awaiting any special left-turn signal.

With this in mind, the only uniform law which may be applied to the left-turn is to permit it only with the green light and from the lane of traffic nearest the center of the roadway. At that, such a law is reasonably safe, since the driver of a vehicle, approaching an intersection where a green light is displayed, has only one thing to guard against and that is the possible left-turn made across his path from the opposing parallel lane of traffic. And yet in a city like New York City, with its one-way streets, it is not the best nor the safest. New York makes its left-turns when the north and south traffic is stopped and thus all left-turns into and out, of the one-way streets are made without cutting any lane of traffic.

Color Sequence

Perhaps the place where a uniform traffic law is most needed is in the standardization of the sequence of color—the color of the lights to be used and the order in which they are to be displayed. At the present time there are about 20 different color sequences in use, some of which are good and some are bad. There is much debate at the present time over the amber light—whether or not it is necessary or even advisable. This argument immediately divides the signals into two main classes, viz: the three-color signal and the two-color signal. It is not the province of this paper to take sides in this argument, but rather to analyze the claims of both, hoping that the immediate future will settle the point.

Regardless of the number of lights per signal, it is universally agreed that traffic shall move on the green light and stop on the red light. It is only as to the change period that there is any disagreement.

The following Table 1 gives the color sequence in use with three-color traffic signals.

This table lists eight color sequences and when the double bell is used, four more are added to it. All twelve are in use throughout the United States. It will be noted that in all these color sequences the signal to go is the same and the signal to stop is the same. It is only in the change periods that there is any variation. For the purpose of comparison it is possible to eliminate those color sequences employing the bell, leaving only numbers 1, 3, 5, and 7.

Numbers 1 and 3 are the color sequences most generally used. Number 1, involving the display of colors in rotation without overlap was perhaps the original color sequence. It was superseded, in many instances, by number 3, having a complete overlap of the amber with the preceding signal. This change was made for two reasons; first, to prevent stopped vehicles from "beating the amber light" and second, to give immediately an indication of what color is to follow the amber. With this color sequence, traffic stopped by the red light gets the red and amber signals during the change period and is presumably held back by the red light until both these colors disappear and the green light is shown.

Of late, color sequences 5 and 7 are being used. Both are effective and both prevent the "beating of the amber" by stopping traffic, since those vehicles see only the red light during the entire change period. Of these two, number 7 is

COLOR-SEQUENCES WITH TWO-COLOR SIGNALS					
NO	FACES OF SIGNALS	"GO" NORTH-SOUTH "STOP" EAST-WEST	CHANGE	"GO" EAST-WEST "STOP" NORTH-SOUTH	CHANGE
1	North-South East-West	Green Red	Lights Out Lights Out	Red Green	Lights Out Lights Out
2	North-South East-West	Green Red	Bell Bell	Red Green	Bell Bell
3	North-South East-West	Green Red	Red Red	Red Green	Red Red
4	North-South East-West	Green Red	Red Bell Red Bell	Red Green	Red, Bell Red, Bell
5	North-South East-West	Green Red	Green, Red Red	Red Green	Red Green, Red
6	North-South East-West	Green Red	Green, Red, Bell Red	Red Green	Red Green, Red, Bell
7	North-South East-West	Green Red	Green, Red Red, Green	Red Green	Red, Green Green, Red
8	North-South East-West	Green Red	Green, Red, Bell Red, Green, Bell	Red Green	Red, Green, Bell Green, Red, Bell
9	North-South East-West	Green Red	NO INTERVAL	Red Green	NO INTERVAL
NOTE: Four other sequences are obtained by ringing Bell					
only at beginning and end of "Change Period." Crouse Hinds Co. K. W. M.					

COLOR-SEQUENCES WITH THREE-COLOR SIGNALS					
NO	FACES OF SIGNALS	"GO" NORTH-SOUTH "STOP" EAST-WEST	CHANGE	"GO" EAST-WEST "STOP" NORTH-SOUTH	CHANGE
1	North-South East-West	Green Red	Amber Amber	Red Green	Amber Amber
2	North-South East-West	Green Red	Amber, Bell Amber, Bell	Red Green	Amber Bell Amber Bell
3	North-South East-West	Green Red	Green, Amber Red, Amber	Red Green	Red, Amber Green, Amber
4	North-South East-West	Green Red	Green, Amber, Bell Red, Amber, Bell	Red Green	Red, Amber, Bell Green, Amber, Bell
5	North-South East-West	Green Red	Amber Red	Red Green	Red Amber
6	North-South East-West	Green Red	Amber, Bell Red	Red Green	Red Amber, Bell
7	North-South East-West	Green Red	Green, Amber Red	Red Green	Red Green, Amber
8	North-South East-West	Green Red	Green, Amber, Bell Red	Red Green	Red Green, Amber, Bell

NOTE: Four other color-sequences are obtained by ring Bell only at beginning and end of "Change Period"

CROUSE HINDI CO
K.W.M.

CROUSE-HIND CO
K.W.M.

the one more generally used. Either of these two color sequences give a clear, positive indication for the movement of traffic.

There is a sharp disagreement between those who advocate the three-color signal and those who advocate the two-color signal. Those latter claim the amber light is unnecessary—and in some cases confusing.

The color sequences in use with the two color signal are shown in Table 2. This table shows nine combinations, but four more are added by ringing the bell only at the beginning and the end of the change period.

Here again, the signals to go and stop are the same in all cases and also the same as with the three-color signal. For the purpose of analysis let us eliminate those color sequences involving the bell and consider only numbers 1, 3, 5, 7, and 9.

Of these, number 1 is the simplest to attain, but the "lights out" change period of five or more seconds is apt to be confusing and there is some question as to its meaning and legality. Number 3, having an "all red" change period is much better and yet has one rather serious objection: namely the sharp transition from green to red, displayed to moving traffic. Red is a positive command to stop and should be obeyed. With swiftly moving traffic it is impossible to obey the stop command immediately, since certain vehicles are just about to enter the intersection and could not be brought to a stop short of the cross-walk.

Vehicle drivers may know that the "all red" change interval is to last for five seconds and try to be guided by that, but it is most difficult to judge five seconds correctly and the main objection to this color sequence is that vehicles will be found entering the intersection after the five second change interval is up, since there is no clear indication of the duration of this change period to moving traffic. With color sequence number 5, the green and red lights are overlapped to moving traffic to indicate the duration of the change period, while stop traffic goes sharply from red to green. This color sequence is better than number 7, which indicates the duration of the change period to both moving and stopped traffic, thus giving stopped traffic an opportunity to start before cross traffic has completely stopped.

It would seem, therefore, that color sequence number 5 is by far the best of those obtainable with two-color signals, since it gives a distinctive change period to moving traffic, while holding stopped traffic with the red light. Its principal objection is that the change period involves the use of the two other signals, one of which, the green, is a positive command to go and the other, the red, is a positive command to stop.

Color sequence number 9 shown in this Table 2 has little or no value, since with it the change period is entirely eliminated. It was formerly used, but so far as I know has been abandoned everywhere.

Marking Intersections and Aligning Waiting Cars

I would like to bring one other point to the attention of this meeting and that has to do with the proper pavement markings, particularly at intersections. Paint is a wonderful aid to safeguarding traffic. On streets where there are no street cars, the marking of the center line does wonders to align traffic and keep vehicles on the proper side of the roadway.

Pedestrian cross-walks should be clearly defined with two lines, one in line with the curbing and the other in line with the property line. Cross-walks so marked will be more generally respected by both stopped and moving traffic.

One of the great delays in traffic is due to the incorrect alignment of stopped vehicles at intersections. Streets wide enough for two lanes of traffic in each

direction may be rendered less efficient by bad alignment. If the first car in line straddles the two lanes, the second car must wait behind it. If the first car goes into the proper lane the second car will be right beside it and when traffic starts, both will cross the intersection together. Therefore, to assist in aligning cars, traffic lanes should be indicated by white lines or some other means. If it is not possible to indicate these lanes throughout the entire length of the street, they should be marked far enough behind the pedestrian crosswalk to take care of the number of vehicles usually held by the stop signal.

One more thing may prove very helpful and that is a clear indication of the turning limits. If the center spots of the crosswalk lines, which continue the property lines, are marked with a single or a traffic button, it will materially assist in correctly aligning both left-turn and right-turn vehicles and thus eliminate much confusion at intersections.

Where the National Safety Council Can Help

If the National Safety Council is to fulfill the function which the general public expects it to fulfill, it must add to its already large staff of engineers, at least one competent traffic engineer for each state or regional district. It should be the duty of each such traffic engineer to study traffic conditions in the cities under his jurisdiction and be prepared to assist the local safety councils and city authorities in the solution of the problem. Each city should in turn employ a competent traffic engineer of its own, who should have complete supervision of all phases of traffic within the city, consulting with the police department, the city electrical department, the safety council, the city planning commission, and the engineers of companies making traffic signals and control apparatus. Only by some such procedure as this, can any city intelligently plan a signal system which will meet present conditions and permit extensions to take care of future demands.

It is quite a job to ask your organization to undertake, and yet there is no organization better qualified to undertake the task. You have the machinery—a national organization serving without profit and which is nationally respected. You have been useful and successful in so many other fields of endeavor, that I sincerely hope you will undertake this one. It will be a long, hard battle, for many cities have already installed signals, governing traffic with a multiplicity of conflicting laws. But, if we are to have that very desirable feature—namely, uniform traffic laws, with reasonable exceptions—we must begin immediately to attain it. Only competent engineers will solve the problem. There are already entirely too many amateur traffic experts who can only see one phase of the problem, and that none too clearly.

F. C. LYNCH (Kansas City Safety Council): We have an intersection where the traffic movement is about 12,000 per hour, north, east, south, west. The question is whether a light would work better than a circle.

MR. MACKALL: I don't like to pass an opinion on it until I see the intersection.

MR. LYNCH: What would be your suggestion if you used the light, would you use a center light with the lefthand turn inside the pivot or outside?

MR. K. W. MACKALL: I would use the left hand pivot. They can't be made simultaneous around the pivot.

MR. LYNCH: If there is chance for storing cars in the street, would you recommend a turn on the amber light?

MR. MACKALL: I don't like any movement of traffic on the amber light. If there is any chance to store cars on the street make them turn when the signal turns either ahead of or following cross traffic.

There is one thing I would like to bring out here. Regardless of what signals or what orders you give for the change interval, unless the city authorities or police force make it clearly understood at the outset that that change period must be respected, you are going to have careless drivers beating the amber light or beating the change signal. In some cities they are very lax. In other cities if you attempt to beat the amber light it means a trip to the police court. Until cities let it be known that any violation of that change period means an arrest, you will not get the full advantage of that change period. The change period to my mind, whatever signal is given, is the heart of safety in mechanical or electrical signalling.

F. M. ROSELAND (Newark Safety Council): I would like to ask the speaker how the traffic control lights are used in the pedestrian control.

MR. MACKALL: Any traffic signal system which doesn't take care of the pedestrian is not doing its full duty. Pedestrians are a large part of the traffic problem; I may say here a major part. Pedestrians who get off the curb, stand out in the street a few feet or dodge between vehicles, are not only endangering their own lives but they are endangering property and they are materially slowing up traffic. Some people advocate a very long period to permit pedestrians to walk. The length of the pedestrian period is not of real great importance, because your pedestrians come continuously, they are moving all the time on the sidewalks, they are approaching that intersection and all the while the pedestrian period is on they are going to walk. If the pedestrian period is 10 seconds and some fellow takes the first step off the curb at just the end of that period, he is going to try to complete his journey. The pedestrian period if it were properly observed would mean that no one should step off the curb after the amber light has been shown or the change period.

Walking With the Green Light Is Safe

Pedestrians are reasonably safe walking with the green light, particularly if the laws read that all turns should be made on the green light, because then the pedestrian knows exactly what to expect. He is about as safe under that ruling as any ruling at all. There are elaborate traffic cycles which will give a special signal for both right and left turns, a separate time for pedestrian control, which will absolutely give safety, but any of those is going to slow down your vehicular traffic so that a city will not tolerate them at all.

Perhaps the best pedestrian controlled city I know of is Dallas, Texas. In order to enforce the regulation which was very new, they got the boy scouts with their staffs at each intersection. When the traffic changed they held their sticks out in front of that line of traffic. When the traffic changed again they walked around to the other sidewalk. After a period of about two weeks and several arrests, they put the fear of God enough into these people of Dallas that today when you walk in Dallas you don't see a single person put their foot off the curb. They move only with the green light. If you attempt to step off the curb Mr. Cop will put you back. The boy scout idea was a good one.

The point I would like to make if you are contemplating putting in pedestrian control is at the very beginning let it be known that it is going to be enforced and you will have no trouble. The short traffic cycle will help.

CHAIRMAN COLLADAY: The next speaker, Mr. W. B. Powell, is consulting traffic engineer to the city of Buffalo as well as chairman of the Committee of the American Engineering Council which is studying the subject of signs, signals and pavement markings for the purpose of preparing a national standard. This work is being done under mandate from the Hoover Conference and in cooperation with the National Safety Council and others.

Progress Toward Standardization of Signs

W. B. Powell, American Engineering Council, Buffalo, New York

There is no feature of the traffic problems that has so completely impressed everyone as the tremendous confusion in the traffic signs, signals, and markings that we depend upon to control traffic in the different cities and towns of our widespread country. At the time of the Second National Conference on Street and Highway Safety, which was held about a year ago, this was one of the outstanding points that developed in the discussion. When the Conference set up a series of sub-committees to carry out various functions, made a proposition to the Committee on Metropolitan Traffic Facilities that if they felt that something could be accomplished in that direction, the American Engineering Council, which I had the honor to represent and which is a national body composed of engineering societies throughout the country, would be willing to undertake to carry forward an investigation in that direction, with the hope that eventually we might develop a standard code of practice.

The entire committee and later the entire conference accepted that offer with a considerable degree of enthusiasm, and as a consequence we set about such a research effort. We appointed, as we generally do in such matters, a committee of some leading traffic engineers of the country, and after several months of correspondence and work we developed a sixfold questionnaire, two questionnaires on each one of the three fields. One of these in each case was simply a statement of the facts of existing practices; the other was a statement of the experience that each community had had with the various devices and particularly their reasons either for approving of certain devices or for having abandoned them because of there not being satisfactory. It was our thought that the experience part of the program would be of greater help in developing a code of standard practice than the actual development.

We all know that when we send out questionnaires, nine times out of ten we get very little real value from the returns. We knew before we began that if we wanted to get any real facts of value in this investigation we would have to pursue some extraordinary method of getting those questions answered in a satisfactory manner. Before we sent them out at all we sent to our member engineering societies, and also in cases where there were no existing engineering societies, to the local safety councils or to the local chambers of commerce, or to the local automobile clubs, and we succeeded in each place where we were going to send the questionnaire for answer, in developing a local committee of men, either engineers or those that were related to the traffic problem in such a way that their judgment would be worth having, who assumed the responsibility of seeing to it that those questionnaires were adequately answered. Then we sent them out.

We attempted to canvass altogether about 200 cities, and up to the present time we have had returns from approximately 100 of those cities, and in those we have all of the principal cities in the United States, with one exception. In addition to that, we have cities of varying size, clear down to a few small towns of not more than 10,000 or 15,000 inhabitants. These cities are scattered throughout the country so we have a fair cross section of the traffic practice of the entire country, including all the varying conditions that have to be met in the different places.

That data was secured during the past spring and early summer. We have had some people at work in Washington during the summer compiling the information in large tabulations and getting it into shape so that our committee could get something out of it. Just recently we have reached the stage where we have gotten statistical tabulation done; we have developed certain general conclusions and have undertaken to prepare a tentative report of recommendations.

While we must take into account the fact that a majority of the cities are

doing a particular thing, and have organized it to the best of their ability and their circumstances, we have to take into account in some cases the fact that the development of the art has shown that those particular practices are not the best.

Throughout this whole work we have been attempting to develop a code which would represent the best possible practice, and in doing that in a field that is developing as rapidly as traffic control has developed in the last few years, you have to be very alert to see that you do get the very latest and best scheme in each individual case. We are not yet prepared to present the result of our findings to the public.

There are two or three items of research that we think are deserving of more attention than they have ever received by any community. I have in mind the obvious fact that most communities today are beginning to suffer from oversignalization. I think you will all agree with me that most of our American cities today have too many signals rather than too few, and particularly the smaller cities and the rural communities are oversignalized. I don't mean to say by that that signals have been put at places where there is no need for them at all. But I do mean to say that signals are frequently put in places where the need for them is very occasional, once a week perhaps, or once a day at the most, and that at other times the use of the signal at that particular place is a detriment rather than a help, even for the preservation of safety.

Bad Time Cycles May Be Found In the Country

I frequently come in contact in my state, in the rural communities, with a signal at a country cross road at which during the time cycle there would be no other vehicle in evidence at all but my own. Of course, that is not a good condition to have because the tendency is to encourage the motorist who is impatient to go on with his journey, to violate the signal. Frequently he gets into a state of mind where he exercises his own judgment. I am gratified to say in general at the present time our American motorists are obeying the signals very well indeed. A great mass of them do observe signals even when there is no particular reason why they should. If we continue to install signals we are going to arrive at a time when there will be a very strong public reaction against it. Our committee feels that this is the proper time for a definite research to be made as to what volume of traffic justifies the use of a traffic control signal, and we are hopeful that through some field investigation which we expect to inaugurate almost at once, we can bring forward a recommendation on that point which, if observed, would change the current practice to signal operation only at such time when the traffic volume is sufficient to warrant it. At other times it would go out of service.

That seems the most hopeful way of meeting the problem unless our friends, the signal engineers, will develop a timing device which will operate the signal on small volumes of traffic and large volumes. I know that that involves some very difficult electrical and mechanical problems. I am not particularly hopeful they will get it, although some efforts are being made in that direction. If we can't develop a timing device that will measure the volume of traffic the necessary thing is to arbitrarily cut out the signal at the time when the volume does not justify its use.

That is one of the several problems we have undertaken to get some real scientific data on, so we can make a recommendation that is worth while. The outcome of our work if it is as successful as we hope it will be, will be substantially this: Mr. Hoover last winter recognized not only this confusion as to signs and signals and markings, but also the great confusion in city ordinances, and so he established a committee for the drafting of a model city ordinance to supplement the model state

law which was already well in the course of its advancement toward adoption by the various states of the country. That committee divided up into subcommittees and appointed our American Engineering Council Committee as one of their subcommittees. When we get through with this job our first duty will be to report back to the Hoover Committee such features of our work as have to do with the drafting of a model ordinance. That, I think, will happen some time during the next few months. Then our next move will be this: Having gotten our proposed standard code into what we think to be its best shape, it is our expectation to go to the American Engineering Standards Committee, and to promulgate the code as a code under their jurisdiction. In other words, it will come out under the authority of the American Engineering Standards Committee as well as the American Engineering Council.

The Hoover Uniform Vehicle Code

I have a strong expectation that another conference will be convened next year, at which time this model city ordinance will come up for final adoption. Also, our proposed uniform code of practice will be offered for adoption, and should that prove to be the ultimate result we would then go before the country with this code with the authorization of the Hoover Conference behind it as well as the engineering bodies that have directly sponsored it. It is a pretty tough job to get all of the American cities to adopt the same practice in traffic control when each one of them thinks the method they have developed is the very best, and where in many cases it might involve the sacrifice of a considerable volume of equipment that has cost real money. Nevertheless, we are encouraged to believe, in the light of what has been done by the states so far in the adoption of the Hoover Uniform Vehicle Code, in the course of reasonable time we can expect the cities to gradually change their practice as they have to make renewals or modify their plans one way or the other, and to move in the direction of the Standard Code.

Take the question of signs, for instance. Signs as a general thing are not permanent; they deteriorate quite rapidly; they are frequently spoiled in one way or another. It wouldn't be a very difficult thing if the cities in making renewals should adopt a standard that we propose to find, so all cities within, say a period of five years, would come around to the standard signs. That is equally true as to markings, because markings deteriorate the most rapidly and have to be renewed more often.

When it comes to signals our problem is much more difficult. Nevertheless, even there, while there are a great number of different time cycles in use the variation between them is not so very great. They are all attempting to accomplish the same thing and the method they go about doing it is one of minor detail rather than of principal importance. I am hopeful that even in that field we can get sufficient concessions from one source or another so that as time goes on we can get a practically uniform system of signals. If that can be accomplished in a period of ten years the result will be so tremendously helpful that every driver of a motor car will have had a real service.

E. R. FARRA (Grand Rapids Safety Council): I would like to know if there are any other cities of any considerable size in the country that are making the right-hand turn on the red light, outside of a few in the state of Michigan.

MR. POWELL: I can't answer that question. The secretary of our committee has all of the tabulations of the questionnaire with him and if you will see him after the meeting I am sure he will show you the tabulations and show you just exactly what all the cities are doing. The great mass of opinion among the cities we have canvassed is in favor of going on the green alone. Buffalo used to operate on the red and now is operating entirely on the green, much to our satisfaction and to the

betterment of the safety of our citizens, having less accidents than they have had before.

T. G. BRABSTON (Birmingham Electric Co., Birmingham): In Birmingham the street cars turn right on the red; automobiles do not. As a result, there have been practically no collisions.

MR. POWELL: I can easily see under certain circumstances that a special movement of that kind is the best solution you can get, and in our attempt to draw a standard code of practice we naturally would not attempt to cover any special cases; we would only be able to go so far on a standard intersection under average conditions. Then you have got to apply that as best you can so those very peculiar conditions which are local in their character can each be treated as a separate problem.

CHAIRMAN COLLADAY: The next thing on our program this morning is a debate, the subject being "Should the Speed Limit Be Abolished?" The affirmative is to be handled by Mr. John N. Mackall, Chairman of the State Roads Commission of Maryland, who is one of the best known state officials interested in the highway traffic situation. He is a believer in the abolishment of speed limits on highways and the substitution of a general rule prohibiting reckless and unsafe driving. Mr. Mackall!

Debate—Should The Speed Limits Be Abolished?

The Affirmative Presentation

John N. Mackall, Chairman and Chief Engineer, State Roads Commission of Maryland, Baltimore, Md.

Today marks the greatest progress which has so far been made toward the efficient and satisfactory use of the highways. The very fact that this National Safety Council is willing to have discussed the matter of increased speed, in itself, marks great progress in bringing this about. Those of us who believe that orderly and efficient movement of vehicles over the highway is essential in the development of highway transport, and who believe that this can be brought about only by the abandonment of the present ridiculous speed requirements, have been greatly handicapped because of the fact that whenever even an argument was made in favor of it, the opponents took the position that we were in favor of the killing of more people.

I remember only a couple of years ago, when I attempted to discuss briefly the matter of abolition of minimum speeds before the Hoover Safety Conference, I was not mobbed, simply because no one felt like doing bodily injury. Those at the Conference for the most part, however, did think that it was necessary in the interest of safety to give a pretty good "panning" to any man who would dare to speak of the thing most sacred to them, namely, the maintenance of present speed limits. When I finished talking it seemed that every one in the room wanted to answer me, and those who were permitted to do so pointed to the man who was willing to sacrifice human lives to save a few minutes of time. They entirely missed the point and most of the advocates of the retention of the present speed limits have also missed the point.

A few figures are necessary to show the magnitude of the highway transportation system of the nation. For these, I am indebted to the Bureau of Public Roads and to the National Automobile Chamber of Commerce. I am sure the figures which they furnished me are accurate and serve the purpose and I wish to express my appreciation for their courtesy in furnishing me with them.

The public highway system of the nation, exclusive of city streets, is composed of 3,006,000 miles of road, of which only 521,260 miles have been improved with any kind of surfacing and of these 360,518 miles are gravel, so that we have 160,742 miles of improved roads of macadam or better. The value of the right-of-way and improving of all the highways is in excess of ten billions of dollars. The state highway departments expended \$621,744,210 for the construction of 19,492 miles of road in 1926. The counties, towns and townships brought the total expenditures up to \$1,288,939,707, so that it will be seen that the expenditures for roads aggregated more than one and one-quarter billions of dollars in 1926, which is a very sizable sum of money.

On the other hand, the paving of but less than 20,000 miles of the main roads of the nation shows that great progress is not being made in the construction of the highway system. At this rate, we are just about providing parking space for the new cars. As a matter of fact, the addition to the highway system is slightly in excess of one-half of one per cent of the total mileage of the nation yet to be completed, at which rate it will take 200 years to complete surfacing these highways, but long before this is reached the sums needed for maintenance will equal the total resources available for road construction.

Highways Not Keeping Pace With Automobile Construction

Now, if we turn to the figures of the motor vehicle industry, we find that they are certainly impressive in their size and it is evident that the highways are not keeping pace with the automobiles which are being placed upon them. There were registered in 1926, 19,237,171 passenger cars and 2,764,222 trucks, having a combined value of twenty billions of dollars. We find in the same year that there was produced and sold 3,936,933 pleasure cars having a wholesale value of \$2,730,385,507, and 491,353 motor trucks having a wholesale value of \$433,371,169.

The accessories and tires for these vehicles amounted to another 200 millions. It seems quite evident that the so-called saturation point has not been reached and the problem of moving vehicles over the highways is greater today than ever before and is likely to become greater and greater as the years go on.

The total deposits of all banks and trust companies of the United States for 1926 were \$52,499,960,000. Of these less than eight billions were in the Mutual Savings Banks. The value of automobiles and trucks of 20 billions is two-fifths of the value of all the bank deposits and two and one-half times as great as the savings banks, and is one of the greatest businesses of the country.

In highway transport we have invested, as I have shown, more money in public roads than we have deposited in all of the savings banks of the nation. We have invested in vehicles to run over these roads twice as much money as we have invested in the highway system. We have an automobile in the hands of every 6.1 persons in the United States. We have a business that virtually affects the health, prosperity and happiness of every man, woman and child. Certainly it behooves us to make the maximum use of these facilities. It seems to me quite remarkable that a business of this magnitude should not have the sympathetic regulation which it deserves. It seems to me incredible that those charged with the regulation of this great industry have made no study as to how it can be most effectively, efficiently or safely used. Simply because, in the natural operation of a business of this magnitude, fatalities will occur, distressing personal injuries will occur, is no reason for the arbitrary curtailing of the entire industry. This is exactly what we have permitted to be

brought about by the police officers who are charged with the regulation of this traffic.

In the matter of saving of human lives, I yield to no man. I maintain that you cannot measure human lives in dollars and cents; but I do claim and I think can prove that there is little or no relation between the speed limits which are promulgated and attempted spasmodically to be enforced and these accidents. On the other hand, I think it can be shown quite clearly, and it has been my observation over a large number of years, that the reverse of this is true. I have seen and had reported thousands of accidents. I do not remember one in which speed was a factor when some other form of reckless driving did not contribute. On the other hand, I have had reported hundreds of accidents when reckless driving was the important factor and when the element of speed did not enter into it.

Before we get too far into the discussion of speed limit, let us see, first, what the speed limit is; second, why it was enacted into the laws of every state, city and town; third, what effect it has had on the safety of persons using the highways; and, fourth, why it should be so religiously guarded.

Speed Limits the Idea of the Police Official

In the first place, the speed limits were originated and are now in fact an arbitrary statement of what some police official believes to be a safe speed. It was arbitrarily arrived at to represent the police mind's belief that a slower speed than had been theretofore used was desirable. No attempt was ever made to prove that a speed of 15 miles an hour in the built-up parts of cities and towns and of 20 miles an hour in the outlying sections and of 25 to 35 miles an hour in the open country were in fact safe speeds, were speeds at which fewer accidents were likely to happen than at higher speeds.

I am not finding a great deal of fault with the original enactment of the maximum allowable speeds. When they were enacted, the automobile was to some a source of pleasure—to most a source of nuisance. It played no part in the industrial, commercial or social lives of any community. If it were slowed up, it made no particular difference to any one. It caused no congestion and did not cause one vehicle to interfere with another. I am, however, finding fault with the fact that we have permitted without change these speed limits to be the guiding factor in the motor vehicle regulation, while we have developed the automobile from a nuisance to a necessity; while we have developed it from an instrument in the hands of a few to an instrument in the hands of virtually everybody; when the slowing up of one vehicle means the slowing up of a long line of vehicles, and when this is likely to produce congestion resulting in serious inconvenience and menace. The effect of this regulation has been to slow up the traffic until it is an admitted major governmental problem in every city and town in the United States. It has slowed up traffic until in addition to causing congestion in the cities and towns, it is causing congestion and unsafety on all of the main highways of the nation. If this is a fair statement of the cause and the effect of speed limit regulation, I think we are safe in saying that a change is needed.

If the change is so urgently needed, you naturally ask, why is it not made? The answer is as simple as the question itself. It is not made because there are two groups of people who want to retain them. First, the policemen; and by policemen I mean the entire police authorities of the nation from the commissioners in the big cities and of the state police force to the one-man police force of the little town. They are demanding its retention because it gives them a yard-stick by which they can be assured of convictions from arrests.

Second, it is retained because of numerous individuals and groups of the American public, who have become alarmed at the increase in number of fatal and serious accidents upon the highways and who are demanding some relief without any knowledge of how this relief may be obtained.

At the last Hoover Safety Conference in Washington it was stated that in street and highway accidents for the preceding year, 23,300 persons had been killed and 600,000 had suffered serious personal injuries; that the actual money loss from these accidents aggregated 600 millions of dollars, and that the economic loss due to inadequate use of the highway runs into the gigantic sum of two billions of dollars.

It is my belief that the Hoover Safety Conference has done a tremendous amount of good in focusing public attention upon the enormity of the street and highway accident problem. It, with the National Safety Council, has done all that has been done to bring about safety upon the highways. This is a rather broad statement, but I think a true one. It is, and it is intended to be, a criticism of the police authorities for their lack of vision and lack of intelligent handling of the highway transport matter and of the very closely allied subject of street and highway safety. It is a fair statement that until the Safety Council and the Hoover Conference began advocating a study of the causes of accidents no police organization had made any attempt to determine the causes, and it is further a fair statement that no police organization is very effectively or efficiently doing this today. We have thousands upon thousands of persons engaged in the regulation of one of the biggest industries in the country, none of which have given any intelligent thought as to the cause of the accidents—none of which have ever made a study to determine the causes of the accidents—yet are attempting day in and day out to apply a remedy. Obviously, the remedies are going to be highly, if not totally, unsatisfactory, because they are attempting to remedy something the cause of which they have not the slightest idea.

Observance of Speed Regulations a Dead Letter

I said a moment ago that the police used the maximum speed solely for the purpose of obtaining arrests and convictions. I think this is a fair statement, because it is my observation throughout many parts of the United States that no attempt is in fact made to require the public to travel at the prescribed maximum speeds. On the contrary, I believe that no man or woman ever operated an automobile in a city for a consecutive period of 30 minutes without many times violating the prescribed speed laws. I believe further that no experienced operator ever operated a car, save for the time a policeman was actually looking at him, at any given speed because it was the prescribed one. He operated his car at a speed which he believes to be safe, irrespective of the prescribed speed. If the police believed in the speed limits which they insist upon placing on the statute books, then they should believe in their enforcement for the safety of the public. The police even do not regard the speed limits seriously, except at the time that they want to make an arrest and be assured of conviction.

You might, obviously, ask why, if no person obeys the speed limits, I should favor their abolition. I think the fact that nobody obeys them may in itself be sufficient cause for their abandonment, but I think the effect is tremendously more far-reaching than this. The police mind is in education, training, temperament and tradition, a mind which runs on a single track. The mind of the traffic policeman seems to have a well defined groove in which it runs. He believes that all traffic should be made subservient to his will, but he is in no wise a servant of the people—that traffic shall be operated according to his

judgment and not according to any rules of safety or of satisfaction. It has never occurred to him that after he has performed his first duty, which is the interest of safety, that the second and perhaps equally important duty is expediting the movement of traffic at a given point. It has never occurred to him that it is not his duty to compel traffic to obey his arbitrary rules, but that he is placed there in order that flexibility rules may be given solely in the interest of the traveling public. Many times I have seen a traffic policeman stop a vehicle going in one direction when there was no traffic visible in the opposite direction, simply to show that he had the authority to do this. The whole frame of mind of these police seems to be that they are in complete control and that the more arbitrarily they render this control, the more satisfactory will be their services to their superiors. That they are acting in the interests of traffic to expedite traffic never has, and as the police forces are constituted, never will occur to them.

Arrest Too Often Is For a Minor Infraction

I have seen policemen, and I am sure many of you have seen policemen, overlook the most glaring cases of reckless driving upon the highways, but make arrests for some minor infraction of the arbitrary speed law, when no question of safety to himself or others had been raised. I make the statement as my belief (because there is no way to prove it) that not one arrest is made in each one thousand cases of reckless driving which come to the direct attention of the police unless there is an accident involved, or in other words, that reckless driving, unless an accident results therefrom, is never a matter in which the police show any interest, or is ever brought to the attention of the offenders, and this despite the fact that this reckless driving causes most of the accidents.

I favor the abolition of the speed limit because in doing so we will remove the groove in which the police mind runs. We will make it necessary for him to go out and look for the real menace to street and highway safety—reckless driving. There is no difficulty in making arrests or in securing convictions for exceeding the speed limit, because practically all motorists do exceed them many times a day. It may be, and I think is, far more difficult for the policeman to convict a man of reckless driving. However, if a speed of five miles an hour in excess of that allowed by law is not dangerous, and reckless driving, as such, is dangerous, isn't it essential that we concentrate the police mind on this question of reckless driving? Simply because it is more difficult to obtain convictions is no reason for abandoning this regulation.

If we assume, and I think we should for the sake of argument, that the maximum speeds were prescribed because they had something to do with safety on the highways, we must immediately be confronted with the fact that the same safe speed cannot be prescribed for all types and makes of vehicles. If we assume that 15 miles an hour in the built-up parts of cities and towns and 20 miles an hour in the outlying sections was a reasonable limit only five years ago, we are forced to the conclusion that it is an unreasonable one for many cars today. Take any standard make and model of automobile; it is much safer at any given speed today than it was five years ago; two wheel brakes have given away to four wheel brakes; small tires with small braking resistance to the road have given way to large tires with large braking resistance; high center of gravity, likely to overturn, has given way to low center of gravity. Many of the standard cars today can stop quicker, operate better at 30 miles an hour than the same make and model could have at 15 miles an hour only five years ago. The cars of one make are much easier to stop than cars of

another make, but the same make of cars of different types have different degrees of safety at different speeds, and, indeed, the same car in the hands of a more efficient or less efficient operator become more or less safe. It seems quite obvious, then, that we cannot prescribe maximum speed limit unless we prescribe it for the poorest type of car in the poorest mechanical condition in the hands of the poorest operator. Does anyone believe that the American public is going to operate their improved motor cars at the speed thought necessary only for the oldest and almost obsolete type of car in the poorest mechanical condition? As a matter of fact, it is a fair presumption that the speed limit was adopted as a guide to the distance at which an automobile will be able to stop. It has been suggested that, in lieu of minimum speeds, we require all automobiles to have the ability to stop within a definite limit. This seems to me to be a step in the direct direction. The ability of cars to stop depends upon their design and on their condition. The condition of the brakes is a tremendous factor in the safety of the automobile, and yet I know of no place in the country where police-controlled brake-inspection stations are established and maintained or where the police and the owners make any effort to find out whether or not their brakes operate efficiently.

Unfortunately, the vast majority of the public, who have made no great study of street and highway safety, have taken the police judgment for their judgment. It is but natural that they should. Few of them realize that the police have made no study and have not determined at all the causes of street and highway accidents.

The Greater Question Involves Safety

The operator of the motor vehicle has unconsciously or subconsciously developed to the point where he thinks as does the policeman. Because the policeman, in attempt to make arrests, only looks for the man violating the speed law, so does the motorist try to protect himself from what he considers most unreasonable arrest and conviction for these violations. In concentrating his efforts on protecting himself from arrest for speeding, he does, in fact, lose sight of the greater questions involving safety. Both of them, in concentrating their efforts on the question of speed, have done a great deal to divert attention from the question of reckless driving, and the motorist's mind has come to follow the groove of the police mind. If the only thing we could do by the abolition of this speed is to abolish the groove in which the police mind runs, it, in itself, would more than justify what anyone would consider the loss from the abolition of the maximum speeds.

A fair sample of how the public takes its cue from the police mind, regardless of how warped or wrong it may be, is shown by an address which Mr. John Hertz, of Chicago, made before the last Hoover Safety Conference. I am sure I need not tell you that Mr. Hertz is one of the great business men of America today. He has built up a great industry, dealing in motor transport, and he has at the same time overlooked no opportunity to help in matters of safety. He is one of the outstanding figures of America, who stands always by safety first, yet his misconception seems to go very far because he has taken the continuous cry of the police as a fact instead of thinking for himself. In speaking at the Safety Conference, he said in part as follows:

"The mad, unrestrained rush to get some place is only a delusion on the part of the driver and is the cause of most accidents. We recently proved that. In our city we made a test of the time it took to travel from the South Shore Country Club to the Congress Hotel—a distance of about eight miles—first at 20 miles an hour and then at 35 miles an hour. With

such precautions as were absolutely *necessary* for safety, the difference in time was only four minutes, as I recall. But the difference between 20 miles an hour and 35 miles an hour, *with respect to safety*, on a crowded boulevard, is past calculation."

In the same address he said:

"I spoke a moment ago of simplifying traffic regulations for the motorist. It was our privilege, in Chicago, to contribute the system of stop signals in use on Michigan Boulevard, for the reason that we thought it would be a good thing for the public and a good thing for the Yellow Cab Company and Yellow Drive It Yourself Company, in which we are interested. We had no idea how good this would prove to be. We learned, however, quite by chance from the superintendent of a large hospital that the accidents caused by motors and brought to the hospital for first aid, *had decreased 65 per cent* since the installation of the synchronized traffic lights on the boulevard. I confess to a thrill of great satisfaction in thinking about the number of accidents prevented, and the actual number of lives saved through this system. And I will be candid by telling you that it has saved us a lot of money."

Properly Regulated Traffic Is the Solution

What Mr. Hertz said he was going to prove was that the mad, unrestrained rush to get some place was the cause of most of the accidents. What he was going to show was that the difference between 20 miles an hour and 35 miles an hour with respect to safety on a crowded boulevard was past calculation.

Now, just what does Mr. Hertz prove? Not this at all! What he proves is that the *regulated* traffic may move a great deal faster than unregulated traffic and with a great deal more safety. What he proved was that by simultaneously effecting regulations and by increasing the speed on the boulevard from 20 miles an hour to 35 miles an hour (and I think, in many cases, 45 miles an hour) he decreased the number of accidents 65 per cent. I am sure Mr. Hertz does not mean to argue that traffic on the boulevard actually moved at anything like 20 miles an hour. If he did mean to say that, we all know that it does move from 35 to 45 miles an hour, but with orderly regulation we eliminate a tremendous number of accidents and save a tremendous number of lives. No motorists think that the regulations on the Chicago boulevard are unreasonable and they are accepted as solely in the interest of safety. Parked vehicles are eliminated from the travel way. Right-of-way is always maintained on the boulevard over other streets. Right and left turns are made from proper lanes and at proper times and high speeds are not only permitted but demanded, and by doing so we make them safer than before by 65 per cent.

Whether we want to or not, I think it is necessary to recognize the fact that the American public is not going to go slow. Indeed, it seems to me that we have gotten to the point where human life is the cheapest commodity of the world. Just remember that only a month ago nine persons, one of them a girl, set out from California to gamble their lives against a few dollars and the plaudits of a few people that they could hit a speck in the Pacific Ocean, 2,600 miles away. Five of the nine lost the gamble and disappeared and within a few days their names disappeared from the press. A week later, a fine, courageous fellow set out to fly to South America. I am told that his only equipment for the flight was a good fast aeroplane. He did not even have a map and of course he disappeared somewhere en route. Who in the room knows this brave fellow's name at this time? Only a week later three people set out from New York City to fly to Rome. For some reason they flew a few hundred

miles out and actually made no more ripple in our daily lives than they made in the Atlantic Ocean when their plane dropped.

I do not mean to illustrate from this that we are to go on taking toll of human life. I think we should not, and I think every preventable automobile accident should be prevented, but I do mean to illustrate that when we try to prevent accidents by making vehicles move at a speed which the vast majority of people believe is unreasonable, we are bound to have a failure from this; and failure from this, we have demonstrated, means failure from many other things which make for highway safety.

If the police would enforce the present maximum speed, if the public would be required to operate their motor cars at the present maximum speed at all times, there would be sufficient sentiment within one week to demand a change in these laws, because the public for the most part does not know of their existence, except in a most indirect way. Because the public knows that they were enacted for some other motorist and not for them, they have accepted them because they have disregarded them. In the disregarding of this law, they are very lavishly bringing up a disregard for all other motor vehicle laws, some of which are essential for safety upon the highways. This in itself, I think, is sufficient reason for their abandonment.

Present Right-Of-Way Rules May Be Obsolete

The greatest single menace to the operation of motor cars is not a violation of the law, but compliance with them. I refer to the present obsolete right-of-way rule. I strongly urge the immediate abandonment of the present right-of-way requirements and substitute for them the boulevard system of rights of way. The main lanes of traffic in the country and in the city should be operated so as to make the maximum use of them consistent with safety. This cannot be done with the present right-of-way law, and it can be done with the boulevard system of right of way. I think it is wholly unreasonable to expect a man operating a car in the open county or in the city to always give the right of way to vehicles coming in from the right. In the country there are many cases where a driver has no way of knowing that there is a road approaching from the right. The boulevard system of right of way becomes a success only with adequate marking on all intersecting roads, advising vehicles that they must come to a full stop and with suitable control at the intersection of boulevards. It has been my observation that many more accidents are caused from failure to give right of way than from any other one thing in connection with motor vehicle operation.

Now, in conclusion, I would like to say that some way must be found to eliminate the drunken driver. All of our regulations, all of our laws, all of our cautions come to nothing with the man under the influence of liquor at the wheel of an automobile. Since everybody wants him eliminated, I will not take time to discuss the havoc he can bring to traffic. Suffice it to say that he must be eliminated.

There are really only a few rules necessary to greatly reduce the number of accidents occurring on the highways. Speed is not one of these. If the driver of an automobile felt that the road ahead of him was and would remain reasonably clear of obstructions, the fear of greater speed on his part would be greatly reduced. If he was sure that there would be no parked vehicles in the line of traffic, if he was sure that no vehicle would come out from an obscure side road at high speed, simply because it had the right of way, and if he were assured that the driver in front of him would only make a right or left hand turn from a right or left hand lane, he would not be afraid to drive at a reason-

able rate of speed, and he could do so with the maximum of safety. If we will do just these things and forget about speed, if we will remove the groove in which the police mind runs, and with it the motoring mind, we will immediately greatly reduce the number of accidents. We should certainly reduce them as greatly as they have been reduced on the boulevards of Chicago.

When we are reducing the number of accidents, we will be greatly increasing the use of these highways. It is essential that both of these things be done to prevent the breakdown of the highway transportation system of the nation. It is necessary that some change be made and made quickly, and the outstanding need seems to be the elimination of the ridiculous speed limits provided at the present time.

CHAIRMAN COLLADAY: The negative of the debate this morning will be taken up by Mr. Walter J. Mattison, Assistant City Attorney of Milwaukee, who is a firm believer in the fact that there should be a speed limit.

Should The Speed Limit Be Abolished?

The Negative Presentation

Walter J. Mattison, Assistant City Attorney of Milwaukee, Milwaukee, Wis.

I have been a driver on the roads of the United States, going from coast to coast. I have for the last ten years driven on the highways of Maryland and I don't blame my good friend, my opponent, for desiring to abolish the speed laws when you have roads such as they have in Maryland.

I don't quite agree with his view of the members of the police department and their methods of enforcing laws. As a newspaper man and as a lawyer in private practice, as a prosecuting attorney and as a man who has been very close to the police department for the last 20 years, I would like to say that in my opinion his conception of what the police officer is today is erroneous.

We have just finished a course of instruction in Milwaukee. We had a safe drivers' school and I wish I could take all my time telling you about it. All of our traffic officers attended that school. We had as many as 2,200 people present at a single session and we had an enrollment of 1,400 who attended five out of six lectures. In addition to that, we had a woman driver's school, and they inform me that the average attendance in which they actually discussed safety methods, was 1,100 for four sessions. The police department of the city of Milwaukee cooperated in every way, furnishing lecturers—think of it!—for the safe drivers' school, telling people how to drive along the roads in a safe and sane way.

I happened to be driving on one of our roads the other day and a police officer stopped an automobilist. I came up to him, I knew him, and listened in. The officer said, "You were going 40 miles an hour, and in view of the fact that the road is wet that wasn't a safe speed, but," he said, "there is one thing in your favor, you slacked up at street intersections. In other words," he said, "you are not a reckless driver, but you are a bad example on the road, because some of the other drivers on the road who are not capable of exercising the same judgment you are exercising, may take you as an example and create a hazard on the road."

Wasn't that a splendid way of handling what might be a difficult case? It shows that the police officer was there for the purpose of instructing the motorist and not there for the purpose of making arrests or arbitrarily making arrests. We in Wisconsin like to point out the fact that we get through Zion City to the north of us here, without even getting arrested. There is another example of law enforcement which is the kind of law enforcement that our friend from Maryland spoke about. If you go through Zion City and cities like that you are going to be arrested if you

exceed even by one mile the prescribed rate of speed. We have one of our best safety workers in Milwaukee right here in the room today, who went from the 20-mile an hour zone to the 15-mile an hour zone, coasted into it, and he didn't go more than four car lengths, when a police officer arrested him and went into court and testified that he was going 16-miles an hour in a 15-mile zone. That is the other extreme.

One city in Wisconsin got a brilliant idea. They had heard about all the antagonism that law enforcement had aroused in the hearts of those who toured the country. They conceived the idea of discharging their motorcycle policemen and selling their motorcycles. They did it and sat back to await the good will of the motoring public. Signs were placed on the entrance to the city saying, "This is a city of good will. Automobilists use your discretion," and what happened? Last month they bought a new motorcycle and hired a new motorcycle policeman. It is a fine thing to say that automobilists use judgment when they are using the roads, but the experience of Kewasum, Wisconsin, is that either an automobilist is incapable of exercising any discretion, or he is a careless driver and deliberately refuses to exercise any discretion.

I will admit that as an individual my sympathies are wholly with the side which is taken by our good friend from Maryland. It would be wonderful when I go up to my shack in Northern Wisconsin just 302 miles away from my house in Milwaukee, which now takes me 11 hours, when I comply with the laws, if I could put my car into 60 miles an hour when she purrs beautifully and go up there in Northern Wisconsin and make that trip in five or six hours. But I may be a safe driver, you may be a safe driver, I may be able to exercise an honest discretion—at least I kid myself into the belief that I can exercise my own discretion in observing traffic conditions—but how many automobile drivers on the road today do you think are capable of exercising real, honest judgment as to what constitutes a safe rate of speed under any given condition?

A Very Nice Young Lady in Milwaukee

I know a very nice young lady in Milwaukee, one of these dear girls who drive an automobile to the despair of the traffic officers. She drives across the lanes of traffic and when the police officer calls to her she thinks she is a good scout, she wants to be a good fellow, and she thinks the police officer is flirting with her and she waves back in the most friendly manner. Every police officer in Milwaukee happens to know this particular girl, because they have all had experience with her. They tell a story about her, but I don't think it is true, because I read it in a magazine before. They tell this story: One of the motorcycle policemen got her over to the curb, stopped her and bawled her out in the vernacular. She listened and said, 'Mr. Police Officer, I am very glad you stopped to talk to me. I have always wanted to know you. I have a luncheon engagement, so I have to go right away. Now that you have met me, every time you pass me I wish you would wave your hand at me, especially when I have friends in the car, because I want my friends to know that I am friendly with you.'

This police officer said she started up and went right ahead and he stood there absolutely dumbfounded; he didn't know what to do, so he didn't do anything.

I am wondering what this dear girl would say if we abolished speed limits in Wisconsin, and some police officer should stop her and tell her she was driving beyond the point of safety? I would be very much interested in her answer. I would also be interested in hearing the answer of a young man who drives a Ford delivery truck, these little business trucks that shoot in from nowhere and shoot out regardless of what the traffic conditions are. I would like to know what the reactions would be of the average moron that is behind the wheel, a person whose judgment is warped by the fact that his mental age is far below his real age.

I have some statistics in my pocket to prove what I am about to say. I read that

the average mental age of the American people is 14 years. That means there are a lot of people over 14 years of age mentally, but there are just as many people under 14 years mentally. Now a 14-year-old boy or girl may be unusually bright, and may be capable of exercising a discretion while sitting behind a great, big powerful machine called an automobile, which is capable of making many miles an hour. But would you vest the discretion in a boy of 14 years to drive an automobile just as fast as he thinks he ought to on the road, judging for himself whether it is a dangerous rate of speed or not?

I recall a very scientific gentleman, who has a reputation in this country. He came up to visit our health commissioner and after discussing a proposition in the most sane way you ever heard, told the commissioner about his new automobile which is capable of making 70 miles an hour.

"What are you going to do with an automobile going 70 miles an hour?" said the commissioner.

"I get into the center of the street and drive right along."

"But that's dangerous driving, isn't it? What are you going to do if somebody comes out from the side streets?"

"It don't make a bit of difference; they have got to get out of my way."

That man isn't insane enough to be in an insane asylum, but he is driving an automobile. You find a lot of people driving automobiles who shouldn't drive automobiles. If every man driving an automobile were capable of exercising perfect judgment, then I would say, "Abolish all speed laws and let the man exercise his judgment in driving an automobile." But men and women, too, are not all perfect when it comes to exercising judgment.

Are Automobilists Capable of Honest Judgment?

If every automobilist was capable of exercising an honest discretion, an honest judgment, many of those driving automobiles today would be off the road, because they would know themselves, their judgment would tell them that they were not safe on the road. This dear girl I was telling you about who thinks that traffic officers are mere decorations at street intersections, would stay off. The chronic window-shopper driver would park her car rather than shop as she drives along. A chronic gossip, before looking around to see how those in the rear seat take her story, would also park. The slow driver who is out for an airing would keep away from the main highways, and you could go along until everybody was off that highway with the exception of my good friend, my opponent, and myself, and then I might be scared stiff to think he might run into me.

Everybody who talks ought to be able to give you some concrete remedy, and I am going to try to force upon you an idea I have had in my mind for a good many years. In the first place, I want to say that this proposal, while ideal from the standpoint of all of us who like to drive our cars just as fast as we can (and I am no exception to all the rest), is unworkable because of the fact that all automobilists are not capable of exercising the right kind of discretion. That presents the most difficult feature—the actual enforcement of that law. You are substituting reckless driving for a definite limitation. Your police officer comes up, he is all alone in his motorcycle. He has to make out a case of reckless driving, and you know and I know that it is very difficult to make out a case of reckless driving; you have got to be able to testify when you get into court on the number of automobiles, the number of people, the relative position, the signals that were given, and many, many other things all coming under the general heading of carelessness, and that police officer is going to get up there, as a rule, all alone, and is going to testify that this man, in his opinion, under the circumstances, was guilty of reckless driving.

In the automobile there were three or four passengers. In their judgment their

driver was driving that car safely, taking into consideration all the other facts regarding the condition of the road. There is a preponderance of evidence right there against this man and it is going to be utterly impossible for a police officer to make an arrest, even though he is honestly of the opinion that the automobilist was guilty of reckless driving. It may very well be that that police officer, being a human being, is incapable of exercising a judicial discretion and it may be that he is wrong; that is very true. But, when a police officer takes a case into court and he loses it, he is immediately faced with a suit for false arrest and malicious prosecution. You probably read in the papers within the last couple of days of the case in Cleveland where a police officer arrested a couple who were spooning in the park. When they came into court it developed that they were man and wife and the case was dismissed. Yet that police officer now has a judgment against him of \$3,000. How many of us, how many of you rather, could afford to take a chance of having somebody get a \$3,000 judgment against you? I know very few police officers who can take the chance. Yet, you expect a police officer to go out and take care of that road, patrol that road, keep conditions safe, when he knows if he doesn't prove up his case he is liable to be arrested on a civil warrant, he is liable to have a judgment against him of \$3,000, \$4,000, \$5,000, or \$6,000, which is more than he earns in three or four years. He is not going to make an arrest, and the result will be you are going to have traffic conditions worse than they are today.

The Prima Facie Evidence of Reckless Driving

Then take the poor fellow who is in the road and who is actually injured. Probably his leg is gone, his arm is gone, some family has been deprived of its father or mother, the loss is great. In addition to proving all these facts I told you about which come in and constitute reckless driving, he is faced with the necessity of showing that the reckless act contributed and was the proximate cause of the injury, and right then and there you will face the situation where the fellow will be minus an arm or leg, his earning capacity cut way down, and yet he has no recourse because he can't prove up his case.

My remedy for the situation is this: You have talked about the Hoover Uniform Law. It has good rules. For instance, it says, "Twenty miles an hour in the business district where traffic is controlled, 15 miles an hour where it is not controlled." Then they have 20 miles an hour in the residential districts and 35 miles an hour under all other circumstances.

Now it may be that 20 miles an hour in some residential districts might be too slow; it might be that 40 miles an hour under some circumstances might be too slow. Our experience has taught us that sometimes 10 miles an hour is reckless driving. But if you adopt a law that establishes a definite limitation on speed, and then make speed in excess of that limitation prima facie evidence of reckless driving, then instead of forcing the police officer to prove up his case you place upon the man who is actually speeding the burden of proving that his rate of speed in excess of the legal limit was not under the circumstances reckless driving.

If you pass a law in that way you are going to get all the benefits which I can see can be obtained under your scheme, and at the same time, you are placing the burden on the driver who elects to go faster than the legal rate of speed; you are placing the burden upon him of proving that the speed in excess of the legal rate was not reckless driving. I believe in that way you can solve the question of traffic in our cities and in the country.

CHAIRMAN COLLADAY: Is there any discussion on the subject before we allow Mr. Mackall five minutes to respond?

MR. POWELL: I want to call your attention to one instance where a speed limit

has been removed successfully. During the spring of this year I happened to have quite a long trip abroad. When I was in Spain, driving out of Madrid, I observed the man driving my car had a peculiar method. He would drive like the very devil until he met another car and then he would slow down. Then he would step on it again until he met another car. I inquired into the reason why he was driving in that peculiar way. First, I asked him if there was a speed limit.

"No, there is no speed limit, we had so many accidents the Dictator took off the speed limit."

"Why do you slow down so much when you meet another car?"

"Well, if we have an accident both drivers go to jail for 72 hours incommunicado, on bread and water. Then they fish them out and determine which one is responsible for the accident, put him back and let the other fellow go."

MR. MACKALL: Mr. Chairman, I believe Mr. Mattison has made a much better argument for the elimination of the speed limit than I am capable of making; certainly, he made a very much better one than I made.

I'd like to take a minute to speak about his girl friend. I think Mr. Mattison put his finger on just what I am talking about in the policeman. There was a girl who drove recklessly, dodged corners and what not, for which not a word was said by the police of Milwaukee. I think there are many people like that. Also, if I believed what Mr. Mattison believes with reference to the mind of the operator, I would take the same position he does. I believe that the boy on the Ford delivery wagon drives today without any regard to the speed limit, and he would drive exactly as he does if all the speed limits were reduced. Indeed, I think it might be a good thing to abolish boys from delivery wagons, but I don't know how we are going to do that.

I hope what I said will not be construed as a condemnation of all of the humane acts of the police. I believe the police have administered first-aid treatment to save a human life not only in Milwaukee, but everywhere. However, I am talking about the policeman when it comes to regulation of traffic, he has to be taught that there is one dangerous thing, to-wit: Driving in excess of the legally prescribed rate of speed. There is your difficulty. That policeman other than in the regulation of traffic is a perfectly normal and sane man, but when it comes to enforcing the law he is not there.

We don't have to go to Spain to prove we can drive carefully, safely, and effectively without a speed limit. You need only go to the state of Connecticut. They have abolished the speed limit, and I assure you in my experience I have never seen better driving anywhere than in the state of Connecticut. I have never seen worse driving than we have in the state of Maryland, where we have definite, well-defined speed limits which nobody obeys. I do wish Mr. Mattison would take a minute or two to give some of the reasons why he believes that the speed is the controlling thing. Mr. Hertz's argument is by regulating the traffic on the boulevards of Chicago and going two and one-half times as fast as the prescribed limit we are able to eliminate accidents by 65 per cent. The answer to me is perfectly simple. If you will drive safely you will not have an accident.

I want to say in conclusion just what Mr. Mattison said: if you will make people drive safely you will not have accidents, and the way to make them drive safely is to concentrate their attention and the policemen's attention to the things which make for unsafety; to concentrate their attention and the public's attention to the things that cause accidents, and not have them and the policemen looking for the arbitrary speed limit which somebody has established and which nobody obeys.

ADJOURNMENT

*SIXTEENTH ANNUAL SAFETY CONGRESS
NATIONAL SAFETY COUNCIL*



Home Safety Session

Monday, September 26, 1927

MRS. WALTER H. BUHLIG, Chairman
President, Illinois Council of Parent-Teacher Associations,
Chicago, Ill.

The session of the Home Safety Section of the Sixteenth Annual Safety Congress was called to order at two-ten o'clock by the chairman, Mrs. Walter H. Buhlig, president of the Illinois Council of Parent-Teacher Association, Chicago, Illinois.

CHAIRMAN BUHLIG: When it comes to home safety, The Parent-Teacher Association is one that should and could promote home safety. We are not a woman's club, because we are sure that the word "parents" means dads as well as mothers, and we do have many men members of our organization.

Many of our policies and the direction of much of our work comes from the national organization, and Dr. A. B. Meredith is chairman of Safety for our national body. Then in Illinois we have a State Chairman of Safety, Mrs. Julius Floto, of Oak Park. We are hoping to have the associations throughout the state take part in the survey that is being promoted by the National Safety Council. Through the Parent-Teacher Associations and their meetings much information can be disseminated concerning home accidents, concerning the training of children to protect themselves on the street, on the playground, wherever they may be; and then there is the more positive side of getting the parents really interested in the recreational lives of their children in order that life may be saved by teaching them how to do things.

I am very pleased to introduce to you Mr. Joel D. Hunter, who is the general superintendent of the United Charities of Chicago, who will talk on what accidents mean to social agencies.

What Accidents Mean to the United Charities

Joel D. Hunter, General Superintendent, United Charities of Chicago,
Chicago, Ill.

Prevention is a word which is often used when social workers are gathered together. That same word is probably in much more common use in the select circles of the National Safety Council. However, it has not yet been possible to prevent all the evils in the world; some still exist. From these, many different forms of distress arise. It is a matter of vital concern to know whether or not the social, economic, health and other problems arising from existing evils are being adequately and properly met.

It is the purpose of this brief paper to give the record of the United Charities of Chicago on accidents other than industrial for the six months between January first and July first, 1927, and then to discuss this record from the standpoint of prevention and adequate relief. Most of the material which has been obtained for this paper was gathered by Professor Scott E. W. Bedford, research secretary of the United Charities.

Some weeks ago Mr. Sidney Williams requested that a paper be prepared on "What Accidents Mean to Social Agencies" or some similar subject. After consideration it seemed best to limit the discussion to the records of the one social organization with which the speaker is connected. A questionnaire was sent to the superintendents of the ten different districts of the United Charities asking them for information showing first, the amount of money spent in accident cases during the six months above mentioned. They were asked to state the amount of money spent on industrial accidents and the amount spent on non-industrial accidents. Second, they were requested to send in case stories showing unusual features in home accidents. The answers to this questionnaire were intensely interesting.

I think it is safe to say that the general public has no idea concerning the number of home accidents, how difficult it is to prevent them, how little guarantee there is of adequate medical service and how great the economic strain and mental turmoil that come to the families in which the accidents occur. From January 1 to July 1 the districts of the United Charities reported 217 families in which an accident was the main problem in the family. Of these 82 were industrial accidents and 135 of them were non-industrial.

Hazards Lie In Most Child Activities

So far as the industrial accidents are concerned it is only necessary to say that these came to the United Charities mainly for two reasons: First, for temporary relief pending the settlement of their claim for compensation; second, because compensation had been denied. In these 82 families \$2,707.89 was spent for relief. There were 135 other accidents. In these families \$8,012.98 was spent for relief. It is difficult to make absolute classification of these accidents, however, it was possible to classify some of them:

- 29 were accidents in the home.
- 9 were on the street.
- 28 were auto accidents.
- 12 were related to recreation.
- 5 were directly due to alcoholism.
- 2 were in school.

No one will dispute the desire of social workers and that of the National Safety Council to prevent such accidents. The difficulties arising in doing it seem almost insurmountable. The following brief stories show something of the variety of the things recorded and the amount of work needed in order to prevent even a part of them:

1. Albert fell from a railroad elevation while flying a kite. He was in the South Chicago Hospital for six days.
2. Walter fell while playing and injured his knee. Osteolysis developed and this child is still under medical care.
3. John lost an eye by being hit with a snowball.
4. Andrew cut his finger to the bone while cutting bread. His finger became infected and had to be amputated.

This last story hints that proper medical attention is not always given when injuries are obtained in home accidents. While there is no absolute guarantee of proper care when an employee is injured while at work, yet one can be reasonably sure that such care will be given. One can also be reasonably sure that in many,

many cases it would not be given when a child or adult is injured at home or while at play.

Another example of this is shown in the story of Amy, who was 11 years old and burned her fingers quite seriously while at home. Her mother treated the burns with home remedies, but they became infected. This child was later provided with proper medical care and the wounds were healed.

In endeavoring to prevent accidents such as this the family case workers of the United Charities, as they go into these homes, are constantly advising the parents and children concerning safety at home and at play. The Coroner of Cook County at one time carried on quite an extended campaign to prevent accidents in the home. One thing which he suggested to mothers was that when they were washing always to put cold water into the tub first and then the boiling water. If his suggestions were carried out in all cases such accidents as that which happened to Tommy, two years old, would not have occurred. Tommy was left alone in the kitchen while his aunt went into an adjoining room. He fell with his arms into a tub of scalding water. This child's burns were treated at the Children's Memorial Hospital and there was a thorough and complete recovery, but the accident never should have happened. There is no doubt that a thorough study needs to be made of all accidents occurring in the community other than industrial and that a continuous battle to prevent them needs to be waged. Every individual in the community ought to be interested in furthering the program to reduce the number of accidents which occur on the streets and in the playgrounds and homes in the community.

The Family Problem in Non-Industrial Accidents

What are the problems which arise in the families in which non-industrial accidents occur? How are they met?

First—*Provide medical attention.*

Whether or not this is received depends entirely upon members of the family. The public has no organized way in which it shows interest in this particular type of accident. Another example of the sort of treatment that is sometimes obtained is as follows:

Mrs. Bartholomew fell down the cellar steps on January 22, 1927, and broke her leg. She had a man living near-by fix it for her. This man was not a doctor. Mrs. Bartholomew now walks with quite a limp.

Second—*How is the economic loss made up?*

It goes without saying that in many of the families in which general accidents occur they are using their entire income. Any reduction in the family income means that credit must be obtained or that outside relief must be sought. Whether or not this relief is given depends upon the efficiency and the financial ability of the organizations in the community which give relief. That considerable amount of relief is needed in some cases is shown by the fact that the United Charities gave \$741.00 in six months to one family in which there was an accident and \$721.00 to another family. The total amount given in 135 families was \$8,012.98, an average of \$59.35 per family.

This is not an ideal situation. I presume that there are family welfare societies in most of the large cities of the country and that reasonably adequate relief is given in all families that suffer economically because of a general accident when those families get in touch with the workers of the family welfare societies. However, there must be many that pass unnoticed.

I do not know what can be done except the extension of accident insurance. Probably the best way to extend this is through group insurance. The United Charities is now making an extensive study of group insurance covering life, disability and retirement. I do not know what we are going to do when the study is completed. If we take out group insurance covering all the employees of the United Charities, if any one of them suffers from an accident, no matter what the accident may be,

that individual will receive certain benefits from the insurance company. This seems to me a more practical way of spreading the type of insurance that covers accidents than through individuals taking out separate policies. Professor Bedford has been making this study for a number of months. The information which he obtains will be published somewhere when his research is completed.

There are also some things in the figures which were obtained by the United Charities which ought to make us all hopeful about the future. In the 135 accident cases covered none of them was from asphyxiation by gas stoves nor were there any by electricity. It is true that many of the families with whom the United Charities deals do not have gas stoves and very little if any electrical equipment, yet both are present in a certain number of families. The fact that no accident was recorded from either gas or electricity shows that the danger of those is universally recognized and that many protective devices have been adopted in the manufacture of gas and electrical equipment.

The statistics gathered in the United Charities for six months show that six per cent of the relief given in that period went into families who came to the United Charities because of some accident other than industrial. The records show that certain types of accidents have been prevented and that some of the others need not have happened. It is also clear that there is room for much more preventive work in which every citizen of the community should be interested. It is evident that whatever steps are taken in carrying on a preventive campaign should also include the information showing the necessity for immediate and proper medical attention for every person suffering from any sort of accident. Cases can be quoted showing permanent partial disability because of inadequate medical care. Whether or not the family is in economic need because of accident, adequate relief depends largely upon the support which is given to the family welfare agency in the particular community. To improve that situation it is my impression that accident insurance should be extended and that the quickest and best way to develop that insurance is through group policies.

Developing a Community Program for Home Safety

Dr. Bernice Neuberger, President, Cleveland Federation of Women's Clubs

In developing a community program for home safety, public service groups of men and women become interdependent. There is not much difference between the reaction that comes through organization of women's groups and those in which there are men members. The success of organization, on a community basis, depends upon the guiding sense of the leader, who must be one who knows your city and whom your city knows.

In reviewing the history of The Cleveland Federation of Women's Clubs, the records showed a "Safety Campaign" written into its history, which occurred in 1913 and the memory of which will today raise a smile. It was the successful effort to shorten the length of women's hat pins. Whether the immediate incentive was the scratch of some club woman's cheek, or a similar disfigurement of the husband, is not recorded; however, through the commendable efforts of the Federation of Women's Clubs resulted the passage of a city ordinance that limited the length of hat pins, forbidding their extension beyond the hat. Cleveland newspapers gave columns of front page to the subject. The first woman's safety campaign was successful and far reaching. A special correspondent in Berlin even found it important to cable that the action of the Cleveland women had found a grateful echo in the German metropolis. where similar legislation had, as a result, been promoted. Rather amusing

today, nevertheless it was a successful endeavor proving woman's desire for safety reform.

A woman's greatest occupation will always be her home, and it is a vast and notable one. The character of the home many times depends upon the woman in that home; lack of interest leads to disintegration. The community cannot become better than the citizens who compose it, better homes are good investments for any city, therefore, efforts made by women to make the home safer will help materially in creating a safer atmosphere in the community.

The great need of a community program for home safety in Cleveland is indicated by the accurate statistical information secured from the Police Department. During the year 1926 in Cleveland there were 611 persons killed; 237 traffic accident fatalities, 174 industrial workers killed and about 190 home accident fatalities. Falls, burns, scalds, asphyxiation, suffocations, poisons, fire, explosions account for 96 percent of all home accident fatalities, and for a large proportion of the injuries. The most tragic fact about accidents in the home is that so many victims are children. Science tells us death should be the final chapter of the book of life, not an early one. The mother should be the "Safety Engineer" of the home and acquaint herself with the principles of accident prevention in her place of employment and thereby be prepared to teach her children safety precautions at an early age.

The Age of Reason

This is the age of reason. Whatever other criticism may be brought against this era it must be given credit for its commonsense and practical way in which it faces the problems of life. A careful analysis of the facts showed that there are almost as many fatal accidents in the home as on the streets or in our industrial establishments and convinced the Cleveland Safety Council that attention should be given to home accident prevention, just as men in industries, after careful study of ways to reduce the number of accidents in their establishments, decided upon the logical procedure of founding schools for safety instruction for their employees, because employers know that accidents to their men will mean an economic loss to their establishments. That being the case, is it not equally important that we should realize that accidents in the home mean weeks of suffering, total disability or death, in addition to an economic loss to the community? Accordingly, safety instruction should be given the home manager, for no longer should we be excused by saying, "It was an accident." Accidents are careless acts and the home manager should be held responsible. If the home is worth fighting for, it is worth working for.

In conducting a permanent educational campaign for home safety in a community, we must deal largely with women who in their groups gladly give knowledge to those who need it badly. Much careful thought was devoted to the development of a program for Home Safety in Cleveland when the Home Safety Division was organized one year ago; for it is of the utmost importance that every affiliated organization of this large body of women should lend its support in service to make for efficiency. To be assured loyal support those asked to serve as officers of the Home Safety Division were heads of influential organizations; thereby through the representative corps of officers more than 500 organizations gave their assistance in the biggest cooperative movement ever undertaken by women of our city, an organization of 60,000.

The actively participating organizations were as follows: The Cleveland Federation of Women's Clubs with 154 clubs. The Parent-Teachers Association—100 organizations. The Citizens Bureau, having contact with at least

250 foreign groups, which are essential in view of the fact that there are so many avoidable deaths caused by home accidents in foreign sections of the city. The Federated Churches, the Catholic Societies, the Jewish Councils, Welfare Agencies, Social settlement houses, visiting nurses, and many individual members assisted generously. This substantial method of organization found the Home Safety Division of the Cleveland Safety Council soundly established. Preliminary plans were outlined for the year.

Enumerating the important features of this community program: (1) Home Safety committees appointed in clubs. (2) The Cleveland Safety Council issued a series of six monthly bulletins on home safety instruction which were mailed to the 500 presidents of the affiliated clubs. (3) The bulletins were read by the chairmen of the Home Safety Committees at their club meetings, open discussions followed and records were kept. (4) Five radio messages were broadcast on home accident prevention. (5) Enthusiastic quarterly meetings were held at which addresses were given on preventable accidents in the home. (6) A Speaker's Bureau was formed in our Home Safety group. (7) Publicity was given to the cause, not an individual; newspapers will always give publicity to a cause which helps better conditions for the entire community. (8) A city survey was made to determine sections of the city where home accidents were most prevalent. (9) Accurate statistics were secured each month and these data were studied to properly gauge our efforts.

Community Program for Home Safety

I will dwell for an instant upon the character of our community program for Home Safety. Each month the safety council bulletins on home safety instruction were read and discussed by heads of the women's committee at the meetings of their clubs. A most favorable reaction was noted. Time does not permit a lengthy description nor detailed account of these bulletins, but on the cover page was a significant pen sketch, a self explanatory safety appeal, and it was thought that these bulletins communicated to the 60,000 women of greater Cleveland, members of this safety movement, an abundance of useful facts, with concrete illustrations presented in a very comprehensive manner, which aided materially to make the home secure. The lessons ranged from the social aspects of home accident prevention to the subject of home engineering and the necessary safety equipment; however, knowing that accidents would still occur, the final bulletin was "First Aid" of a non-professional nature. The instructors on our public playgrounds last summer used the First Aid Bulletin.

Five home safety messages were broadcast over radio station WTAM during the year; which meant that for the first time in Cleveland's history the measures of accident prevention in the home were broadcast on a big scale, reaching the homes of the rich and the poor, the cultured and the uncultured in the city and the country districts as well.

A very important activity of the Home Safety Committee was the arrangement of the quarterly home safety luncheon meetings to which cooperating organizations were asked to send delegates. Attractive programs were arranged and addresses on home accident prevention were given by prominent speakers to the 750 delegates from Clubs. Based upon experience, heads of organizations must be kept vitally interested and genuinely enthusiastic in order to carry out a successful program for home safety. These meetings did much to rouse the interest of the public to greater care of its homes. The association of the home and the school is one of the strongest factors for good in any community, this being the opinion of the superintendent of the Public Schools, in giving his support in the successful promotion of these meetings. A committee of 75 teachers, representing the Cleveland School

of Education, and principals of schools attended these meetings to secure information on various phases of the home accident prevention problem, for these women are teaching the youth of today, upon whom rests the future of our country.

The speaker's program included Mrs. James N. Downey, of Detroit, Dr. Gabriel Tucker, of Philadelphia, Charles E. Hill, of New York City, and officers of our local safety council. Mrs. Downey gave her appreciative audience many safety engineering aids in the home, urging the women to work faithfully for safety in the home, saying that women must bear the burden when accidents occur. After having heard the illustrated lecture on "Preventable Accidents to Children," by Dr. Gabriel Tucker, of the Chevalier Jackson Bronchoscopic Clinic of Philadelphia, many young mothers were so impressed that they thought it would be a miracle if their children managed to grow up. Charles E. Hill, vice-president of the National Safety Council, gave a splendid address on "Preventable Accidents in the Home" at the spring luncheon of the committee. Mr. Hill said that "of the total number of accidents last year a large percentage occurred in the home. This would be a distressing situation were there no cure, but there is a cure and the responsibility rests with the women's organizations, the schools and churches. Cleveland has made a good record in this direction," he added.

A speaker's bureau was formed within the Home Safety Division and speakers were supplied clubs upon request. We learned that men were interested in home safety, inasmuch as men's organizations asked for speakers. Men know that women alone cannot solve the problems of modern life in the home; this must come through civic agencies of both men and women.

Home Safety Work in Cleveland

A survey was made by the Cleveland Safety Council to determine the most important causes of home accidents in the order of their frequency, the sections of the city having the highest percentage of accidents, classes of homes, and also a study of the most effective methods of prevention. The foreign sections have a large proportion of accidents in the home. The effectual measure used to give out home safety knowledge was the Citizens Bureau which has contact with all of the foreign groups and publications in the city. Mindful that frequent safety warnings would not go unheeded in the classes of homes in which accidents occur, due to the carelessness of the mother, home safety instruction was given in the classes teaching the art of good housekeeping at the social settlement houses.

We are justly proud of the good we have accomplished, since the statistical report of the Health Commissioner proves that the Educational Campaign for home safety conducted in Cleveland has had effective results, there being an encouraging reduction in home accident fatalities the first half of 1927 as compared with the first half of the previous year.

Women have shown that they are willing to assume their responsibilities and have demonstrated their sterling qualities of service in doing their share of work in civic housekeeping, and hence developing a successful program for home safety in Cleveland.

E. R. FARRA (Manager, Grand Rapids Safety Council, Grand Rapids, Mich.): I should like to ask if the result of the survey showed that most of the accidents, especially fatal accidents, were in the poor homes, or did you find a reasonable percentage happening in the middle class or better class of homes?

DR. NEUBERGER: As I have stated, we thought a great number occurred in foreign sections. However, none of us are excused.

E. R. FARRA: We can get cooperation from any city department or we can

get cooperation from the organized women's clubs. The problem as I see it is how to get the unorganized women.

DR. NEUBERGER: You will get them through the social settlement houses in your classes teaching the art of good housekeeping. We have a number of them in Cleveland. The Citizens' Bureau has contact with all of the foreign papers and you will reach them through the foreign papers and through the social settlement house.

CHAIRMAN BUHLIG: Many of the Parent-Teacher Associations reach the type of home that the women's club doesn't.

MRS. JAMES N. DOWNEY (Detroit Police Department, Detroit, Mich.): We are reaching the foreign groups through the International Institute, the educational branch of the Y. W. C. A. We are giving a lesson in English to these foreign groups. Then for those who have not yet learned the English language, we have a pamphlet that has been printed in 12 foreign languages, and we reach the people in that way. Another way we are going to reach all the groups is through the Parent-Teachers Associations.

What Is The Home Accident Problem?

R. L. Forney, Statistician, National Safety Council, Chicago, Ill.

A problem, according to the dictionary, is a question for discussion and settlement; a matter of uncertainty requiring further light to determine the truth, especially when difficult or uncertain of solution. If uncertainty and difficulty of solution be the prime elements of a problem, the home accident problem is one in the truest sense of the word.

In view of the fact that we must know what a problem is before trying to solve it, I have been given the job of telling you what the home accident problem is. I interpret this assignment to mean that I should say something about why there is a problem, what causes the problem, the extent of the problem, and what individuals are involved in it; but, fortunately for me, I am not obligated to give you a solution. That task is left to others on our program.

If the problem of home accidents were mentioned to the proverbial visitor from Mars he would, undoubtedly, have a lot of questions to ask and we should have to reply by saying, "Yes, accidents do occur in our homes. In spite of the fact that we have in our homes no coal mines, no steel foundries, no large bodies of water, no streets full of rushing automobiles, no airplanes, and no machinery worthy of the name, yet we do have a lot of accidents there." He would probably be surprised to hear about these accidents but would answer us by saying that although some accidents may occur in homes, yet these are fortunately very few in number. And at that point we would have to get down to brass tacks and tell him that, according to the best information we have, more people are killed and injured every year in homes than by automobiles or in industry. We should have to tell him that the workman who is injured in his home is just as thoroughly and completely injured as though he had been hurt at the rolling mill; and, furthermore, that the same sort of an economic loss results when the housewife falls off the rocking chair and breaks an arm as when her husband suffers a similar injury at the plant. We should have to tell him that the pain and suffering resulting from home accidents is not any different from that resulting from automobile accidents, and that the dollars paid for hospital bills and those lost by being unable to work are just as good dollars when the injuries occur at home as when they occur some place else.

What, then, are the facts about home accidents? Or, in other words, what is the home accident problem? We know from records of the United States Census Bureau that there were, in 1925 about 90,000 deaths in the United States resulting from accidents. We know furthermore, that the figure for 1926 will be very nearly

the same. Some of these accidents occur in industry, some in public places and the remainder in homes. Most of you know that although the United States Census Bureau receives a record of all deaths from almost 90 per cent of the population of the United States, the reports of these accidental deaths are not classified in accordance with the three-fold classification which I have just mentioned. We believe, however, that from an accident prevention viewpoint, it is essential that we know the approximate number of deaths occurring in each of these three places—in home, in industry and in public. With that end in view, the National Safety Council, in cooperation with police and health departments and local safety councils, obtains information on accidents that are so classified. Certain insurance companies have also analyzed reports in this way. A careful study has been made by the National Safety Council staff, utilizing all available information, to determine the number of fatal accidents occurring in homes each year. In past years estimates of home fatalities have ranged from seventeen to nineteen or twenty thousand. We have studied these estimates, the new reports received by us for 1926, and other sources of information, have taken account of the valuable information contained in the reports of the United States Census Bureau, have also taken into account the probable number of public and industrial fatalities, and have come to the conclusion that all previous estimates of the number of home accidents have been too low. We believe after studying the available information, that there were not less than 24,000 fatalities as a result of home accidents in 1926. Our experience further indicates that there are about 200 non-fatal injuries for every fatal injury in the home so that there were probably four to five million such non-fatal injuries in 1926.

Classifying the Home Accident

In considering the home accident, two types of homes are involved—rural homes and city homes. This distinction is necessary because in studying the accident situation on farms we must decide what are really home accidents and what may be considered industrial accidents, in the sense that they occur during the course of employment. In other words, we must as further study of the subject proceeds, set a dividing line where, on the farm, industry stops and home begins. If the housewife is injured while tending a vegetable patch near the home, is the accident an industrial accident or a home accident? Should there be any distinction between an accident that occurs while the farmer is hitching up his horses to go to the fields, and when he is hitching them up to the carriage to drive to town? Such distinctions will have to be made as we go farther into a study of home accidents.

The figure of 24,000 which we have estimated for 1926 includes only those accidents on the farm which may be called home accidents in the sense that they are accidents that also occur in and about the home of the city dweller. I wish to emphasize, however, that this is something which should receive attention as more and better statistics of home accidents are compiled.

It is difficult, if not impossible, to estimate the amount of economic loss involved in these 24,000 deaths and 4,000,000 to 5,000,000 home injuries. We believe that there are as many fatalities and more non-fatal injuries in homes than in industry. The economic loss involved in industrial accidents has been estimated at more than one billion dollars. While the actual economic loss involved in home accidents is probably not as high as this, it seems almost certain that it is at least half as much or at least one-half billion dollars. From an economic point of view, therefore, the home accident problem is also a real problem.

What we want to do is to prevent the occurrence of these fatalities and other injuries, and thereby cut down the economic loss and the human suffering involved in them. But we can't get very far in the matter of prevention on this narrow

advanced age. We now see that the situation is just the reverse for burns and scalds, where there is such a heavy fatality rate among small children. Here again it is the obligation of mothers and others in the home to maintain careful watch of these small children. Many of these accidents are scalds, in which the child falls into a tub of hot water placed on the floor, or pulls over on his head a pan or basin of hot water left sitting too near the edge of the table or stove. Children are also burned to death as a result of playing with matches or firecrackers, or as a result of catching clothing on fire from gas stoves or other flames. The latter type of burn is also responsible for many deaths of adults in the home.

Suffocation is another important cause of death among children. Again using the figures of the United States Census Bureau, we find that about 950 children under five years of age meet death by suffocation every year. This number does not include gas asphyxiation. These 950 deaths are in children who swallow objects, who strangle on food, etc. Here again we have an obligation to keep the child from getting hurt. We can be quite sure that most of these deaths of children so young occur in the home.

Asphyxiation still remains an important cause of home fatalities. Perhaps we are learning to be more careful with gas stoves, but if so we are becoming more careless with our automobiles, with the result that the toll from carbon monoxide poisonings is increasing. In the city of Cleveland, during a fourteen month period, out of 35 home deaths, charged to poisoning of all kinds, 22 were of carbon monoxide gas. Most of these were the result of running automobiles in closed garages. This is one of the things which should receive particular emphasis in the next few months when the cold weather will cause the car owner to shut garage doors that should remain open.

Poisonings Take Heavy Death Toll of Children

Other poisonings than gas poisonings are also important. Let us look again at the figures for children under five years of age. I am using this age group because in it we can be quite sure that a large percentage of all deaths do occur in homes. Figures of the Census Bureau show that a thousand children under five years are killed each year by poisoning. The things responsible are poison food, poisonous animals, and of even greater importance, various poisonous chemicals kept around the house for medicinal or cleaning purposes. From a study of all the facts available we believe that deaths by poisoning constitute somewhat less than one-tenth of all accidental home deaths.

There are, of course, other causes of home fatalities which deserve mention. Among these are fire-arms, electricity, and drowning. These are things which have great inherent hazards and those responsible for home safety should be on guard against them.

I have already said that we do not know so much about non-fatal home injuries. The difficulty is that in most cases no one knows anything about the accident except the family itself and the attending physician, if there is one. In industry it is a different matter. In nearly all cases the employer is required to pay compensation to the employee who is injured and in general it is to his benefit to obtain reports of accidents. Through insurance companies and state governments we are enabled to get this information about the way in which industrial accidents occur. In the case of public accidents the accident occurs in a public place, and in many cities and states someone involved in the accident is required to report it to a city or state authority, or the police department is able to obtain a record of it. Here again these reports are available for our information and can be used in analyzing the causes of these kinds of accidents and in taking measures to prevent them.

In home accidents the situation is very much different. In fact I know of no plan whereby even approximately complete reports of non-fatal home injuries have been obtained in any locality. Our estimate, therefore, of the total number of such

injuries occurring in the United States must necessarily be a very rough one. The Travelers' Insurance Company has recently made available some very valuable information concerning home injuries on which claims were paid by the company. In this experience, for the year 1926, the ratio of fatal to non-fatal accidents is about two hundred to one. The non-fatal accidents show an average disability of seventeen days, so we can say that in general they were serious accidents. It seems conservative, therefore, to say that there were probably four million non-fatal home injuries in the United States last year.

We have been discussing the causes of fatal home injuries. When non-fatal injuries are included there is at least one other important cause which should be added, namely cuts and scratches. These accidents are extremely numerous about the home and cause much disability and of course much pain and suffering. These cuts and scratches are ordinarily minor in character, however, unless the wound is not properly treated an infection sets in.

What Is the Home Accident Problem?

I have already stated that it is extremely important to differentiate between the experience of cities and country sections in studying any kind of accidents. The National Safety Council, in various surveys, has obtained certain information about home accidents in cities. I have made a study of ten cities on which we had information and have found in some cities that home fatalities run as high as 47 per cent of all fatalities. In seven out of these ten cities more than 25 per cent of all accidental deaths occurred as the result of home accidents. In one or two cases the percentage runs as low as 19 per cent. I am pointing out these facts regarding cities simply to indicate that the problem in any individual city relative to home accidents may be much greater than for the country as a whole. In a city, for example, like Providence, Rhode Island, where during the last four and one-half years 46 per cent of all accidental deaths were in the home it seems that no further indication is needed as to where the very greatest accident prevention efforts should be made.

These observations that I have been making are leading up to what I would call the keynote of my talk, and that is that we are still pretty much in the dark as to exactly what the home accident problem is. To a great extent I have been unable to answer the question—What is the home accident problem? What I want to say, however, is that in my opinion there are still two phases of it. Our ultimate objective, of course, is to solve the problem, i.e. to keep the accidents from occurring. It is my contention, however, that this cannot be intelligently nor completely done until we have more facts. These facts must be about non-fatal injuries as well as fatalities. As I see it, the first thing to do is to get those facts. Furthermore that is your problem. There are agencies in your community whereby this information can be obtained, and will be obtained just as soon as the people there who are interested in safety realize the importance of it.

A Heavy Death and Injury Total

My conclusion is that the home accident problem is one of preventing 24,000 fatal accidents and over 4,000,000 non-fatal accidents annually. Its solution means saving the lives of possibly 7,000 or 8,000 children every year—our school children with their future ahead of them. It also means saving the lives of that many older people—the lives of our fathers and mothers who have passed the prime of life. And finally it is a problem that requires a great amount of further study regarding causes and circumstances so that this prevention work can be carried on more intelligently and therefore more effectively.

MRS. L. CASS BROWN (LaGrange, Ill.): I should like to ask the speaker if he considers the melodramatic way in which accidents are put in the papers, a help to this sort of work. We deplore it many times, but would you consider it a help?

MR. FORNEY: We can say on one hand that any method may be worth while to get the matter to the attention of the public. It may be worth while to put it in a melodramatic way if it will start people to thinking. For preventive purposes, I can easily see where a thing of that kind might be a detriment. It might call attention to something that occurred in a particular case which would divert attention from the more important causes and the things which should really be driven at by the person who is doing the educating. For example, as I have said, and as Mr. Hunter also said, electricity is not an outstanding important cause of home fatalities or of home accidents. We frequently see reports of fatalities in the home due to electricity. Electricity is something that has great inherent hazards, if you will allow me to use that term, but the falls or burns which do not seem inherently so dangerous are the things which need stressing in the home accident prevention program.

Parents Should Realize Home Accidents Are Avoidable

MRS. HARVEY C. JOHNSON (Alcott Parent-Teacher Association, Chicago): Don't you think that the reason you still have so many home accidents is because people don't think that home accidents are avoidable? The average parent thinks that an accident in the home is something that couldn't be helped. If one member of the family were run over by an automobile, it could be avoided. If a child fell from a chair, it was unavoidable. Don't you think your education has not been far-reaching enough to the home maker? There are mothers who are interested to see that their children are safe and to do the right things in their homes. They are not ignorant, they are not foreign mothers, but they are busy mothers and mothers at home that can't get out to meetings. It isn't every mother that can go to the meetings and learn these things. Don't you think there ought to be a drive to get into the home regardless of education and money and whether foreign speaking or Americans?

MR. FORNEY: I certainly do. One difficulty is this idea, that a man's home is his castle, and it is pretty hard to find out what goes on within the doors of a man's home. We still are very much in the dark about the way in which home accidents occur. We are beginning to find out pretty definitely that automobiles are dangerous, and we started finding out some time ago that punch presses and various other machines used in industry are dangerous, and consequently we are beginning to be careful of them. I think the reason home accidents continue to occur is because we have not made people realize that these things in the home are dangerous. We haven't made them realize that falls do cause accidents. We haven't made them realize that burns and scalds do cause deaths.

MRS. JULIUS FLOTO (Illinois Council of P. T. A., Oak Park, Ill.): These survey forms were prepared by the National Safety Council for the use of the Parent-Teacher Associations in the United States.

I, as chairman for Illinois, am anxious to send out these surveys to every Parent-Teacher Association in Illinois, and we hope that we will get 100 per cent results. I feel that after these surveys go in a great deal of information will be obtained on how our home accidents are caused.

CHAIRMAN BUHLIG: Is there anything further before we go to the next speaker? If not, I am very glad to introduce to you Mrs. Bertha Winter Mahoney, Director, Home and School Safety, Erie Safety Council, Erie, Pennsylvania, who will talk on *As the Homekeeper Sees It*.

As The Home Keeper Sees It

Mrs. Bertha Winter Mahoney, Director, Home and School Safety, Erie Safety Council, Erie, Pa.

I am one of these professional women. I shall say I was one of the professional women who left the ranks of the teachers and entered into the unprofessional ranks of housekeepers. As soon as I became a housekeeper, I was overwhelmed by the innumerable things I was supposed to do perfectly well, and by instinct. I had no education for it. I had had a little training by imitation in my professional age, but I had no education as a housekeeper. Those were in the days, I shan't tell my age, when we didn't educate housewives for their duties.

Men and women today have realized that industrial accidents, as has been told you before, are always blamed on the employer. He is responsible for his employees, consequently we instituted a plan of safety education in industry, very detailed, very definite. Then we had traffic difficulties. The number of people increase, and differences in education made it necessary that we have traffic education. The best way to have that was to put it into the schools. We are doing that. We have very detailed systems of education in our schools and I am so glad, because those children coming up are going to be equipped for the thing that I wasn't.

I am an unskilled laborer. You have them in your shops, but they are not that way long. I am learning by the trial and error plan. Do you know what that is? If I try a certain thing one way and it works, all right, I do it again, but if it doesn't work, I try some other way. I try, make mistakes, and profit thereby. Don't you? Isn't that the only way you learn, you housekeepers? We weren't educated and still all this big home accident problem is put at our doors. It is at our doors, but are we responsible? Is it our fault? No, ladies, it isn't. I am going to defend you. I am a very staunch defender of my sex and I am going to talk to the heads of households (laughter), the men. I want you to be the head of the household, not only nominally, but actually. As a head of a household you are directly responsible for the accidents that occur in that household, aren't you? Not the housewife. You heads of households, have you done your level best to educate your home keeper? As an employer in your shop would say that you had functioned right if you hadn't told every one of the foremen under your control how to do the job safely? And still do you carry into your homes those lessons?

Let's take an inventory of our homes. Start right up at the attic and come down. How many hazards do you have in your home? All you men who are here this week talking on safety in the shops, safety on the streets and everywhere else, think about your homes. Have you eliminated all the hazards in your own household for your home keeper, or do you have a home keeper perhaps who is now struggling by the trial and error plan to eliminate the accidents for which she is responsible according to all of these talks that preceded me?

Let's take an inventory of some of these accident hazards. I wonder if you ladies ever had the necessity of going up and changing an electric light fuse when it blew out. Do you all know how to do it, or did you have to telephone the electric light company to send a man? Did you ever see the supercilious expression when he goes up to change the fuse? He thinks, "There you are; we have to do this for the women; they don't know how to do it." Whose fault is it? Why haven't you taught your home keepers how to do it? We don't have the mechanical knowledge; you have to do it for us. You are the heads; you are responsible.

Think about that electric washer that you have in your basement, one of the biggest hazards of today, not in the laboring class household, but in households like my own where you learn by the trial and error plan. You screw a little bit of a nut, if it works, all right, if it doesn't work call the repair man. Have you ever had that contingency to cope with? I think you ladies understand perfectly.

The man in the shop is the logical one to talk. He is taught a series of safety lessons in industry that are absolutely invaluable to carry into the home. There is one way to reach your foreign homes. Why not tell your foreign laborers to go home and tell their wives how to do some of the ordinary tasks? Isn't that a way of reaching the home that cannot possibly be reached by a club woman?

I speak from experience. I have tried to enter some of these foreign homes. They resent it. They resent advice from a woman who thinks she knows all about it, but they won't resent it from a person on their own level. The International Institute is very good, but how many homes does that reach? Very few in comparison with the millions of homes there are to reach. Reach them through your shops. I am going to plead to you men that you will go to your shop gangs, your shop lessons, and tell those men to carry home a definite series of safety lessons for the home.

Why not give those shop men as heads of households the series of leaflets on home safety, prepared by the National Safety Council? Isn't it worth while?

Ladies, you have a sewage system in your homes. Do you know much about it? Do you know where it goes? If you do, I am so glad; if you don't, find out. Isn't it one of the safety things of the town to have a very efficient sewage disposal system? You don't think anything about it. Perhaps if you investigate you might improve conditions that already exist. What about the drainage systems in your houses? Disease lurks in improper drainage systems and that is true in every home with improper drainage. Couldn't you ask the men in your shops what a drainage or sewage system is? Isn't it going to help you to have the homes of those men in pleasant, healthful condition, so that they are going to function more capably in your shops? A man can't work when he is worrying about his home.

The Mechanical Side of the Home

Then there is the gas outlet in your house. We all have gas, or electricity. I think now that the homes in the United States not equipped with one of those two powers are very, very few, perhaps only in the outlying rural districts, and still do you know what gas is? Do you know whether it is manufactured or natural? Do you know where it comes into your house? If you should have a fire in your kitchen would you know what to do first? Think, what would be the first thing you would do? You would jump and scream and perhaps send Johnnie for the nearest fire box, and by that time your kitchen would be aflame.

I wish every man would have a fire extinguisher in his home. How many homes do have one? Have you ever used one? Would you know what to do immediately, without thinking or reading the directions? I doubt if you would. Let's find out what to do. You might be called upon to use one. We never know, that is a home safety problem. Your gas outlet is important; you should know where to turn it off instead of waiting for the fireman to ask you.

Very soon in every household kiddies begin to come and you have a new baby, a dear, dear child, the apple of your eye. Are you guarding that child in your house? The previous speakers have told some of the hazards—you know the hazards that a little tiny child in your house has to work with. Are you guarding against them, are you eliminating them? You can't always take care of your every little detail for the tiny baby. You can't watch him every moment, but you can at least provide a suitable place for him to play or creep that is going to be safe for him. I don't have to say anything more about a mother and father setting a good example for a tiny baby. It is known in school circles that children begin to form habits at the age of six months and they observe what father and mother does at that age and by the time they are four or five years old the habits are so very firmly fixed it takes a very decided system of education in our schools to obliterate them. They come home and see mother and father doing exactly the thing of which the teacher

in school says, "Don't do that, Johnnie," or "That isn't the right thing to do." You do it; it is done. Can't you tell the men in the shops not to do that? Wouldn't it be worth while to carry that lesson into the home?

Sometimes children like to follow the trial and error plan also. They like to do everything they see being done. They are curious, they want to experience all sensations. A child will fall into an accident because his curiosity leads him to find out what this thing is or what the effect will be if he does the thing he was told not to do. We can't help that, it is natural. The only thing we can do is to try to put away that hazard so the child's curiosity won't lead him to it.

CHAIRMAN BUHLIG: We have Mr. J. I. Banash, Consulting Safety Engineer, Chicago, to open the discussion.

MR. BANASH: We can't make engineers out of our wives, but we have by her method a real authoritative approach to house and home safety. You can't work in a manufacturing plant today unless you are a safe worker because you are safety supervised and taught and you have to do it, but when you get home you are your own boss, or you think you are, and you can be safe or not, as you please. As far as yourself is concerned that isn't so bad, but there is on you responsibility for the rest of the group in that house.

I want to say something about the rural communities. A farm is practically a factory. That is one reason we have so many accidents on the farm, not only in the home of the farm but on the farm itself. Almost every form of industry is indulged in by the farmer and we can't be expert on all of them.

Another point to keep in mind in electrical matters in the home is to do things with one hand only and put the other hand in the pocket and you are not likely to be injured by changing a plug.

Household mechanics have progressed to a considerable degree in the last three or four years. Industry is paying particular attention to the markets which are opening up through the increased use of utilities in the home, and I must say that the manufacturers have done pretty well in their initial attempt in various kinds of machines, especially the safeguards that they can design into those machines, with the cooperation and assistance of safety organizations such as the Underwriters Laboratories. If you are going to buy a household refrigerator of the mechanical variety I wouldn't advise anyone to buy one, unless it is approved by the laboratories. You are not supposed to know about refrigeration; it is not your business; it is theirs. They are a group of engineers who have no other tasks to do.

In this territory we have more fires in households on Sunday morning from fuel oil burners than in all the rest of the week put together. Why? Father has time to fool with it. (Laughter.) It happens; I am quoting statistics. Those are some of the incidental things that you run into in studying this question of home safety. You are really safer in a factory than in your home or on the streets. I want to impress on you men that the safety whistle does not blow at five o'clock.

J. E. THOMPSON (Toledo Safety Council, Toledo, Ohio): We found last year there were 23 home fatalities in Toledo in the first four months, nineteen in the second four months, and at the beginning of school we started a campaign against the home fatalities. What we did was ask our schools to submit lists of home hazards. We gave \$100 in athletic equipment for prizes, to the first, second and third schools. What happened? We gave them a little better than three months to complete their list. We had a bank in Toledo print 50,000 copies of the prize-winning list and they were distributed by the Boy Scouts to the homes. This year we have had a 32 per cent reduction over last year in home fatalities.

ADJOURNMENT

Wednesday, October 5, 1927

Chicago's Pageant of Safety

This Pageant, which was to have closed the Congress program on Friday afternoon, September 30, was postponed until the following Wednesday on account of weather conditions. At that time some 75,000 persons, most of them school children, gathered in Soldiers' Field stadium at Grant Park, forming undoubtedly the largest gathering ever assembled for a safety demonstration. Represented among the actors in the Pageant and among spectators were every public, private and parochial school in Cook County, automobile clubs, civic, fraternal, social, religious and other organizations.

Particularly impressive was the opening parade of 6,000 boys and girls, headed by the Lindblom and Senn High Schools, R. O. T. C., with their bands.

One division of the parade which attracted considerable attention was the memorial procession of 389 children; representing the boys and girls who were victims of fatal accidents in Chicago last year. Many of the paraders wore striking costumes, and numerous floats portrayed the dangers that confront youngsters on their way to and from school, at play and at home. Warnings against the perils of fire, the grade crossing hazard, contagious diseases and lessons regarding the importance of the tooth-brush, the value planned recreation and other points were presented. Floats were also entered by the Pullman Company, the Chicago Motor Club, the Public Service Corporation of Northern Illinois, and the West Park Board. Among other contributions to the success of the event, the Chicago Motor Club financed the transportation of the school patrol boys to and from the stadium.

A humorous touch was given to the event by the antics of a pair of rustic jay-walkers. Safety patrol boys gave a demonstration of how they protect the lives of children at crossings.

Twenty drivers of the Yellow Cab Company took part in an interesting demonstration of skillful driving, maneuvering their vehicles with the precision of infantry on parade.

Gold medals were awarded to two young heroes, Sidney Goldberg and Robert Styber, the medals being presented by Si Mayer, president of the Automobile Club of Illinois. Goldberg resuscitated a baby who had almost been drowned in a bathtub, and Styber saved the life of a baby and her nurse in Jackson Park when the perambulator fell into the lake.

Brief addresses were made by Edward J. Kelly, president of the South Park Board, and J. Lewis Coath, president of the Board of Education. The addresses were delivered over the public address system.

To the children the most interesting and exciting event of the afternoon was a demonstration of the fire extinguishing and life saving work of the Chicago Fire Department. A frame building, constructed especially for the occasion, housed an alleged descendent of Mrs. O'Leary's legendary cow. Inside the house were combustibles planned to produce a great deal of smoke and little flame. After a thrilling rescue of the cow, fire fighting apparatus from the City Fire Department arrived at the stadium and dashed around the field to the burning building. In addition to extinguishing the blaze, the city fire fighters gave a demonstration of the use of the life net and resuscitation.

INDEX

Volume III

- Accident Statistics: Grade crossing. In "Have our cities fallen down on their traffic job?" (Buttenheim) 60-61.
 "What we learn from statistics," (Kopf), 28-31.
- Automobile Driving: "Viewpoint of cab companies," (Cloud), 8-9.
 "Only some people have bad luck," (Dunlap), 74-79.
 See Lighting; speed.
- Barber, A. B.: "Plans of the National Conference on Street and Highway Safety," 39-45.
- Brakes: Discussion, 73.
- Brooks, R. B.: "Who is responsible for lack of law enforcement—courts, police, prosecutor, or public?" 46-48.
- Burnett, A. C.: "Community safety program at minimum cost," 68-70.
- Buttenheim, H. S.: "Have our cities fallen down on their traffic job?" 57-62.
- Cab Companies, see Automobile Driving.
- Campaigns: Discussion on American Roadbuilder's Association Campaign, 86-87.
- Charities, see United Charities of Chicago.
- Cloud, W. W.: "Viewpoint of cab companies," 8-9.
- Clubs, see Motor Clubs.
- Community Safety, see Public Safety.
- Community Safety Councils: "Community safety program at minimum cost," (Burnett), 67-70.
 "Viewpoint," (Hardgrave), 14-17.
- Compulsory Insurance, see Insurance.
- Conferences: "Plans of the National Conference on Street and Highway Safety," (Barber), 39-45.
- Debate: "Should the speed limits be abolished?" 112-124.
- Drexler, L. A.: "Safety at grade crossings," 88-93.
- Dunlap, K.: "Why some people have bad luck," 74-79.
- Eldridge, H. W.: "Taking stock of the community accident problem," 53-57.
- Electric Railways: "Viewpoint of the electric railways and utilities," (Webb), 7-8.
- Enforcement, see Traffic Laws.
- Fish, L. C.: "Traffic law enforcement," 32-35.
- Forney, R. L.: "What is the home accident problem?" 132-136.
- Grade Crossings: In "Have our cities fallen down on their traffic job?" (Buttenheim), 60-61.
 "Safety at grade crossings," (Drexler), 88-93.
 "Safety at grade crossings," (Hill), 93-96.
- Grade Crossings—Signals: Discussion, 79-80.
- Harnett, C. A.: "Opening address," 36-39.
- Hayes, C. M.: "Viewpoint of the motor clubs," 9-11.
- Hardgrave, A.: "Viewpoint of the community safety council," 14-17.
- Headlights, see Lighting. Automobiles.
- Hill, C. E.: "Safety at grade crossings," 93-96.
 "Viewpoint of the railroads," 3-6.
- Home Safety: "As the home keeper sees it," (Mahoney), 138-140.
 "Developing a community program for home safety," (Neuberger), 128-131.
 "What accidents mean to the United Charities," (Hunter), 125-128.
 "What is the home accident problem?" (Forney), 132-136.
- Home Safety Session: Minutes, 125-141.
- Hunter, J. D.: "What accidents mean to the United Charities," 125-128.
- Insurance—Compulsory: Discussion, 51-52.
- Junior Police, see Police.
- Junior Safety Councils: "Reducing accidents through Junior Safety Councils," (Owen), 82-85.
- Kopf, E. W.: "What we learn from statistics," 28-31.
- Laws: "Who is responsible for lack of law enforcement—courts, police, prosecutor, or public?" (Brooks), 46-48.
 See also Traffic Laws.
- Lefferts, E. B.: "Regulation of pedestrians," 19-22.
- License Laws, see Traffic Laws.
- Lighting—Automobiles: Discussion, 48-51.
- Mackall, J. N.: "Should the speed limits be abolished?" 112-120.
- Mackall, K. W.: "Recent developments in the control of traffic," 97-107.
- McClintock, M.: "Uniform traffic regulations," 24-27.
- Mahoney, Mrs. B. W.: "As the home keeper sees it," 138-140.
- Mattison, W. J.: "Should the speed limit be abolished?" 120-123.
- Motor Clubs: "Viewpoint of the motor club," (Hayes), 9-11.
- National Conference on Street and Highway Safety: Plans, (Barber), 39-45.
- Neuberger, Dr. B.: "Developing a community program for home safety," 128-131.
- Owen, C. C.: "Reducing accidents through Junior Safety Councils," 82-85.
- Pageant of Safety: Program, 141.
- Pedestrians: Discussion, 22-24.
 "Regulation of pedestrians," (Lefferts), 19-22.
- Police Departments: Junior patrols. In "Viewpoint of the Motor Club," (Hayes), 11.
- Powell, W. B.: "Progress toward standardization of signs," 109-111.
- Power, T. F.: "Viewpoint of the school," 12-14.
- Public Safety: "Community safety programs at minimum cost," (Burnett), 68-70.
 "Opening Address," 36-39.
 "Taking stock of the community accident problem," (Eldridge), 53-57.
- Public Safety Division: Minutes, 3-124.
- Public Utilities: "Viewpoint of the electric railways and utilities," (Webb), 7-8.

- Railroads: "Viewpoint of the railroads," (Hill), 3-6.
- Schools—Safety Work With: "Viewpoint of the schools," (Power), 12-14.
See also Junior Safety Councils.
- Signals, see Grade Crossings—Signals.
- Signals—Traffic: Discussion, 107-108.
"Recent developments in the control of traffic," (Mackall), 97-107.
- Signs: "Progress toward standardization of signs," (Powell), 109-111.
- Simpson, H. S.: "Accidents as symptoms of traffic ills," 63-68.
- Speed: "Should the speed limit be abolished?" (Mattison), 120-123.
"Should the speed limits be abolished?" (Mackall), 112-120.
- Statistics, see Accident Statistics.
- Surveys, see Traffic Surveys.
- Taxicabs, see Automobile Driving.
- Traffic: "Accidents as symptoms of traffic ills," (Simpson), 63-68.
Discussion on St. Louis traffic council, 70.
- "Have our cities fallen down on their traffic job?" (Buttenheim), 57-62.
- "Plans of the National Conference on Street and Highway Safety," (Barber), 39-45.
- "Recent developments in the control of traffic," (Mackall), 97-107.
- Taking stock of the community accident problems," (Eldridge), 53-57.
- Traffic Laws: In "Plans of the National Conference on Street and Highway Safety," (Barber), 41.
- "Traffic law enforcement," (Fish), 32-35.
- "Uniform traffic regulations," (McClintock), 24-27.
- Traffic Surveys: "Taking stock of the community accident problems," (Eldridge), 53-57.
- Uniform Traffic Regulations, see Traffic Laws.
- United Charities of Chicago: "What accidents mean to the United Charities," (Hunter), 125-128.
- Webb, H. F.: Viewpoint of the electric railways and utilities," 7-8.